Proceedings of the 9th European Conference on Innovation and Entrepreneurship
University of Ulster Business School and School of Social Enterprises Ireland
Belfast, UK
18-19 September 2014

Edited by Brendan Galbraith

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ECIE 2014

University of Ulster and School of Social Enterprises Ireland
Belfast, UK

18-19 September 2014

Edited by
Dr Brendan Galbraith
University of Ulster
Belfast, UK
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Many thanks to the reviewers who helped ensure the quality of the full papers.

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Preface

These proceedings represent the work of contributors to the 9th European Conference on Entrepreneurship and Innovation (ECIE 2014), hosted this year by University of Ulster Business School and the School of Social Enterprises Ireland, Belfast, UK, on the 18-19 September 2014. The Conference Co-Chairs are Dr Brendan Galbraith, Dr Sandra Moffett, University of Ulster, Belfast, UK, Professor Ken O’Neill and Professor Jackie McCoy, School of Social Enterprises Ireland.

ECIE continues to develop and evolve. Now in its 9th year the key aim remains the opportunity for participants to share ideas and meet the people who hold them. The scope of papers will ensure an interesting two days. The subjects covered illustrate the wide range of topics that fall into this important and growing area of research. The theme of this year’s conference is ‘Societal-driven Innovation and Entrepreneurship’ and we are pleased with the range of research that has been submitted this year on the topic.

The opening keynote presentation is given by Micheal Pyner, Social Entrepreneur and Creative Advisor and will address the topic of “Innovating for Community Good”. This is followed by Dr Stephen E. Cross, Executive Vice President of Research, Georgia Institute of Technology, USA – who will speak on the topic of “The influence of social courage on innovation ecosystems” and Fr Myles Kavanagh CP, Flax Trust, Northern Ireland, UK will give a talk entitled “A blast from the past”. Our final keynote will be delivered by Mr. Roberto Santoro (Italy) President of the European Society of Concurrent Engineering Network (ESoCE Net) on the topic of “People Olympics for Healthy and Active Living: A People Driven Social Innovation Platform”.

In addition to the main themes of the conference there are a number of specialist mini tracks on topics including Innovation and strategy, Entrepreneurship education in action, The theory and practice of collaboration in entrepreneurship and Challenges for entrepreneurship and innovation n the 21st Century.

With an initial submission of 178 abstracts, after the double blind, peer review process there are 56 Academic Research papers, 1 Master Research paper 2 Non Academic papers, 13 PhD Research papers and 1 work-in-progress paper published in these Conference Proceedings. These papers represent research from Australia, Brazil, Canada, Chile, Cyprus, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Iceland, Indonesia, Italy, Kazakhstan, Kuwait, Lithuania, Malaysia, Mexico, Northern Ireland, Poland, Portugal, Romania, Russia, Slovenia, South Africa, Spain, Taiwan, UK, USA.

Dr Brendan Galbraith
University of Ulster Business School, Belfast, UK
September 2014
Conference Committee

Conference Executive
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Dr Christos Apostolakis, Bournemouth University UK
Dr Fernando Romero, University of Minho, Portugal
Claire Auplat, Novancia Business School Paris, France
Sonia Ben Slimane, Novancia Business School Paris, France

Committee Members
The conference programme committee consists of key people in the entrepreneurship and innovation community, both from the UK and overseas. The following people have confirmed their participation:

Dr. Kamarulzaman Ab. Aziz, Multimedia University, Malaysia; Ass.Prof.Dr. Zafer Acar, Okan University, Istanbul, Turkey; Dr. Bulent Acma, Anadolu University, Turkey; Dr. Hassanali Aghajani, University of Mazandaran(UMZ), Iran; ; Jaione Aguirre,Tekniker technological centre, Spain; Prof. Ruth Alas,Estonian Business School, Estonia; Dr. Laurice Alexandre Le-claire, Sorbonne Paris Cité University, France; Dr. Saleh Al-Jufout, Tafila Technical University, Jordan; Prof. Khedijda Allia, University of Science and Technology. Algiers, Algeria; Dr. Hanadi Al-Mubarakji, Kuwait University, Kuwait; Dr. Morariu Alunici, "Stefan cel Mare" University of Suceava, Faculty of Economics and Public Administration, Romania; Dr. Rumen Andreiev, Bulgarian Academy of Sciences, Sofia, Bulgaria; Dr. Zacharoulia Andreopoulou, Aristotle University of Thessaloniki, Greece; Dr. Christos Apostolakis, Bournemouth University, UK; Erik Arntsen, University of Agder, Kristiansand, Norway; Omid Askarzadeh, Polad Saab Shargh, Tehran, Iran; Samantha Aspinall, University of Leeds, UK; Dr. Claire Auplat, Imperial College Business School, London, UK; Prof. Miroslav Baca, University of Zagreb, Varaždin, Croatia; Prof. Alina Badulescu, University of Oradea, Romania; Susan Bagwell, London Metropolitan University, UK; Dr. Tabarak Ballal, The University of Reading, UK; Prof. Dr. Mihai Berinde, University of Oradea, Faculty of Economics Sciences, Dept. of International Business, Romania; Prof. Cristin Bigan, Ecological University of Bucharest, Romania; Prof. Dr. Ferrucio Bilich, University of Aveiro, Portugal; Prof. Dr. Dietmar Boenke, Reutlingen University, Germany; Ana Maria Bojica, University of Granada, Spain; Tina Bratkovic, University of Primorska, Slovenia; Dr. Alexander Brem, University of Erlangen-Nuremberg, Germany; Fraser Bruce, University of Dundee, UK; Dr. Cagri Bulut, Yasar University, Izmir, Turkey; Dr. Cagri Bulut, Yasar University, Turkey; Jeffrey Burke, National Pollution Prevention Roundtable, Washington DC, USA; Kevin Burt, University of Lincoln, UK; John Kaiser Calautit, University of Leeds, UK; Prof. Luisa Carvalho, Institute Polytechnic of Setubal, Portugal, Portugal; Dr. Toly Chen, Feng Chia University, Taichung, Taiwan; Kuo-Sheng Cheng, National Cheng Kung University/Institute of Biomedical Engineering, Taiwan; Prof. Chuang-Chun Chiou, Dayeh University, Changhua, Taiwan; Dr. Nick Clifton, Cardiff Metropolitan University, UK; Prof. Costas N. Costa, Cyprus University of Technology, Lemesos, Cyprus; Prof. Teresa Costa, Instituto Polit cino de Set bal | Escola Superior de Ci ncias Empresarialis, Portugal; Dr. Fengzhi Dai, Tianjin University of Science and Technology, China; Dr. Leo-Paul Dana, University of Canterbury, Christchurch, New Zealand; Sven H. de Cleyn, University of Antwerp, Antwerp, Belgium; Prof. Armando Carlos de Pina Filho, Federal University of Rio de Janeiro, Brazil; Maria Chiara Demartini, University of Pavia, Italy; Dr. Izabela Dembińska, University of Szczecin, Poland; Carine Desleeve, University of Lille 2- IMMD, France; Charles Despres, Conservatoire des Arts et Metiers, Paris, France; Dr. Prof. Anca Dodescu, University of Oradea, Romania; Prof. Dr. Michael Doellinger, University Hospital Erlangen, Germany; Dr. Nelson Duarte, Porto Polytechnic - School of Management and Technology, Portugal; Dr. Smile Dzisi, Koforidua Polytechnic, Ghana; Prof. Vasco Eiriz, University of Minho, Portugal; Dr. Hatem El-Gohary, Birmingham City University, UK.; Dr. Scott Erickson ,Ithaca College, USA; Prof. Engin Deniz Eris, Dokuz Eylül University, Turkey; Dr. Mahtab Farshchi, London South Bank University, UK; Prof. Luis Fé De Pinho, Universidade Lusíada de Lisboa, Portugal; Prof. Paula Odete Fernandes, Polytechnic Institute of Bragança, Portugal; Prof. João Ferreira, University of Beira Interior, Covilhã, Portugal; Prof. Maria Joao Ferreira, Departamento de inovação, Ciência e Tecnologia, Portugal; Adriana Fillo Mazo, Delegation of the government of Andalusia in Brussels, Belgium; Dr. Heather Fulford, Aberdeen Business School, UK; Dr. Erdei Gábor, University of Debrecen, Hungary; Brendan Galbraith, University of Ulster, UK; Dr. Laura Galloway, Heriot-Watt University, Edinburgh, UK; Prof. Dr. Ramaswamy Ganesan, Asia-Pacific Institute of Man-
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Biographies

Conference Co-Chairs

Brendan Galbraith is an innovation academic in the Department of Management and Leadership at the University of Ulster. Brendan is a member of the European Network of Living Labs, Business and Management Research Institute, and Connected Health Ulster. Brendan has led EC and national innovation and research projects that are valued at more than £4 million and has published his research in Technovation, R&D Management, International Journal of Operations and Production Management and Technology Analysis and Strategic Management. His research interests are technology transfer, innovation intermediaries and social innovation.

Professor Ken O’Neill is Professor Emeritus of Entrepreneurship and Small Business Development at the University of Ulster. He is also Chair of the School for Social Enterprise in Ireland and of the Centre for SME Development in the university’s Business School. He sits on the Academic Advisory Council of the Chartered Management Institute, is a member of the Governing Body of Belfast Metropolitan College, a director of the Westminster-based, all-party SME group - The Genesis Initiative, and of the International Small Business Congress as well as a non-executive director of a number of not-for-profits and SMEs. His roles have included President of the International Council for Small Business, President of the UK Institute for Small Business Affairs, Board member of the UK’s CBI SME Council, UK Vice-President of the Institute of Business Advisors, member of the BBC Broadcasting Council for NI and Chairman of Young Enterprise (N.I.) Ltd.

Jackie McCoy is Professor of Management Development at the University of Ulster. Former Director of the Business Institute and Head of the Department of Marketing, Entrepreneurship & Strategy, and Jackie is currently Director of the University of Ulster QA Business School Partnership based at the London Branch Campus. Jackie is a founder member of the School for Social Enterprises in Ireland and has been responsible for the design and delivery of a wide portfolio of business development initiatives targeted at third sector organisations with a particular focus on social enterprises. She was awarded the Distinguished Community Fellowship by the University of Ulster in 2004 in recognition of her outstanding contribution to the development of the social economy on the island of Ireland.

Dr Sandra Moffett Senior Lecturer of Computer Science with University of Ulster’s School of Computing and Intelligent Systems, Magee Campus. Core member of Business and Management Research Institute. Expertise on Knowledge Management contributes to her being one of UK leading aut hors in this field. Received a number of research awards and citations for her work. External funding has enabled Dr Moffett to undertake extensive quantitative/qualitative research to benchmark KM implementation within UK companies.

Programme Chair

Paul Humphreys is the Director of the Business and Management Research Institute at the University of Ulster and is an Associate Editor at Leadership and Organization Development Journal. Paul has published extensively in a variety of top tier journals and has secured prestigious external funding in a variety European and UK funding bodies. His research interests are in the area of supply chain management and operations management.

Keynote Speakers

Roberto Santoro is the President of the European Society of Concurrent Engineering Network (ESoCE Net). Roberto is the President of the European Society of Concurrent Enterpriseing Network (ESoCE Net), which brings together academics, researchers and industry professionals to stimulate the exchange of theory, practice and development in the field of concurrent engineering, enterprise and collaborative innovation. He is also Managing Director of Collaborative Engineering, which supports the creation, development and commercialisation of new ICT based products and services, and Chair of the AMI@Work (AMBient Innovation AT Work) Family of Communities, a Europe-wide community of more than 5,000 members. He has contributed in a leading role to the establishment of the European Network of Living Labs (ENoLL) since 2005, chairing the Governance Task Force and being nominated ENoLL Acting Council Chair in 2009. During 2010 he launched the Living Lab Summer School and the Living Lab Prize. Roberto developed the conceptual and operational frameworks for Virtual Professional and User Communities, and for Living Labs in Open Innovation Functional Regions and their enabling role within the “Concurrent Innovation” paradigm. In 2011 he supported the creation of LLABS Domain Net-
work in the areas of e-Health&Wellbeing, Energy and Media. In 2013 he launched the initiative PEOPLE OLYMPICS for Healthy Living and Social Innovation.

Micheal Pyner is an award winning entrepreneur and advisor, who works internationally He differentiates himself by bringing a hugely successful track record in delivery to bear on policy and strategy approaches. He works to enable change, resolve differences in communities, manage conflict and generate growth through re-localising economies. Micheal offers expertise in cross sector relationship management and reconciliation. He has delivered projects valued at over £270m in the last 10 years working across sectors, brokering and managing complex relationships ensuring real and sustainable change in diverse localities.

Myles Kavanagh's early academic studies were in Dublin, his philosophy was in Scotland and he returned to Dublin for his theology. In 2004 he received an honorary Doctorate from the University of Ulster for his services to Social Enterprise. For 53 years he has lived in one of Northern Ireland's "black spots", The Ardoyne area in North Belfast, where he has experienced killing and inter-community strife. This area has higher levels of unemployment than perhaps any other area in Northern Ireland. In 1977 he set up the Flax Trust to bring about reconciliation through economic development. Since then he has been responsible for establishing a wide variety of projects and providing help to many charities, including an incubation system which produced over 300 business' in 5 years. His battle against social deprivation and unemployment lead to the development of a Housing Association which lead to the development of housing and other facilities for all members of the community. His knowledge and expertise in the field of community economics means he is frequently invited as a guest speaker to conferences in Ireland (North and South), England, Scotland, North America and Canada.

Mini Track Chairs

Dr Christos Apostolakis holds an MA in Business Administration from Bournemouth University, an MA in Public Administration and Public Policy from the University of York, and a Ph.D. from De Montfort University – Leicester all of them in the UK. He currently works as lecturer in Strategy at Bournemouth University Business School whilst at the same time he holds the post of the School’s Masters Programme Leader. He has published and presented extensively on social entrepreneurship as well as he has

Claire Auplat is a professor of innovation and strategy at Novancia Business School Paris and a director of Research at Dauphine University. She is a member of the French Research Council (ANR) specialist committee on eco-innovation (ECOTECH). She coordinates the LABEX research chair in Nanotechnologies, Ecodesign, Innovation and Strategy. Her areas of interest cover public policy and entrepreneurial dynamics, innovation and sustainable development. She has published widely in these areas and her most recent publications include Nanotechnology and Sustainable Development (Routledge), and ' The challenges of nanotechnology policy-making', Global Policy, 4(1):101-107 (2013)

Dr Luisa Carvalho is an Assistant Professor at the Open University, Lisbon, Portugal and a Researcher at the Centre for Advanced Studies in Management and Economics (CEFAGE), University of Évora. She received her PhD in Management from the University of Évora (Portugal). As a guest professor in international universities she teaches courses on master and PhDs programs. She is the author of several articles published in scientific journals, international conference proceedings, books and book chapters. Her current research interests are in the areas of entrepreneurship, innovation, internationalisation and the services sector.

Alex Kakouris lecturer in entrepreneurship and innovation at the University of Athens. He holds a Ph.D. in Physics and a M.Sc. in Adult Education. He has been involved in entrepreneurship research since 2006, involved mainly with educational issues. His special interest concerns fostering of entrepreneurship and innovation to science graduates and support of youth entrepreneurship through counselling. He also specialises in nascent entrepreneurship and virtual business planning.
Dr Fernando Romero holds an MA in Technology Policy and Innovation Management from the University of Maastricht (NL), and a Ph.D. in Science and Technology Studies from the University of Manchester (UK). He is at the Production and Systems Engineering Department, and at the Centre for Research in Industrial and Technology Management, in the University of Minho (PT). He lectures and publishes in the area of industrial innovation, innovation systems and innovation management.

Sonia Ben Slimane is associate professor of innovation, and holder of the LABEX Chair in Nanotechnologies, Ecodesign, Innovation and Strategy at Novancia Business school. She participated to scientific projects related to the systemic approach of innovation for ministry, institutional, and national agencies in France. Her field of expertise covers mainly innovation, sustainable development, financing innovation, and technological transfer. She published some of her research results in international journals.

Doan Winkel is an Assistant Professor of Entrepreneurship at Illinois State University. Doan promotes learning by doing in his courses (http://teachinglean.com), and promotes this method through his leadership roles within ISU, through USASBE (http://www.usasbelaunch.org), NACCE, the Coleman Fellows program and beyond.

Dr Heather Fulford is a Reader in Entrepreneurship and Academic Director of the Centre for Entrepreneurship at Aberdeen Business School, Robert Gordon University, Scotland. Her research interests include entrepreneurship education and education resources, the language of entrepreneurs, social enterprise start-up and social entrepreneurship education. She is currently supervising a number of doctoral students in aspects of entrepreneurship, entrepreneurship education and social entrepreneurship. She delivers courses at postgraduate and undergraduate level on new venture creation. Heather is a visiting Fellow at Loughborough University, a Member of the British Computer Society, and a Fellow of the Chartered Institute of Linguists.

PhD Colloquium Chair

Biographies of Presenting Authors

Joseph Evans Agolla is currently a lecturer at the Botswana College of Distance and Open Learning, and a PhD (Business Management) candidate at North-West University Mmabatho, republic of South Africa. Agolla is also a regular reviewer of Management Decision Journal published by Emerald Publishing Company. Agolla has published several peer and refereed articles widely in business and management journals.

Hamid Alalwany has more than twenty years of cross-disciplinary experience gained in the fields of information systems management, systems design, quality assurance as well as the applications of sustainability innovations and entrepreneurs in sustainable development. During this period, he has held positions as Director, Information Systems Consultant, Senior Engineer, Project Manager, and Principal Researcher.

Marina Arkhipova graduated from MESI in 1987 as economist-mathematician. She received her PhD in economics in 1999 and Doctor of Sciences in 2007. She is now working for the National Research University Higher School of Economics and for Trapeznikov Institute of Control Sciences of Russian Academy of Sciences. Marina is also an author of 190 papers, 8 monographs, and supervisor of four PhD students.

Yulia Balycheva PhD student, research associate, Central Economics and Mathematics Institute of Russian Academy of Sciences, Moscow, Russia.

José Barata is an Assistant Professor of Economics, R&D Management and Industrial Organization at the School of Economics and Management of the Technical University of Lisbon, (ISEG/UTL). Professor Monteiro-Barata holds a PhD in Economics
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**Fernando Barbosa** is an invited lecturer in the Department of Production and Systems Engineering at the Engineering School of the University of Minho. He holds a B.Sc. in Management from Portucalense University, and an M.Sc. in Industrial Engineering from the University of Minho. He is a Business Consultant and Trainer in several organizations.

**Julio Batle Lorente** has an MBA from the University of Middlesex (1991) and a PhD in Economics from the University of the Balearic Islands (UIB) (1996). He has been a Researcher in UIB since 1992 and he has been Director of the Masters in Tourism Planning and Management since 2007. He is also Director of UIB Entrepreneurship Chair since 2006.

**Radek Blahus**, Ph.D. student at the Tomas Bata University in Zlin, Faculty of Management and Economics, is very interested in enhancing of potential of employees especially in field of creativity and innovation. He is also interested in experiential education and its possibilities for development of individual employees as well as teams.

**Markus Bodemann** studied Economics and Business Law in Hamburg and Kassel / Germany; since 2013 student at the Bucharest University of Economic Studies, Romania 2005 – 2011 project manager for the introduction of double-entry-bookkeeping in municipalities in Germany from 2005 – 2011; current main field is to optimize processes to cope with decisions and developments under uncertainty.

**Jan-Patrick Cap** is a senior researcher and consultant in Innovation and Benchmarking at Fraunhofer Institute for Production Systems and Design Technology, Berlin. He holds degrees from RWTH Aachen University, Tsinghua University (Beijing) and Collège des Ingénieurs (Paris) and has long-term research and consulting expertise in China, USA, Europe and Brazil.

**Brian Cleland** is a PhD candidate with the Ulster Business School, University of Ulster, where he is researching “Open Innovation Practices in the European Public Sector”. He has over 20 years experience of working in the IT sector, and has recently been working as a researcher in the area of e-participation.

**Eliza Laura Coras** My field of work is credit risk management but during my ten year experience in the banking industry I have accumulated extensive knowledge on all banking processes and risks. In am currently advancing my business risk knowledge and intrapreneuring experience by attending a PhD programme at the Bucharest University of Economic Studies. My research is focused in risks in the innovation process and my practical studies are aimed to open innovation practices.

**Dorotéa Bueno da Silva** is Ph.D. Student in Industrial and Systems Engineering at the Production and Systems Department, School of Engineering, University of Minho, Portugal. She obtained a Master degree in Industrial Engineering at the Production Engineering Post-Graduate Department, Paraiba Federal University, Brazil after graduating in Psychology at the Paulistana University, Brazil. The theme of her doctoral research is evaluation of innovation programs for SME, with a special focus on the evaluation of their indirect effects.

**Karan Dakup** is a doctoral candidate with the Aberdeen Business School, Robert Gordon University. Her research interests include green procurement, waste management, green supply chain management, sustainable development and continuous improvement. Her current research focuses on the adoption of green initiatives in SMEs.

**Laura Di Giunta**’s current research focuses on the continuity and change of individual differences in predicting youth (mal)adjustment, accounting for socialization and culture factors. She also investigates individual differences in youth entrepreneurs in partnership with the Regional Government of Lazio (Italy) to evaluate policy implementation to encourage youth to engage in jobs that revitalise cultural heritage.

**Dr. Philip Dover** has spent much of his academic career in executive education, working with multinational firms on the topic of business strategy and strategic market planning. He also worked in marketing positions for BP and Nestlé and is now Chair of the Marketing Division and Faculty Director at Babson Executive Education, Babson College. He is a co-founder of the MEL-Institute.

**Dr. Andreas Efstathiades** is a Full Professor at European University Cyprus. He holds a BEng (Hons) degree from the Engineering Council (UK), an MPhil and PhD degrees from Brunel University UK. His research work is concentrated in the thematic areas of Technology Management, Innovation and Entrepreneurship in the Small and Medium Size enterprises.

**Emmanuel Frémiot** After graduating with a doctorate from the University of Paris Dauphine, Emmanuel Frémiot worked in the IT sector before becoming a venture capitalist and eventually focusing on teaching and research. His research work is articulated around the funding of innovation, innovative start-ups, and policies designed to promote research.
Karl Friðriksson is Managing Director at Innovation Center Iceland. Karl is authored of books on Product Development and Future Studies i.e. Scenario Planning. He is certified international Project Manager and a professional Product Development facilitator from PDMA in the USA and certificated as Cluster Expert by EFCF.

Anna Glaser is assistant professor of business policy and strategy at Novancia Business School Paris. She is a member of the French observatory of competitiveness clusters at Mines ParisTech and the LABEX research chair on Nanotechnologies at Novancia. Her research concentrates on cluster policies, cluster governance, and factors that facilitate the genesis of inter-organizational collaborations.

Oleg Golichenko has a degree of Doctor of Economic Sciences. He is a chief research associate at the Central Economics and Mathematics Institute of the RAS. He is also a professor at the National Research University Higher School of Economics and the Moscow Physics and Technique Institute in Moscow, Russia. His research interests are related to investigation of innovation development processes on micro-macro economic levels and design of social economic and innovation policy. He is an author of more than 200 scientific publications.

Izold Guihur is professor of management at Université de Moncton, in Canada. Her fields of interest are innovation and entrepreneurship, particularly within small and medium-sized businesses. Her research includes in-depth study into the phenomenon of innovation as a dynamic capacity of an enterprise, especially when related to strategies of cooperation and growth.

Steen Hoestrup is Associate professor in the Department of Education at the University of Aarhus. Copenhagen, Denmark. His research interests are in the areas of Workplace learning and Employee-driven Innovation. He is a Member of the EDI-network: The European network of Employee driven innovation and workplace learning. Recent publications include Hoestrup, S., et al (Ed.) (2012). Employee-driven innovation: a new approach. New York: Palgrave Macmillan.

Denisa Hrusecka is a PhD candidate at Tomas Bata University in Zlin – Faculty of Management and Economics. In 2009, she received a Master’s degree in Industrial Engineering. Her current research involves advanced methods for production planning and scheduling and their support in business information systems. She also deals with process innovation and logistics. She teaches several subjects at Tomas Bata University in Zlin such as Business Information Systems, Logistics, Production Management or Industrial Engineering.

Danut Iorga is a PhD student at the Doctoral School of Entrepreneurship, Business Engineering and Management, UPB, Romania. He has a bachelor’s degree in Avionics. As an ASQ senior member, Danut is certified as Six Sigma Black Belt, with more than 200 Improvement and Design Projects in companies such as NCH Group and Accenture.

Simona Jegeleviciute is a Pd. D. student at Kaunas University of Technology, Lithuania. She is also a lecturer at the Accounting department, Kaunas University of Technology. She holds a master degree in Finance Management and a bachelor degree in Economics. Her doctoral research focuses on the impact crowdfunding has on value creation.

Paivi Jokela is a Postdoctoral Researcher at Turku School of Economics, University of Turku, Finland. Her research focuses on business networks, business ethics and entrepreneurship in diaspora networks.

Eva Jurickova is a senior lecturer of innovation at Tomas Bata University in Zlin, Faculty of Management and Economics. She received her PhD in Economics and Management from the TBU in Zlin. Her major research interests include industrial engineering, innovation, creativity and patents. She has authored a number of articles and she cooperates in several innovation projects.

Algerim Kaumenova is responsible for international cooperation, accreditations and rankings at International Academy of Business. She holds MA degree from University of Aberdeen in International Relations and Management and MSc degree from University of Exeter in International Management, Entrepreneurship and Innovation; a DBA student at International Academy of Business, the area of research is social entrepreneurship. Has experience in teaching Business Planning in English to master level students.

Olga Kazina has a Master of Arts in Cultural Management. She is Director of the Creative Industries Agency, and Deputy Head of the Project Centre «Creative Moscow». She is Curator and co-organizer of the all-Russian distance education program School for Creative Entrepreneurs and an Organizer of the Creative Business Cup competition in Russia. She is Author of publications on creative cities and cultural management.

Jens Kohler works as a PhD candidate at the Institute for Enterprise Computing at the University of Applied Sciences in Mannheim. His research focuses security architectures and their implementation in distributed Cloud Computing environments.
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Chih-You Lee is a Business Administration PhD student, National Sun Yat-Sen University in Taiwan, is committed to research management phenomenon by narrative inquiry approach and community of practice theory. The main research areas at present focus on entrepreneurship, learning, and entrepreneuring.

John Liptak is the Associate Director of Career Services at Radford University. He works with college students interested in starting a business after college. John conducts considerable research on the topic of entrepreneurial readiness and developed an assessment titled the Entrepreneurial Readiness Inventory. He also conducts workshops based on his book Entrepreneurship Quizzes.

Joan Lockyer is Assistant Director, Institute of Applied Entrepreneurship, Coventry University. Joan is responsible for the development and delivery of the academic programmes offered by the IAE and for its research strategy. In addition, Joan also leads on or supports the delivery of a number of European projects.

Ilidio Lopes is Professor and researcher at ISCTE Business School – University Institute of Lisbon. Graduate in Business Administration, he obtained a Master Degree in Statistics and Information Management and a PhD in Management, Specialization in Accounting (University of Coimbra, Portugal). Researcher in the fields of: Knowledge Management, Management and Financial Accounting, Management Control Systems, and Research Methodologies.

Lawrence Loughnane is the University of Limerick awarded Lawrence his Ph.D. He has over twenty-five years of business experience and has taught at the Undergraduate, Master and Ph.D. levels in Ireland, Spain, Mexico and the US. He worked as a consultant to small, medium and large businesses in both technical and senior management positions.

Maria Jesus Luengo-Valderrey PhD, is Associate Professor at Department of Management Evaluation and Business Innovation, at the University of the Basque Country (Spain). She has managed some research projects and at present time, she is the coordinator to the project “Strategies to optimize innovation resources in Spanish high and medium technology Enterprises”. She has contributed to scholar area with international articles and books. Her current work focuses on knowledge management, intellectual capital and innovation.

Douglas MacDonald is an Associate Professor (Entrepreneurship) with the Bissett School of Business, Mount Royal University, Calgary, Alberta, Canada. His research interests include the Knowledge Management Processes of Growth-oriented SMEs and the emerging “Lean Start-Up Movement”.

Selma Martins has a degree in Nursing from Nursing School of Coimbra, Portugal, 2007 and a Master in Management of Health Units from the University of Minho, Portugal. She has been a Generalist Nurse in Valladolid, Spain, since 2008.

Veronica Mašínová is a postgraduate student in the Faculty of Economics at the Technical University of Liberec. In 2011 she received an engineering degree from the same faculty. She is a member of the Marketing Department where she specializes in marketing research with a focus on E-commerce. In her thesis she engages in online shopping and in factors influencing e-customers’ decisions.

Ronak Massand is a recent graduate from Brown University where he earned a Master’s degree in Innovation Management and Entrepreneurship. Currently, he is the Co-Founder & CEO of Parkloco, a location-based parking spot-availability app that helps people find parking spots in real time.

Adam Mazurkiewicz is Prof., CEO at the Institute for Sustainable Technologies - National Research Institute, Radom, Poland. Supervisor and expert in research projects – systems engineering, machine construction and maintenance, materials engineering, technology transfer, foresight. He is an expert in FP6, COST, Polish interdisciplinary research groups and head of a few strategic national and international programmes. He is author of 300 publications including 15 monographs.

Chris Moon is an award winning social and eco-entrepreneur with a Phd from Imperial College. He is the founder of several eco businesses and formerly Head of Sustainability at two leading companies. He has consulted to large and small business and is Senior Lecturer, Eco-entrepreneurship, Middlesex University Business School.

Rodrigo Jose das Neves Morais is Adjunct Professor at the Polytechnic Institute of Tomar (IPT), Portugal. His academic background includes a Master’s degree in Health Management Resources, from the Polytechnic Institute of Tomar (IPT), and Graduation of Management and Administration of Health Services. He is a research fellow in NECE. Expertise: Entrepreneurship, Business Creation, Knowledge Management.
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Pavla Odehnalov, Ph.D. works on the position of Assistant professor on the Department of Business Economics, Faculty of Economics and Administration, Masaryk University Brno, Czech Republic. Her specialization is family business, she also teaches management and marketing. She participates on the researches of the Masaryk University as Competitiveness of Czech enterprises that took place in years 2006 - 2009 and Crossborder-cooperation that took place in years 2012-2014.

Ruslan Pavlov is a senior researcher at the Central Economics and Mathematics Institute, and post graduated from the same institution. His research interests include the diversification of business within a context of the long waves theory; institutions of social entrepreneurship as factors of social innovations.

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Lucy Richardson is General Manager for Australian environmental not-for-profit organisation, Condamine Alliance. Based in Toowoomba, Queensland, she has led the organisation’s science and information management components for almost 10 years and is a strong supporter of knowledge sharing and collaborative action.

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Assessment of Innovation in Public Sector Organisations in Kenya

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Abstract: The purpose of the present study was to assess innovation in Kenyan public sector organisations. Qualitative and quantitative approaches to data collection and analysis were utilised. Middle managers and non-managerial employees of two public sector organisations (PSOs) participated in focus group discussions and completed self-administered questionnaires respectively. Sixteen managers (2 groups of 8 each) were interviewed in the focus groups and these data were analysed by extracting common themes. Of the 400 questionnaires distributed among employees, 230 were returned, but only 181 were usable. The measuring instrument consisted of a total of 102 5-point Likert type items and a brief biographical scale. A theoretical model of the relationships among drivers, barriers and innovation outcomes in PSOs was developed from literature, and the model was analysed by means of structural equation modelling utilising the AMOS programme. Firstly the main drivers, barriers and innovation outcomes in the public sector organisations were identified. Secondly the findings revealed that, there is little innovation in the two public sector organisations investigated. Thirdly, results of the qualitative and quantitative analyses showed contradictions between managers and employees on the factors perceived to be drivers of innovation in the public sector organisations, which were not only inconsistent within the present study, but also differed from previous studies. Despite this discrepancy, the present study contributes to the public sector innovation by developing a model that could further be refined in future studies to enhance the understanding of innovation in the public sector organisations. The present paper contributes to the body of knowledge through an extension of the literature in the field of public sector organisations and also by opening avenues for scholarly debate.

Keywords: assessment, developing countries, innovation, Kenya, public sector, private sector

1. Introduction

To reinforce and sustain economic growth, public sector organisations (PSOs) need not only to be active, but rather proactive in adopting creative approaches in providing goods and services that are unique values to their customers (Khilji, Mroczkowski, and Assudani 2012). Many countries specifically developed ones have long recognized the strategic importance of country competitiveness and have taken steps to reinvigorate and reinforce their public sector innovation capacity (Agolla and van Lill 2013). This is because, a country growth is not only dependent upon the private sector parse, but rather the combination of the two sectors (public and private). In the developing economies, Kenya inclusive, public sector organisations are the arms of the government in delivering much needed quality services to the citizens. The identified challenges facing public sector organisations (PSOs) at large are inadequate funding, lack of clear policy on innovation, delivery pressures and administrative burden, continuous interference from politicians, poor rewards and incentives, population pressures, competitive pressures, and fiscal discipline (Clark, Good and Simmonds, 2008; World Bank Institute, 2004; Windrun and Koch, 2008). The Africa Competitiveness report by Africa Development Bank (AfDB) and World Bank (WB) (2009:23) further revealed that, Kenya’s public institutions continue to be plagued by inefficiency, undue influence, and high levels of corruption. In despite of all these challenges, Kenya’s innovative capacity is still ranked 42nd in the world, with high company spending on research and development (R&D) and scientific research institutions collaborating well with the business sector in research activities (AfDB/WB, 2009:23). The study by AfDB/WB (2009) indicate that, Kenya’s education system, though educating a small proportion of the population, is of high standard and its sophisticated financial markets by international standards, have been found to be the drivers behind the country’s impressive ranking in the world. Despite enjoying this competitive advantage in R&D and in education, the country has failed to make innovative impact. Oyelaran-Oyeyinka and Sampath (2007) for example, in a study on Kenya’s public sector innovativeness, painted a gloomy picture of PSOs levels of innovation. This is because PSOs tend to be characterised with little or no incentives, and workers are less motivated due to feeling that these are public organisations. On the other hand, PSOs have strong administrative controls that tend to reflect standing orders of the Government Ministries. The study further reveals that the degree of innovation in PSOs is negligible. According to Oyelaran-Oyeyinka and Sampath (2007) this is because the bosses may not wish to accept ideas from subordinates; it is always believed that the boss knows best and may not accept subordinates’ ideas however innovative they may be.

The research questions of the present study are:
What is the status of innovation in the public sector organisations innovation in Kenya?

What are the specific organisational drivers and innovation outcomes in Kenya’s public sector organisations?

2. Drivers of innovation

Previous study (Adams, Bessant and Phelps 2006) identified factors as organisational resources, both tangible and non-tangible, that drive innovation in public sector organisations. These include workers skill sets, depth of expertise and breadth of knowledge. While others (Martins and Terblanche 2003; Murray, Gaulier-Grice and Mulgan 2010) found organisational strategy, structure, support for mechanisms, behaviour and communication as the drivers of innovation in the public sector. It was argued that strategic considerations should drive a significant share of public sector innovation funding, specifically first identifying priority issues: cost, resources, public concerns, fields with gaps between current performance and expectations (Laforet 2011). Organisational climate and culture have been found to be supportive of organisational innovative capability. Studies (Montes, Moreno and Fernandez 2004; Sarros, Copper and Santora 2008) posited that top echelons should support an organisational culture, a climate in which employees are recognised for their efforts towards innovation.

While studies (Pagon, Banutai and Bizjak 2008; Agbor 2008) identified drivers relating to strategic leadership as innovative in the public sector. The leadership dimensions associated with innovation were divergent thinking, critical thinking, while (Sarros, Cooper and Santora 2008; Agbor 2008) added that organisation must first put the right leaders and leadership structures in place in order to promote innovation. Top leaders usually have the power and authority to develop strategies that lead to innovation. Other study (Antoncic 2007) found entrepreneurship as an aspect of innovation in the public sector.

Political factors such as government policies and legislation can have a profound impact on the public sector’s ability to innovate or not. Given the nature of the public sector organisations, formulation of industrial policy that dismantles, reduce and minimise potential barriers, obstacles and restriction would naturally promote innovation (Goh 2005; Marr 2009; Mulgan 2005; OECD 2010). Innovation is driven by the need to keep up with public sector need and expectation such as provision of welfares, efficiency, cost cutting and accountability to the public. Others (Marr 2007; Murray,Gaulier-Grice and Mulgan 2010; Mulgan and Albury 2003) have identified innovation drivers as economic factors, while other studies (Kingsland 2007; Clark, Good and Simmonds 2007) have suggested social factors such as demand for better health facilities, water, electricity, demographic changes, diseases, poverty and host of problems as main drivers to innovation in the public sector.

Collaboration, partnerships and networking have long been associated to innovation drivers particularly in the private sector. Researchers (OECD 2010; Goh 2005; Bloch, Bugge and Slippersaeter 2010) suggest that public sector innovation can be driven by the interaction among firms, universities, research institutions and regulators. Innovation no longer depends only on how public sector, universities, research institutions or government regulators perform on an individual basis, but how they work in unison. Public sector sources external knowledge through partnerships, alliances and joint ventures with external parties through acquisition of knowledge, for example, through contract, Research and Development and licensing of patents. Public-private partnerships based on established good practices such as affordability, value for money, risk sharing, competition, and transparency, can create an avenue for innovation in the public sector (Baskaran and Muchie 2007; OECD 2010; Datta, Reed and Jessup 2013). We therefore hypothesise that:

\[ H_1: \text{Innovation drivers are directly statistically significantly related to innovation outcomes.} \]

3. Barriers of innovation

Previous studies (such as Agolla and van Lill 2013; Mulgan and Albury 2003) revealed that, for innovation to thrive in an organisation, it should have some experience of minor challenges or barriers. Through the organisation’s quest to overcome such barriers, innovative ideas from the employees are triggered and if these ideas are well evaluated and implemented, they may become successful innovations. Studies have shown over-reliance on the exploitation of existing natural resources (Mulgan and Albury 2003; Christensen 2006), and government’s failure in enacting industrial policy (Oyelaran-Oyeyinka and Sampath 2007; Goh 2005; Clark, Good and Simmonds 2008) as barriers to innovation in the public sector organisations. Mulgan and Albury
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(2003) identified low rates and weak higher education systems, while other researchers (Goh 2005; Agolla and van Lill 2013; Mostafa 2005; Clark, Good and Simmonds 2008; Mostafa and El-Masry 2008) found high risk projects, a culture of risk aversion, delivery pressures and administrative burdens, and a reluctance to close down failing programmes or organisations barrier to innovation. Others are poor skills in active risk or change management, inadequate reward systems, inadequate incentive to innovate, a bureaucratic culture, technophobia, and short-term budgets (Windrun and Koch 2008; Mulgan and Albury 2003; Clark, Good and Simmonds 2008). We hypothesised that:

$$H_2$$ A statistically significant relationship between innovation drivers and innovation with barriers to innovation acting as a mediating variable.

4. Outcomes of innovation

Historically, innovation has been treated as residual measure after accounting for other factors of growth. However, the primary goal in measuring innovation is to improve the understanding of growth (Rose et al 2009). Datta, Reed and Jessup (2013) identified measures/outcomes of innovation as investment on research and development and patents, while Laforet (2011) identified innovation outcomes as improved efficiency, cost-benefit, quality transparency, and an improved working environment.

5. Research design and method

The analyses were based on empirical data collected through a survey, during June-July 2012, of Kenya’s public sector organisations innovation at the Ministry of Regional Development Authority and its two state corporations, Lake Basin Development Authority and Kerio Valley Development Authority. The survey measured three latent variables namely; drivers of innovation, innovation barriers and innovation outcomes. A questionnaire was designed for the purpose of collecting quantitative data from purposive randomly selected employees from the Ministry and its two parastatal organisations. The section on drivers of innovation consisted of 65 items, innovation was represented by 34 items and innovation outcomes comprised 3 items. Questionnaire scale was based on Likert type 5-point scale. Qualitative technique focus group discussion (FDG) conducted with selected 16 middle managers drawn from the three organisations aided the quantitative.

Cronbach’s alpha values for items per construct ranging from values 0.666 to 0.927. These alpha values are high and match reliability standards advocated for, since they fall within the cut off. When running reliability test using factor analysis, Cronbach’s alpha of value 0.7 and above is now accepted as the best. Present study instrument measurement scale internal consistency and reliability from drivers 0.757 to 0.927, barriers 0.75 to 0.884 and innovation outcomes 0.666 to 0.791.

6. Sample technique

The survey instrument used to collect this data was theoretically developed and rigorously subjected to piloting through senior managers of the public sector who were well conversant with innovation. The purpose of pilot was to check for content validity, the feedback from the pilot study was incorporated into the final measurement instrument. Of the 400 questionnaires administered, 181 questionnaires were usable, after data pruning.

7. Results of SEM analysis

Confirmatory Factor Analysis (CFA) was performed using AMOS Version 16 integrated with SPSS V 17 to estimate and test the measurement model taking into account all the latent constructs. In this stage, the strength of the paths between the factors and their observed variables are important. The reliability is measured by the proportion of variance accounted for by all the latent variables; and validity can be assessed by the size of the factor loadings. In this model, common fit model measures were applied to evaluate and test the model. The ratio $$\chi^2$$ to the degrees of freedom (df); Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA).

8. Measurement model specification

The current study hypothesised measurement model required that each latent variable consists of three (3) or more indicators (questionnaire items). Innovation Drivers (latent variable) consisting of 65 questions grouped into 8 indicators/observable indicators (organisation culture, organisation resources, leadership practices, entrepreneurship of the top management, economic, customers, suppliers, political support). And finally
Innovation Outcomes measured by 3 indicators (customer satisfaction, new products/services and intellectual property rights) only. The scale of each latent variable was fixed by assuming that the variance of each latent was equal to one and error was equal to zero.

9. Measurement model identification

It is recommended that a model be identified prior to estimation. At this stage, it is advocated that, three measurement items per construct would be enough for identification if each item is connected only to its respective construct and error items are not correlated (Chin, Peterson and Brown, 2008: 289). For this measurement model, there were 16 observed variables and 169 variances, and 55 parameters to be estimated. This resulted in model being over-identified, hence making it possible to test the model.

10. Model fit to the data

Analysis was performed using the AMOS version 16 software integrated with SPSS Version 17; and model tests were based on the covariance matrix using Maximum Likelihood Estimation (MLE). The ratio of \( \chi^2 \) (410.4) to the degrees of freedom (df) (129) was 3.182. Since this value is \( \geq 3 \), it indicated that the data does not fit well with the model. However, there are limitations to this statistic, and a non-significant value may be unlikely even though the model may be a close fit to the data (Weston, 2006). Comparative Fit Index (CFI) was 0.823 and the Root Mean Square Residual Approximation (RMSEA) was 0.111. These fit values are below the minimum recommended threshold; hence we concluded that, the fit is not good or even adequate. Therefore, we proceeded to the next step, model revisions.

11. Measurement model revision

In a situation or circumstances where the fit model is not adequate as demonstrated above, it has become common practice to revise/modify the model by deleting parameters that are not significant, and adding parameters that improve the fit. After making the modifications to the model, the null hypothesis that there is no improvement in the model, fit is tested. We performed modifications (respecification), since there were some Heywood cases which indicated a poorly specified model. This was coupled by a number of other problems such as small sample size and missing data. A modification procedure was performed to get a better fit by adding some hypothesised relations. After examining the modification indices, it was evident that the fit can be improved with the addition of 3 double arrowed paths, indicating that a correlation exists between the joined variable errors. These are: Organisation strategy/culture; organisational resources/suppliers; and Government/Political (Organisation barriers) and Top Management (Organisation barriers). It was found that, Chi-Squared \( (\chi^2) \) (410.4-268.0 = 142.4 with associated change in degrees of freedom (df) (129-126=3) is significant \( p < 0.001 \), thus indicating an improvement in the model. This overall improvement on the model led to a new measurement model (standardised estimates shown on the paths). The fit indices for this modified, model are;

\[
\text{Chi-square} / \text{df} = 2.217 \\
\text{CFI} = 0.911 \\
\text{RMSEA} = 0.080 \ (0.067; \ 0.93.p \ 0.0005)
\]

The results of the standardised loadings were reasonably high and all are statistically significant (\( \alpha = 0.01 \)); the standard loadings ranged from 0.300* to 0.977*. The reliability of each of the observed variables as a measure of the latent variable indicated by the \( R^2 \) for each observed variable ranged from 0.090 to 0.955. This explained a good number of variance. However, some measures were too low for example 0.090 and 0.139.

These results were very much identical to those obtained from the Confirmatory Factor Analysis (CFA). These results were expected to be identical as in the previous CFA. The estimated loadings indicate the validity of each observed variable as a measure of the latent variable with which it is associated, and were high and all statistically significant (\( \alpha = 0.01 \)); only a few having low values (org Strategy/culture 0.3 and overreliance 0.37 with reliability of 0.090 and 0.137 respectively). The reliability of each observed variable, as a measure of the latent variable, were all positive and ranged from (0.09 to 0.960) consistent with expectations of this study. Although the reliability of the items seems to be low the minimum recommended level of 0.5, but items are kept, if required so as to ensure content validity. Therefore removing items from the constructs with low reliability would jeopardise content validity. Furthermore, not achieving threshold values of items/constructs
do not automatically require the rejection of the measurement model (Bomburg and Baumgartner, 1998: 363). As a result analysis proceeded despite single below – requirement values, acknowledging a non-perfectly reliable measurement model (Diefenbach, 2011: 138). The results from the confirmatory factor analysis (CFA), the measurement model can be used as part of the SEM model which hypothesised causal links between latent variables. The estimated correlations were all positive with magnitudes of 0.29 to 0.93. These results were consistent with the expectations of the present study.

12. Results of the analysis of the structural model

The initial model was analysed using Structural Equation Modelling (SEM). The requirement of SEM is that the details of the proposed model be known before the model is fit and tested with. First, this follows strictly confirmatory notion in which the initial model is tested against empirical data is either accepted or rejected. Second, option is where competing or alternative model situation, where several proposed models that are then assessed and selected on the basis of model appropriateness that fits the observed data (Pugesek, Tomer and Eye, 2003). Last, model generating, in which attempts is made until some level of fit is acquired. The decision to which procedure is to be used is based on the initial theory.

13. Initial model fit

The ratio of Chi-squared to degrees of freedom (df) = 3.184; CFI = 0.822 and RMSEA = 0.111 (0.099; 0.124, P 0.001). These values indicate that the data does not fit the model adequately. Therefore, we proceeded with model revision as recommended to achieve the best fit.

14. Model revision

Based on the modification of indices, it was indicated to specify correlated errors for the same pairs of variables as in the measurement. The improvement in the overall model due to the changes made is significant (p 0.001). The fit indices for the revised structural model are; ratio of degrees of Chi-squared ($\chi^2$) to the degrees of freedom (df) = 2.128; Confirmatory Factor Index (CFI) = 0.91; and Root Mean Residual Estimation Approximation (RMSEA) = 0.080 (0.067; 0.093, P 0.001). These were found to be nearly identical to the measurement model fit indices and indicate an adequate model. Hence they were retained for the model. These results were as expected. The factor loadings based on latent variables scales was defined by having regression coefficient constrained at 1. Coefficients are constrained to a number to minimise the number of parameters estimated in the model. It should be noted that value more than 1 can be chosen and will not affect change the overall fit of the model, but rather, affect the variance of the error. As was expected, the results obtained were identical to those obtained in initial confirmatory factor analysis (CFA) for the latent variables with multiple indicators.

However, when considering overall model fit, it is always important to consider the significance of estimated parameters which are analogous to regression coefficient. Figure 1 represents the proposed study model after performing SEM analysis.

![Figure 1: Proposed study model](image-url)
After data analysis, we report the results of various hypotheses of the study based on the structural model fit. The low and insignificant estimates of these constructs are interpreted despite the slight misfit of the initial model.

15. Direct causal effects

The model test outcomes indicate that, determinant (Innovation Drivers) had the lowest direct causal effect (0.001) at $\alpha = 0.01$ level which indicates that, there is non-significant direct relationship between Innovation Outcomes/Indicators. On the other hand, determinant (Innovation Drivers) was found to have non-significant direct cause effect on determinant (Innovation Barriers) (0.096). The determinant (Innovation Drivers) also was found to be non-significant directly related to innovation barriers. The determinant innovation barriers had non-significant direct casual effect on Innovation Outcomes/Indicators (0.077).

16. Indirect causal effects

Determinant, innovation drivers had no causal effect (0.008) on innovation indicators/barriers; this is due to largely indirect effect of (0.007). The rest determinants had non-significant causal effects on Innovation Outcomes/Indicators.

17. Qualitative data analysis

The participants consisted of 2 groups of participants (16) in all, 6 women and 10 men, randomly selected and who were willing to participate in this interviews. The participants were presented with seven (7) pre-determined questions during Focus Group Discussion (FGD). The FGD discussion comprised of 2 groups only consisting of eight (8) members each. The first category question was to address the drivers of innovation. The response for this question by the two groups of FG, were strikingly similar somehow. One respondent from the first batch had this to say, ‘We innovate in order to satisfy our customers, such as to meet their expectations.’ On the other hand, the one respondent from the second batch said, ‘you have to innovate to remain relevant in the market.’ Second category question was about the barriers or challenges faced by the organisation pertaining to innovation. One respondent responded by posing a question, ‘how can someone innovate and the same person’s ideas never recognised by management?’ The respondent went on to say, ‘look at the policy and see how it is rigid.’ The last category was to find out whether participants could highlight what they consider in their organisation as innovation indicators or outcomes/measurement? Two groups responded similarly in this category mentioning innovation indicators as: ‘customers’ satisfaction,’ ‘patent rights and intellectual property rights.’ One respondent from second FGD group said, ‘improvement on overall performance.’

18. Discussions

The results from SEM analysis, hypothesis was tested to find out whether there was a statistically positive direct effect on innovation outcomes/indicators. However, the results were neither statistically significantly positive as was expected in the study. Hence this hypothesis was not supported. Our second hypothesis was to find out if innovation drivers have statistically positive indirect effects mediated by innovation barriers on the innovation outcomes/indicators. The results indicated a non-significant positive effect on the innovation outcomes/indicators as was hypothesised in the study. In SEM analysis, the results for these were found to have a non-significant direct positive influence on Innovation Outcomes/Indicators. These results were not only inconsistent with the previous studies (Agolla and Van Lill 2013; Datta, Reed and Jessup 2013; Goh 2005; Marr 2009; Montes et al 2004; OECD 2010; Rose et al 2009; Sarros et al 2008), but contradicted the results of FGD with the managers. The FGD results confirmed innovation Drivers as: policy, networking and collaboration, partnership with universities and adequate funding, which was consistent to earlier studies (OECD 2010; Bloch, Bugge and Slippersaeter 2010; Marr 2009). We offer possible explanation to this contradiction as: Managers occupy senior positions within the organisation hierarchy, hence have been exposed to innovation concepts. On the other hand, employees because of the position they occupy in the organisation structure perhaps possess inadequate innovation concepts. In addition, possibility could be that, as one assumes the position of responsibilities, the person is exposed to various career and skills upgrade through training and development which enhances his/her knowledge that makes a distinction between managers and employees. Despite the above registered contradiction in the two analyses, SEM and FGD, we still found out that, in the factor loadings, entrepreneurship, leadership practices, and government had a good reliability an indication that, they measured what ought to have been measured.
19. Conclusions and research implications

The present study provided a prima facie evidence of the antecedents of drivers and status of innovation within public sector organisations in Kenya. With increasing demand for better public welfare services, PSOs require innovation to be accountable and responsive to the needs of the general public. Evidence suggest that, innovative PSOs can contribute to the exchequer through improved tax revenues, and support various development infrastructures such as the provisions of clean drinking water, affordable medical care, and security of the citizens amongst others. The study found evidence that support PSOs innovation as: organisational leadership, top management support, government / political support, entrepreneurial activities which can be used to promote innovation in the sector. Others are; registered patent rights / intellectual property rights and customer satisfaction which can be used as PSOs innovation outcomes / indicators. PSOs managers can leverage on these variables to encourage innovation. In this study, we developed a model based on earlier research in the public sector, which we tested empirically using data collected from Kenya’s public sector organisations employees, middle managers and top management. The results based on structural equation modelling (SEM) seem to suggest support for innovation drivers, innovation barriers and innovation outcomes as positively related. Future research perhaps should investigate the contradictions between managers and employees.

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Supporting Innovation and Entrepreneurship: Reflections on Two Case Studies From US and UK Universities

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Abstract: An important area of research is to answer the fundamental question of what can be done to support innovation and entrepreneurship in universities to fulfill the objectives of knowledge economy. In this paper, the authors report findings from two interpretive in-depth case studies from US and UK Universities in different higher education system settings. The paper is designed to address innovation and entrepreneurship activities at three levels, (Individual, Organizational, and Eco System Levels), and is intended to explore the main pillars of entrepreneurship policies, namely entrepreneurship education, venture capital support and intellectual property facilities. The findings that are extrapolated from the analysis of the two case studies are presented. The findings have addressed the key aspects of support systems for innovation and entrepreneurship, and have been outlined in the form of lessons learnt from the initiatives of exemplar US and UK universities in supporting innovation and advancing entrepreneurial practices. The paper will contribute to two discourses: (1) Addressing the relationship between support systems for innovation and entrepreneurship and the universities policies and practices (2) Lessons for University leaders to assist the development and implementation of effective entrepreneurial policies.

Keywords: knowledge economy, entrepreneurial university, entrepreneurship education, venture capital support, intellectual property facilities

1. Introduction

Developing sustainable knowledge economy is the stated ambition of many and diverse economies around the world. In the United States and Europe, at national and local levels, every country, state, region and city set their objective of making the most competitive economy and transform itself into a knowledge based economy. The initiatives in this regard have gained momentum in the last decade of the 20th century when a greater emphasis was placed on so called Entrepreneurial Universities in the transformation process (Brinkley, 2008; Clark, 1998; Conceição and Heitor 1999; O'Shea et al., 2004).

The emergence of entrepreneurial universities has been preceded by two academic revolutions. The first happened in the nineteenth century and added research as a role for universities in addition to the traditional role of teaching. The second revolution transformed universities into teaching and research institutes and added the role of economic development. The third revolution, which began during the last two decades, is aiming to put universities in the leading position in economic and social development. The term of entrepreneurial university was first coined by Etzkowitz (1983) to describe universities that want and are able to take an active role in regional development. In this regard, the case of MIT has been recognized as an important reference example (Roberts 1991; Etzkowitz 2002). After that, the term was adopted by academics and policymakers to indicate the third mission of universities. This mission has evolved and been strengthened thanks to the knowledge economy and national innovation systems. Many scholars who are working in the fields of knowledge economy, innovation, and entrepreneurship; for example, (Clark, 1998: Etzkowitz, 1983; Gibb and Hannon; 2006; Jacob et al., 2003; Kirby, 2006; Röpke, 1998) have proposed several definitions for an entrepreneurial university. Despite the differences between these proposed definitions, there are common aspects shared between these definitions specifically regarding elements of the incentive system and the factors that can influence and support innovation and entrepreneurial activities in an university setting.

In this paper, the authors report findings from two interpretive in-depth case studies from US and UK Universities in different higher education system settings. The best universities in the world, which include institutes in the UK, are led by the US institutes ranking first place worldwide. These universities also have a long standing reputation for innovation and uphold the philosophy on entrepreneurship. The first case study is Stanford University, one of the US universities which have hold a strong academic reputation and places 7th in the world ranking list (QS, 2013). The second case study is Imperial College London, which has historical
foundations linked back to 1834 and is the basis of the St. Mary’s Medical School, currently the largest medical school in Europe. Utilizing both case studies, this paper is designed to address innovation and entrepreneurship activities at three levels, (Individual, Organizational, and Eco System Levels), and to explore the main pillars of entrepreneurship policies, namely entrepreneurship education, venture capital support and intellectual property facilities.

2. Classification of entrepreneurship in universities

In analysing existing research in the fields of knowledge economy, innovation, and entrepreneurship, three main themes can be identified in the study of the Entrepreneurial University concept. According to these themes, the activities of entrepreneurial universities can be classified as follows:

- Organizational Entrepreneurship: The studies in this theme have been mainly centred on the University itself, as an organization, and how to become an entrepreneurial University. This theme which occupied the works of a number of scholars like Clark (1998), Gibb and Hannon (2006), Röpke (1998), and Etzkowitz (2003) is focused on institutional policies and practices, and is concerned with the impact of the institutional and organizational context on university level entrepreneurship.

- Individual Entrepreneurship: The studies in this theme have dealt with two questions. The first is how the members of the university, lecturers, researchers, students, employees, are becoming entrepreneurs. The second question is what the attributed characteristics of entrepreneurship are, and what are the enablers and barriers to entrepreneurship. The work in this theme which occupied the works of a group of scholars like Brennan et al. (2005), Kirby (2006), Laukkonen (2003), Röpke (1998), is mainly based on management-related and entrepreneurship disciplines as the body of knowledge.

- Structural Entrepreneurship: The studies in this theme have implicitly or explicitly described the intrapreneurial process and actions that can happened within and beyond the university boundary. The studies here are focused mainly on the relationships and interaction of the university with the environment, the structural coupling between university and region, and the followed entrepreneurial patterns. This theme which occupied the works of another group of scholars like Chrisman et al. (1995), Jacob et al. (2003), Subotzky (1999), has dealt with many intrapreneurial aspects such as new venture creation, sources of income and external funding, technology transfer activities, commercialization and commoditization, as well as the university–government–industry collaboration.

In order to achieve individual entrepreneurship, the organizational entrepreneurship must be accomplished first. And to achieve the structural entrepreneurship, the individual entrepreneurship is necessary. The three types together are necessary and sufficient conditions to develop an entrepreneurial university.

3. Case study one: Stanford University

Stanford University holds a strong academic reputation and places 7th in the world ranking list (QS, 2013). Stanford also holds the second position in the world rankings for Engineering and Technology, which is Stanford’s forte and the field where Stanford has focussed its efforts to become a strong entrepreneurial university. Stanford University is distinguishable from other institutes by providing a local example for the power of innovation. Stanford University is based on the Silicon Valley, one of the most established innovation ecosystems in the world. Capital, knowledge, and talented human resources all meet there to develop the most valuable and innovative ideas and to transform them into products, services, and companies. According to Markovich (2012), Stanford University has contributed in establishing more than five thousand companies through the innovative ideas of their people, which has lead to the licensing of about eight thousand patents, generating $1.3 billion in royalties.

4. Support and incentives system aspects of Stanford University

The main aspects of support and incentives systems for innovation and entrepreneurship in Stanford University can be addressed through the following elements as outlined in the table (1):

4.1 Industry relations

It is no coincidence that Silicon Valley is located next-door to the Stanford University campus; it was Stanford University students and alumni who have contributed in building and developing this iconic home of modern technology. Initially, it was the encouraging words of Frederick Terman telling his students to open businesses in the vicinity of the university and some small scale investments in technology. Terman later became vice-
Hamid Alalwany, Nabeel Koshak and Mohammad Ibrahim

president of Stanford University and continued his efforts from a more powerful position; his ideas lead to the establishment of the university’s Research Park and are indirectly responsible for the start-up of companies like Hewlett-Packard and Varian Associates (Sandelin, 2004; Sturgeon, 2000). Today, most of the modern silicon chip designers and manufacturers and some of the largest technology firms are located in the San Francisco bay area, over time this area’s influence has continuously attracted new businesses and innovators forming the Silicon Valley of today.

Table 1: An outline for the support and incentives systems for innovation and entrepreneurship in Stanford University

<table>
<thead>
<tr>
<th>Level of Activities</th>
<th>Innovation and Entrepreneurship Categories</th>
<th>Innovation and Entrepreneurship Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual Level</td>
<td>Student Support</td>
<td>Mayfield Fellows program, a course for students dedicated to preparing them to form their own technology based firms Possible financial incentive Assists in acquiring IP: The office of technology licensing, OTL</td>
</tr>
<tr>
<td>Organizational Level</td>
<td>Business Support</td>
<td>The Business Association of Stanford Entrepreneurial Students Forge was set up in conjunction to the university. Forge is especially appealing for innovators looking for funding without any equity share with the business</td>
</tr>
<tr>
<td></td>
<td>Research Facilities</td>
<td>In 2010-2011 $1.15 billion was invested in sponsored research. This is the highest figure in the whole of the US</td>
</tr>
<tr>
<td>Eco System Level</td>
<td>Industry Relations</td>
<td>Silicon Valley Innovation driven community mutually benefits university and businesses Industrial Affiliates program: This brought university faculties and industry together to collaborate on projects for mutual benefit.</td>
</tr>
</tbody>
</table>

The office of technology licensing (OTL) within Stanford started up in 1970. Since then it has done more than what its name entails. The OTL covers the whole process of technology transfer, feasibility studies, securing patents, marketing support; they even offer financial support for technology start-ups (Eesley and Miller, 2012; Mowery et al. 2001). Since its establishment, it has developed quite a portfolio; Google, Sunpower and VMWare software all started out with the OTL.

The OTL is not the only element in Stanford’s support system, one initiative has not solely lead what Stanford is today, there are other unique elements in Stanford support system either general or created to incentivise innovation in particular fields. The Business Association of Stanford Entrepreneurial Students is a testament to the effectiveness of the entrepreneurial atmosphere in the university. Started by five engineering students, the organisation now supports engineering students seeking more from their courses. Seeing the success of this organisation, Forge was set up in conjunction to the university but not exclusively to students. Similar to the OTL, Forge acts as a support and incentive system for innovators in engineering. Forge is especially appealing as they offer funding for innovators without asking for any equity share with the business (Eesley and Miller, 2012). Aside from financial support, they provide legal support and networking with similar businesses in Silicon Valley, supporting start-ups through any legal problems they face, providing office space and assistance with the non-engineering side of their business.

4.2 Entrepreneurial education: Facilities and support

In the earliest developed entrepreneurship education model cases and the most comprehensive universities in the world, Stanford University have their unique ways; represent a typical model of entrepreneurship
education (Ling and Wu, 2008), Stanford University has made considerable progress in promoting entrepreneurship across the traditional home of entrepreneurship, the business discipline, and integrated it into other disciplines such as engineering, medicine, law and social studies. The combination of experienced staff and a tenured faculty has created a strong entrepreneurial culture. In this direction, the university has managed to develop a variety of entrepreneurship courses over the years, designed and delivered through the interdisciplinary Stanford Entrepreneurship Network as well as the Graduate School of Business (NAEC, 2004).

An example of entrepreneurship courses offered by Stanford University is the Mayfield Fellows program. This course has a very practical nature, dedicated to preparing students to form their own technology based firms; it is designed to go beyond giving students the theoretical knowledge about developing modern technology companies. The program aims to provide the experience of working in independent conditions to form a company. As of 2001, two hundred students that have been through this program have started 52 businesses and 10 businesses that have been acquired by large firms like Google (Eesley and Miller, 2012).

4.3 Competitive financial incentives

According to Markovich (2012), Silicon Valley is the highest in creating start-up companies and the first in attracting Venture Capital investments, the statistics show that more than one-third of all U.S. Venture Capital investments are received by the Valley.

The use of competition and financial incentive is also present in order to augment programs already in place. The presence of Silicon Valley also allows for a constant flux of sponsorships and investment for these competitions, thus generating another mutual advantage for the university and surrounding community. Apple, for example has an opportunity for Stanford students to design an application as an academic project with the opportunity to go on to sell this on their Appstore (Eesley and Miller, 2012).

4.4 Research facilities

Sustaining technology based innovation and entrepreneurial activities are reliant on a research. Stanford’s ability to retain its most successful researchers and ensure there is support and incentive for innovative research keeps it in its position today. There are a number of initiatives that support innovative research, many linked to businesses in Silicon Valley granting access to their funding. Examples include the Bio X program for biosciences and the Geballe Laboratory for advanced materials, both leading in their respective fields and affirm Stanford’s status as a strong innovative research driven university (Sá, 2006). The Bio-X program is dedicated to providing new inventions in bioscience technologies for clinical use; facilitating research in these cutting edge fields increases the possibility of attracting students to develop the field. With the entrepreneurial community around Stanford it makes it much more likely that these research efforts will go on to be commercialised successfully.

In 2010-2011 $1.15 billion was invested in sponsored research this is the highest figure in the whole of the US (Eesley and Miller, 2012). This huge figure acts as a great financial incentive for students and researchers, drawing and retaining renowned researchers and new talent. Incentivising research is essential to the continued success of the innovation driven community around Stanford University. What is remarkable is that this community formed by Stanford nearly a century ago has allowed the university to achieve maintain its status today.

5. Case study two: Imperial College London

Imperial College London has historical foundations which link back to 1834. The college is the basis of the St. Mary’s Medical School, currently the largest medical school in Europe. The college supports a strong scientifically-based education platform including 10,000 students, 3,000 research staff and 14 Nobel Prize winners. Imperial College London has recognised entrepreneurship as a major theme in their strategy. Using their position and experience in collaboration with industry, Imperial has successfully developed a powerful network for innovation and entrepreneurship. Their work is centred on the Innovation and Entrepreneurship group, a world leading research group with an interdisciplinary team spanning the natural sciences, engineering and medicine departments as well as the business school. With this wide scope, the group has a number of research themes, open and distributed innovation, business model innovation, diffusion innovation and systems, services and design. Each with a globally recognised academic at its head and a total of 50
research and teaching staff members, the group has won the 2010 Gerry Hill award and was a finalist in the Entrepreneurial University Of The Year award in 2011(NCGE, 2011).

Arguably more important than these awards, the Innovation and Entrepreneurship group has attracted enough funding to establish research centres with powerful associates. The UK Innovation research centre, a joint collaboration between Imperial and Cambridge University, is a hub for some of the greatest minds of the UK. Its relationship with the government has even allowed this centre to influence policy making in the UK, to a certain extent, for the improvement of business policy. In terms of high profile sponsors, the Energy Business Research Laboratory has attracted funding by BP, Ofgem and the EPSRC through its work on sustainable energy technologies. Also sponsored by BP is the Rajiv Gandhi centre, a unique project for innovation and entrepreneurship exchange between the UK and India. Their corporate associations reach not only the UK but India whose recent economic growth has enhanced their global presence.

Imperial’s dedication of effort and resources was the key to the success of the Innovation and Entrepreneurship group. Regardless of the details about the centres achievement and generally the framework Imperial has in place, the key point of all of this was mentioned at the start. The university adopted entrepreneurship as a major theme in their strategy. They focussed time and effort into the establishment of their network and used their present position as a resource not a sole driver.

6. Support and incentives system aspects of Imperial College London

The main aspects of support and incentives systems for innovation and entrepreneurship in Imperial College London can be addressed through the following elements, as outlined in Table (2).

<table>
<thead>
<tr>
<th>Table 2: An outline for the support and incentives systems for innovation and entrepreneurship in Imperial College London</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of Activities</strong></td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Individual Level</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Organizational Level</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Eco System Level</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

6.1 Commercialization activities support

Imperial Innovations is one of the UK’s leading university based technology transfer organizations. The organization was founded by Imperial College in 1986, partially owned by Imperial, in order to channel its technology transfer and business commercialisation activities. The mission of the organization is similar to that of a technology transfer office at an US University: To identify ideas, protect intellectual property, develop and
license technologies, and commercialize research (Lundqvist & Williams, 2006; Williams, 2011). Since its establishment, Imperial Innovations has passed through two phases, as shown in Table (3).

Table 3: The transformation phases of Imperial innovation

<table>
<thead>
<tr>
<th>Phase One</th>
<th>Phase Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twenty Years from 1986 to 2006</td>
<td>The Last Six years</td>
</tr>
<tr>
<td>Founded by Imperial College in 1986, partially owned by Imperial</td>
<td>University-controlled, private-sector company</td>
</tr>
<tr>
<td>Non profit Organization</td>
<td>For profit Organization</td>
</tr>
<tr>
<td>Technology transfer and business</td>
<td>Creating a captive pool of investment capital</td>
</tr>
<tr>
<td>commercialisation activities.</td>
<td>Developing an innovation pool, with Oxford, Cambridge, and University College London</td>
</tr>
<tr>
<td>Generating over 60 start-up companies and creating more than 1000 jobs</td>
<td>Raising US$215 million in new capital from existing investors, 40% of it will go to Imperial</td>
</tr>
<tr>
<td></td>
<td>College start-ups and follow-on investments</td>
</tr>
</tbody>
</table>

Imperial Innovations can claim now that they are a for-profit organization. This claim is supported by the organization achievements tracks. One of these achievements can be seen in the raising of US$100 million and investing in more than 75 companies prior to the recent round of raising US$215 million in new capital (Williams, 2011). The important question here is how Imperial College London did this. Although the success of Imperial Innovations was an accumulation of the efforts of more than two decades, the big achievement was gained in the last six years. During this period, Imperial Innovations went public and managed to form a university-controlled, private-sector company that was a marketable asset in its own right. The success of Imperial Innovations is also attributed in creating a captive pool of investment capital for supporting technology transfer and the commercialization process.

6.2 Intellectual property incentives

The policy and guidelines for use of intellectual property at Imperial College London are in line with UK laws and legislations. UK laws give full ownership of IP generated by an employee or student to the employer, in this case the university, if generated through the course of normal work or research activities. This includes the IPs developed by the student alone, together with a member of academic staff, or through sponsored programs. In order to overcome the negative impact of IP laws and legislations in the United Kingdom on the motivations towards innovation and entrepreneurship, Imperial Innovations has introduced additional commercialization policies. These policies are designed to promote collaboration and limit constrictions or items that would prevent partnerships, with an emphasis in establishing incentives for both innovators and the College in order to establish mutually attractive opportunities. Imperial Innovations has compensated innovators with their commercialization policies. Therefore, if innovators manage to exploit their IPs commercially, the revenue from exploitation is redistributed according to the way outlined in the Figure (1)

Figure 1: Royalty distribution policy at Imperial College
6.3 Engagement in commercial policy development and funding new initiatives

Imperial Innovations is a member of a larger association of regional technology transfer offices, contributing to the best practice and training development. In recognizing the engagement value in commercial policy development, Imperial Innovations have established strong ties with London Development Agency (LDA). Specifically, they manage to maintain substantial contacts with LDA in regards to funding new initiatives, especially those in infrastructure development which will benefit not only Imperial, but all universities in the London area (Lundqvist & Williams, 2006).

6.4 Imperial entrepreneurs club

Imperial entrepreneurs club is considered as one of many successful projects run by the students at Imperial College London. The club aims to launch the next generation of disruptive technology entrepreneurs. The club has managed to run a business plan competition and lead award-winning students in engineering design to contribute to the NESTA guide for creative industries (NCGE, 2011).

7. Summary and conclusions

In analysing existing research in the fields of knowledge economy, innovation, and entrepreneurship, three main themes have been identified in the studies of the Entrepreneurial University concept. According to these themes, the activities of entrepreneurial university have been classified into three types: Organizational Entrepreneurship, Individual Entrepreneurship, and Structural Entrepreneurship. The three types together are necessary and prerequisite conditions to develop an entrepreneurial university.

In practice, the universities in developed countries are moving towards more entrepreneurial forms and experimenting with various innovative initiatives. The entrepreneurial activities of the adopted initiatives by these universities are designed to develop the entrepreneurial capabilities at Individual, Organizational and Eco-system (Structural) levels. Two case studies from UK and US have been selected to examine how the universities can support entrepreneurial practices. The lessons learnt from the initiatives of the two case study universities, Imperial and Stanford, in supporting innovation and advancing entrepreneurial practices are summarized in the following points:

- The importance of developing flexible systems that support and strengthen the ability of universities to learn and apply the new best practices that are evolving from the higher education sector. This is essential while existing and previous policies and practices suggest that universities are continually experimenting with ways in which to diffuse knowledge, support innovations, and involve effectively in transforming knowledge economy.

- Transforming a university based organization such as Imperial Innovation into a for-profit organization usually takes time and effort. Imperial Innovation which was established with the mission of identifying ideas, protecting intellectual property, developing and licensing technologies, and commercializing research has worked for two decades as a non-profit organization before they managed to achieve the status of for-profit organization and change their policy in the last six years.

- The necessity to compensate innovators through adopting generous commercialization policies. Such policies are vital to overcome the negative impact of IP laws and legislations of governments on the motivations towards innovation and entrepreneurship, and to encourage innovators to exploit their IPs commercially. These policies have to be designed to promote collaboration and limit constrictions or items that would prevent partnerships, with an emphasis in establishing incentives for both innovators and the universities in order to establish mutually attractive opportunities.

- Recognizing the value of stakeholders’ engagement in the development of entrepreneurial policies and programs. Such engagement, specifically student’s engagement, has been considered in UK Universities as a necessity to successfully cope with the difficulties and deal with the challenge of students’ lack of interest and commitment, as well as maintaining the effectiveness of support and incentive schemes.

- Considering the nature of innovations and entrepreneurial infrastructure and in order to sustain the success of innovations and entrepreneurial initiatives and activities, the position of such infrastructure has to be established distant and unrelated to specific departments or schools. Such a unique position will facilitate collaboration throughout the whole university, give the power to support any inter-cross-disciplinary ideas, and provide the required support to transform such ideas into business opportunities.
The vital social role of funding entrepreneurs and supporting start-ups particularly in jobs creation. The statistics have showed that business start-ups and surviving young firms are responsible for nearly 20% of gross job creation in the United States despite their small size in the U.S. economy, which altogether accounts for only about 3% of the economy.

The influence of local context in the power of innovation and in the formation of the entrepreneurial community. Stanford University has initiated and contributed in the development of the Silicon Valley, one of the most established innovation ecosystems in the world. The Valley has provided a great opportunity for Stanford as capital, knowledge, and talented human resources all meet there to develop the most valuable and innovative ideas and transform them into new products, services, and companies.

Taking entrepreneurship education across the business discipline is a challenging task. In this regard, American universities like Stanford have made considerable progress in promoting entrepreneurship across the traditional home of entrepreneurship, the business discipline, and integrated it into other disciplines such as engineering, medicine, law and social studies. The combination of experienced staff and a tenured faculty has created a strong entrepreneurial culture.

Sustaining innovation and entrepreneurial activities, especially with technology based innovation, is reliant on research. The ability of American universities like Stanford to retain its most successful researchers and ensure there is sufficient investments, support and incentive for innovative research keeps it in its position today.

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Beyond Incubators Mechanisms: Innovation, Economic Development and Entrepreneurship

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Abstract: Business incubators are proven and well known internationally as dynamic tools for fostering new ventures to support economic development and job creation, and as vital components of an entrepreneurial infrastructure. In addition, business incubators have contributed to the creation of technology-based companies, innovation acceleration, fostering an entrepreneurship climate, technology transfer, and technology commercialization. This paper critically reviews, identifies, and analyzes the literature related to incubator best practices in developed countries. The authors use three categories of indicators to assess the success of incubation programs: 1) economic development includes the number of jobs created and the survival rate of incubator companies, 2) industry growth includes incubator type and incubator services, and 3) culture growth includes entrepreneurship and innovation. This paper provides evidence based on current literature concerning entrepreneurship and innovation as an effective tool for economic developments. The study used a qualitative research methodology including three interviews of incubator programs in the United States. Also, the authors’ professional experience on the topic provides the foundation for this paper. The paper’s results provide guidance, suggestions, and recommendations for future implementation in developed and developing countries for practitioners such as policy makers, governments, funded organizations, and strategic institutions.

Keywords: economic development, technology transfer, entrepreneurship, innovation

1. Introduction

Developed and developing countries have recognized that business incubation involves a unique combination of people, place, and process supporting the creation and the growth of innovative entrepreneurial companies, new venture development, and technology commercialization mechanisms (Lalkaka, 2001; Carayannis and von Zedtwitz, 2005; Lumpkin and Ireland, 1988; Timmons and Spinelli, 2003; Hayton, 2005; Allen and McCluskey, 1990; Mian, 1997; Aernoudt, 2004; Aerts et al., 2007; Aaboern, 2009).

The objective of this paper is twofold: 1) to discuss and analyze the adoption of innovation in as the United States through examination of case studies, and 2) to identify the indicators such as smart growth, sustainable growth, and inclusive growth. The questions addressed are: 1) what are the benefits of innovation as a value-added product for entrepreneurs, employment creation, and enterprises, and 2) what are the best practices learned from the successful U.S. case studies.

The remainder of the paper is as follows: Section 2 provides a thorough review of the literature. In section 3, the authors briefly discuss the research methodology used to facilitate the objectives. Section 4 discusses the study’s findings. Section 5 gives the study’s conclusions.

2. Literature review

Many articles have reported on studies of incubators in the United States, European countries, and developing countries (Temali and Campbell, 1984; Allen and Rahman, 1985; Plosila and Allen, 1985; Campbell et al., 1985; Brooks, 1986; Fry, 1987; Smilor, 1987; Campbell, 1989; Culp, 1996; Mian, 1994a, 1994b, 1996a, 1996b, 1997; Autio and Klofsten, 1998; Thierstein and Wilhelm, 2001; Colombo and Delmastro, 2002; Abetti, 2004; Pena, 2004; Lee and Osteryoung, 2004; Peters et al., 2004; Rothschild and Darr, 2005; Etzkowitz et al., 2005; Tottermann and Sten, 2005; Chan and Lau, 2005; Rothearmel and Thursby, 2005a, 2005b; Wynarczyk and Raine, 2005; Von Zedtwitz and Grimaldi, 2006; Kim and Armes, 2006; Studdard, 2006; Gassmann and Becker, 2006; Voisey et al., 2006; Chandra et al., 2007; Avnimelech et al., 2007; Aerts et al., 2007; Hytti and Maki, 2007; Hughes et al., 2007; McAdam and Marlow, 2007; Akcomak and Taymaz, 2007; McAdam and McAdam, 2008; Schwartz and Hornyc, 2008; Chandra and Fealey, 2009; Akcomak, 2009; Atherton and Hannon, 2006; Schwartz, 2009; Al-Mubarak and Busler, 2010, 2011, 2012; Al-Mubaraki, Ahmed and Al-Ajmei, 2014).

Al-Mubaraki, Al-Karaghouli, and Busler (2010) indicated that business incubation provides entrepreneurs with expertise, networks, and tools that they need to make their ventures successful, effective, and innovative tools of economic development. The research methodologies adopted in this research study were desk-research and case studies of five incubator organisations in the GCC member states.

Al-Mubaraki and Wong (2012) identified a best practice model based on the lessons learned from the data. The model suggests that the characteristics related to the success of business incubators are: (1) clear objectives, (2) the incubator’s age, (3) the ratio of client and graduate companies, and (4) the employment rate achieved by the incubator. Incubators that satisfy these characteristics have a 90% survival rate for the companies launched and reflect sustainability in their market.

Al-Mubaraki, Al-Sharrah and Aruna (2012) indicated that financial indicators are the highest priority in ranking incubators worldwide, as reflected in positive impacts on economic development through job creation. Mathematical techniques as a tool to rank incubators can be an aid in the future development of business practices within incubators to ensure outcomes that will positively affect the business environment and economies in which they exist.

Al-Mubaraki and Hamad (2013) concluded that business incubation programs are designed to accelerate the successful development of entrepreneurial companies through an array of business support resources and services developed by incubator management. Based on evidence from the United States of America, Europe, and other developed countries they concluded that business incubators are model accelerator tools for the 21st Century. Although Al-Mubaraki and Muhammad (2013) analysed the key performance indicators of business incubators in Europe is effective tools for: 1) fostering entrepreneurship, 2) jobs creation, 3) start-up companies, and 4) survival rate. In another study, Al-Mubaraki, Busler, and Al-Ajmei (2013) concluded that business incubators contribute positively in developed countries. They produce results such as: support of economic diversification, technologies commercialization, fostering entrepreneurship, job creation, and wealth building.

Al-Mubaraki, Sharp and Busler (2013) concluded that innovation and technology transfer as an objective of technology incubation is a long-term investment to self-sustain technology and smart growth to commercialize technology and create employment, leading to sustainable economic growth. Another study indicated that (Al-Mubaraki and Kolo, 2013) innovation-based incubators are powerful tools for local economic development; the business incubator provides business support to young companies with the goal of producing smart growth for developing the economy based on knowledge and innovation. The process of business incubation develops business ideas and transforms them into viable and sustainable activity.

Many studies used performance indicators for business incubation referring to the tenant company includes tenant firms survivability (Allen and Levine, 1986; Hisrich and Smilor, 1988; Allen and McCluskey, 1990; Mian, 1997; Westhead, 1997; EC, 2002; Hacket and Dilts, 2004; Knoop, 2007; UKBI, 2009; Amezcuia, 2010), tenant firms sales growth (Dettwiler et al, 2006; Lindelof and Lofsten, 2002; Chen, 2009; Philips, 2002) and tenant firms employment growth (Udell, 1990; Colombo et al., 2002). Furthermore, the other performance measures referring to the tenant firms innovative capability includes tenant firms as number of scientists and engineers, R&D expenditure, number of patents, number of copyrights, number of new products or new services and the incubatee growing survival rate (Westhead, 1997; Colomno et al., 2002; Siegel et al., 2003; Udell, 1990; Bearse, 1998; Philips, 2002).

Moreover, most of the organizations, institutions and scholarly discussed the performance measures referring to the incubator program includes incubator space (CSES, 2002; Knoop, 2007; UKBI, 2009), incubator occupancy rate (Allen and McCluskey, 1990; EC, 2002; Allen, 1985; Allen and Rehman, 1985; Smilor, 1987), and average length of tenancy and ratio of incubator staff to tenants. In addition, average capital investment cost (CSES, 2002; Knoop, 2007), number of incubator tenants (UKBI, 2010), development of incubator in life cycle
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(Allen, 1988; Sherman and Chappell, 1998) and graduation rate per year (Allen and McCluskey, 1990; Mian, 1997; Udell, 1990; EC, 2002).

3. Research methodology

The research methodology in this research study is comprised of desk-research, semi-structured interviews of 3 incubator organizations in the United States. The interview instrument for the semi-structured, in-depth interviews was developed after a thorough literature review and revised after pilot interviews with innovation centers in the US including: 1) High Tech Rochester, Inc., West Henrietta, NY; 2) Blue Valley Schools – Center for Advanced Professional Studies (CAPS), Kansas; and 3) South Side Innovation Center – Inclusive Entrepreneurship, New York. The pilot interviews served as a pre-test for instrument validation and changes were made to the interview instrument based on the findings and comments. In addition, interviews were conducted throughout the period of data collection. In total three top-ranking executives were interviewed. The interviews were semi-structured and recorded to free the interviewer from note-taking and to increase the accuracy of data collection. Finally, the recordings were later transcribed, and the data were organised and analysed in terms of the research model. Furthermore, the literature supports the importance of the semi-structured interview as an important tool for gathering qualitative data (Smith, 1972; Torrington, 1972; King, 1994; Jankowicz, 1995).

Table 1 presents three categories for the interviews, including six indicators. First, the economic development category included two indicators: survival rate and job creation. Second, the industry growth category included two indicators: incubator type and incubator services. Third, the culture growth category included two indicators: innovation and entrepreneurship. The scale for rating each indicator was low (1%-8%), medium (9%-12%), and high (13%-17%).

Table 1: Incubators’ categories and indicators

<table>
<thead>
<tr>
<th>Category</th>
<th>% 100</th>
<th>Scale</th>
<th>Indicators %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>High (17%)</td>
<td>Medium (12%)</td>
</tr>
<tr>
<td>Culture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Innovation</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incubators type</td>
<td>17</td>
<td></td>
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<tr>
<td>Incubators services</td>
<td>17</td>
<td></td>
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</tr>
<tr>
<td>Economy</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Survival rate</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jobs creation</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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</table>

4. Findings

The overall goal of business incubators is to nurture new companies till graduated. Internationally, the most important outcomes of business incubators are economic growth and diversification, fostering entrepreneurship, and accelerating innovation, technology transfer and commercialization (Al-Mubaraki, 2008; Al-Mubaraki, Ahmed and Al-Ajmei, 2014). In addition, many scholarly used the industry indicators such as incubators services (Hacket and Dilts, 2004), economic indicators includes survival rate and jobs creation (CSES, 2002). In table 2, the total responses from the first interview with High Tech Rochester, Inc. were 95%, which yielded ratings of high for all indicators 83%, but jobs creation was rated medium, 12%. See Figure 1.

Table 3 presents results from the second interview with Blue Valley Schools’ CAPS program, with ratings of total indicators 80%, which indicated medium for the two categories industry growth and economic development, including all indicators: incubator type, incubator services, survival rate, and job creation were 48%. However, the culture growth indicators, innovation and entrepreneurship received high ratings-32%. See Figure 2.
Table 4 shows the third interview, with South Side Innovation Center–Inclusive Entrepreneurship, with total indicators 95%, which reflect the ratings of high for all indicators 83% but a medium rating for incubator type - 12%. See Figure 3.

**Table 2:** First interview, High Tech Rochester Inc., West Henrietta, NY, US

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<td>Economy</td>
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**Figure 1:** Percentage of total outcomes

**Table 3:** Blue Valley Schools - Center for Advanced Professional Studies –“CAPS Incubator”, Kansas, US

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<th>% 100</th>
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Hanadi Mubarak Al-Mubarki and Michael Busler

Figure 2: Percentage of total outcomes

Table 4: South Side Innovation Center – “Inclusive Entrepreneurship”, New York, US

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<th>Scale</th>
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<td>Jobs creation</td>
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<tr>
<td>Total</td>
<td>100</td>
<td>83</td>
<td>12</td>
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Figure 3: Percentage of total outcomes

Table 5: Summary of indicators

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<thead>
<tr>
<th>Interview</th>
<th>Indicators %</th>
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<tr>
<td>Interview 1 - High Tech Rochester Inc.</td>
<td>95%</td>
</tr>
<tr>
<td>Interview 2 - Blue Valley Schools</td>
<td>80%</td>
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<tr>
<td>Interview 3 - South Side Innovation Center</td>
<td>95%</td>
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As table 5 shows, the summary of the three interviews indicated ratings of high for the majority of categories and indicators, at 95%, 80%, 95% respectively. The percentage of indicators that received ratings of high demonstrated the successful adaptation of business incubation in the US and is consistent with the evidence for similar studies worldwide (Al-Mubaraki, Ahmed and Al-Ajmei, 2014).

5. Conclusion

This article presented a study that used three previously developed categories, each comprising two indicators, for ranking business incubators. The category economic development included the indicators survival rate and job creation, the category industry growth included the indicators incubator type and incubator services, and the category culture growth included the indicators innovation and entrepreneurship. The authors conducted case studies of three business incubation programs in the United States, including interviews with top executives who participated in a semi-structured interview protocol resulting in performance ratings of all six indicators. With a rating scale of low, medium, and high, most of the indicators received ratings of high. These findings support a conclusion of successful implementation of business incubation programs in the US, a conclusion also supported by similar studies in Europe and other countries. Finally, incubators that employ best practices in the US experience economic growth, foster a climate of entrepreneurship, and accelerate innovation in the industries they assist. Future work can extend this line of research to other regions such as the Middle East and Japan, in order to determine positive guidelines that are valuable for future expansion of incubator mechanisms.

Acknowledgements

The project team would like to express their genuine appreciation to the Kuwait Foundation for Advancement of Sciences (KFAS-2012-1103-01) for the financial support provided for the project. A special acknowledgment and appreciation is due to Prof. Rashed Al-Ajmei, Dean of the College of Business Administration, Kuwait University, and Chairman of the Center of Excellence in Management for all his advice and support required for the project. The team also provides deep thanks to the National Business Incubation Association (NBIA) for providing successful international case studies to be interviewed.

References

Hanadi Mubarak Al-Mubarak and Michael Busler


Bounded Entrepreneurship and Intrapreneurial Performance in Sweden

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Abstract: Sweden is viewed as one of the most innovative countries in Europe; however, the 2012 Swedish Global Entrepreneurship Monitor (GEM) indicates that in comparison to other innovative countries, Sweden is ranked very low in total entrepreneurial activity. Instead, the report suggests that entrepreneurial activity is channeled into intrapreneurship where Sweden is highly rated. The research literature identifies a strong correlation between Swedish political policies and the dis-incentive for entrepreneurship suggesting more broadly that social perception, labor law, insolvency and tax regulation, and access to capital are critical factors impacting Sweden’s low entrepreneurship rate. We hypothesize that these policies are the institutionalization of collectivism embedded in the cultural framework and social structures of Sweden. We further hypothesize that these constraints on entrepreneurial activity relate to the re-direction of entrepreneurial energies into the high levels of intrapreneurship observed in the Swedish GEM study. Utilizing an exploratory case-based analysis in the consumer appliance industry we investigate how this intrapreneurial behavior may impact comparative firm behavior in large established multi-national companies (MNCs). Financial performance criteria related to innovation and anticipated to positively correlate with strong intrapreneurial behavior were compared between the Swedish firm Electrolux and its U.S. competitor Whirlpool with superior return on product development observed for the Swedish firm. The cultural dimensions driving intrapreneurial behavior were also hypothesized to drive greater systematic risk for the impacted companies, supported by the higher Beta values observed for the Swedish firm. This exploratory study suggests that intrapreneurship characteristic of a firm’s country-of-origin may be a convergent dimension of organizational behavior that transcends the homogenization of many organizational behavior traits across MNCs.

Keywords: intrapreneurship, entrepreneurship, Sweden, corporate culture, MNC

1. Introduction

This research initially focuses on the potential driving factors behind intrapreneurial behavior in Sweden. After identifying these factors, and their respective consequences, the discussion turns to their possible influence on the financial performance of large Swedish MNCs.

Financial performance criteria related to innovation and anticipated to positively correlate with strong intrapreneurial behavior were compared between the Swedish firm Electrolux and its U.S. competitor Whirlpool. This paper responds to a call from Harzing and Sorge (2003) for more research into country-of-origin effects on multinational firms. While country-of-origin has been identified as an important predictor of MNC behavior the majority of studies have focused on financial and control characteristics of the firm (c.f. Gao, Ng, & Wang 2011). Through this exploratory study we suggest that possibility that country-of-origin intrapreneurial bias may also be an important predictor of global firm behavior along this important strategic dimension.

1.1 Entrepreneurship and intrapreneurship

An ‘entrepreneur’ is “a person who perceives an opportunity, and creates an organization to pursue it” in the face of uncertainty and high risk (Bygrave & Hofer 1991). Intrapreneurship is referred to as “entrepreneurship within an existing organization” (Jasna et al 2011). In this research, ‘intrapreneur,’ therefore, refers to “an employee who innovates within the limits of an organization” (Dovey 2012).

A recent study suggests different, but distinct, entrepreneurial capabilities for entrepreneurs and intrapreneurs (Douglas & Fitzsimmons 2012). GEM distinguishes these capabilities: intrapreneurs, relative to entrepreneurs, tend to have a lower perception of the opportunities to start a business and perceive themselves less strong in skills and knowledge needed for success (Braunerhjelm 2012). Furthermore, GEM
states that intrapreneurs believe that support from their company is strong for developing new ideas and services.

1.2 Collectivism, risk aversion and perceptions of entrepreneurship in Sweden

Entrepreneurship is associated with building a business around an innovation and invention that often involves uncertainty and risk. Risk taking behavior or the ability to make a bold decision relates to individual perceptions of uncertainty. These perceptions are shaped through identifying oneself in a cultural framework that reinforces certain culturally associated actions and behaviors. According to Lupton an individual’s perception of risk is constructed by cultural symbolic perspectives (1999). For this research, collectivist and individualist societies serve as a workable cultural framework that influences an individual’s perceptions and subsequently impacts behaviors and actions in relation to entrepreneurial activities.

Sweden is an exemplar of a collectivist society. Collectivist societies perceive entrepreneurial activities as less important because of a “feudal outlook” that ranks entrepreneurs lower and less competent than employees. Additionally, while success is highlighted in individualist societies, failure is exaggerated and highlighted in collectivist society, attaching taboos to failure. Furthermore, the collectivist society’s need for affiliation makes actions that strongly promote independence and self-achievement less attractive (McClelland 1975). Based on these observations, it is more likely that individuals in Sweden will be more sensitive towards failure and risk and more likely not to pursue entrepreneurial activities.

The GEM Sweden report concludes that Sweden is characterized by a particularly high portion of the population that perceives they have good business opportunities while displaying similar levels of risk aversion as other innovation driven European countries (2012). Opportunity costs play a role in the entrepreneurial versus traditional employment decision of each individual and government policies play an important role in such decisions.

1.3 Impact of Swedish government policies

1.3.1 Labor law

Labor laws influence the entrepreneurial activity in a country as a highly regulated labor market is less attractive to an entrepreneur because of the low flexibility to hire or fire employees (Henrekson & Stenkula 2009). The Swedish Economic Forum Report states that due to the regulations for terminating an employment contract, companies are reluctant to expand their operations (2013). GEM notes that there is clear correlation between the inertia from employment regulation to the proportion of the population that is involved with entrepreneurship (Braunerhjelm 2012).

Welfare states provide a safety net through high reservation wages resulting in lower necessity driven entrepreneurship. In Sweden, only one in fifteen entrepreneurs start necessity driven companies. (Bosma, et al. 2011). There is less incentive for necessity driven entrepreneurship as one can rely on the safety net’s benefits. The barrier to opportunity driven entrepreneurship is also raised because as an employer, one still needs to pay high reservation wages to employees even in times of low-productivity activity.

1.3.2 Insolvency

An international study conducted by Armour and Cumming indicates that a more forgiving insolvency system can encourage individuals to engage in entrepreneurship (2008). The study also concludes that a stricter insolvency system affects the amount of entrepreneurs negatively. A risk from having a stricter insolvency system is that start-ups will be less inclined to grow beyond the early stage, resulting in less innovation and employment (Falkenhall & Wennberg 2010).

In 2007, the OECD issued a report discussing the Swedish insolvency system. In the report, it concluded that Sweden needs to reduce the risks of starting a new business. The OECD specifically highlighted Swedish bankruptcy law. Henrekson and Stenkula state in their research that an individual will be less encouraged to start a new business when the perceived cost is high, due to the strict insolvency system (2010). OECD also conducted a study discussing the possibilities for entrepreneurs to start a new company post failure. In their
Strict bankruptcy regulations make entrepreneurs act more risk averse (Falkenhall & Wennberg 2010) This is supported by Thorsburn’s study which concludes that several entrepreneurs chose to sell their remaining assets, pay debts, and liquidate their companies rather than be subjected to the potential of reconstruction or bankruptcy (2000).

1.3.3 Taxes

The Swedish tax law affects three different parts of the national entrepreneurial environment; the willingness to start a company, the demand from risk capital investment, and the contracts that are written between the entrepreneurs and risk capital providers (Swedish Economic Forum Report 2013).

The Swedish tax system, according to Henrekson, played a key role in the discouragement of direct household ownership of firms (2005). This type of ownership is essential in the early phase of a firm’s life cycle. Henrekson also notes that rewards for entrepreneurs are taxed at relatively high rates compared to other countries. Dividends are not frequently used due to severe restrictions and, for closely held corporations in particular, the capital gains tax is 13% higher than for other types of corporations.

Furthermore the percentage of the total labor compensation an employee receives compared to the amount paid by the employer is only around 25%, the lowest rate among industrialized countries (Nordling & Damsgaard 1998). Entrepreneurial employees are not frequently rewarded stock options, as these are subject to a social security tax of 33% in addition to a marginal tax rate which can be as high as 57% (Henrekson 2005). An international survey showed that Sweden has one of the highest rates of personal income tax in the world with a top marginal tax rates of 51% (KPMG 2011).

1.3.4 Access to capital

Access to capital is an important requirement for any start-up. The incentives for saving in welfare states, such as Sweden, are highly reduced (Feldstein 1996; Pålsson 1998). To start, as well as to grow, a firm is highly dependent on equity financing. However, the tax system in Sweden has made debt financing more attractive in comparison to issuing new shares. Debt financing is globally less often used to invest in early stage ventures as such creditors are more risk averse (Henrekson 2005). The Swedish Economic Forum Report states that younger Swedish entrepreneurial companies have difficulties accessing capital from banks and private investors.

Venture capital firms are necessary for the expansion of high-growth entrepreneurial firms. A formal venture capital firm adds expertise and provides important network connections for high-growth ventures (Ho & Wong 2007; Keushchnnigg & Nielsen 2004). According to the Sweden Venture Capital Association, investment volume in Sweden has decreased by around 60% from 2008 to 2012. From 3.8 billion SEK in 2008, it went down to just over a billion SEK in 2012. (Tillväxtanalys 2013).

The chance that an individual starts a company in Sweden significantly increases after one receives an inheritance (Lindh & Ohlsson 1996; 1998). This suggests that access to capital is a barrier to earlier action. After the decision to retroactively remove the Swedish inheritance tax which came in place in 2004, the proportion of the inheritance received has logically increased (Pihl & Sanandaji 2009). It could thus be that the removal of this tax will eventually lead to an increased number of startups in Sweden.

1.4 Intrapreneurship

While in most countries, jobs are created by a small number of very fast growing firms, known as gazelles, Sweden once again has proven to be an exception on this rule. In Sweden startups grow slowly, creating a relative lower number of jobs. Unlike other countries, in Sweden the presence of exceptional high-growth enterprises has always been uncommon (Rickne & Jacobsson 1999). Even to date, there is only one enterprise that was founded after 1969 and is now amongst Sweden’s 50 largest private corporations (Nutek & Almi 2001; Henrekson 2005). We suggest that the dis-incentives to entrepreneurship noted earlier results in the low number of high-growth enterprises. This lack of entrepreneurial opportunity may help explain the high amount
of intrapreneurial activity noted in the Swedish GEM study. Thus, most of the innovation takes place within the scope of present firms and few new firms are created.

2. The impact of intrapreneurial behavior on MNC financial performance

2.1 Country-of-origin and MNC behavior

A moderating element to the culturally driven intrapreneurial propensity of large multinational Swedish firms is the global nature of their operations. While firms may be headquartered in the U.S. or Sweden the multinational firms operations are distributed worldwide. Mueller (1994) notes societal, organizational and globalization effects on the convergence of corporate global behavior with, in some cases, behavior converging on norms specific to the firm’s country-of-origin. Supportive of this, firm headquarters location has been found to impact overall firm behavior, even in the case of large multi-national firms. Social interaction theory suggest that reference groups, such as firm leadership, play an important part in the actions of individuals with impacts noted in disparate areas of corporate behavior such as firm financial structure (Gao, Ng & Wang 2010), compensation policy (Kedia & Rajgopal 2009), control mechanisms (Calori, Lubatkin & Very 1994), corporate governance (Guillen 2000) and charitable behavior (Marquis, Glynn & Davi 2007). In their study of corporate control mechanisms, Harzing & Sorge (2003) note unique country-of-origin patterns, even for highly multinational enterprises.

These previous studies suggest that intrapreneurial behavior characteristic of companies headquartered in Sweden may affect the global intrapreneurial behavior of Swedish based MNCs, impacting overall firm performance. We next consider how a propensity to intrapreneurial behavior may manifest itself in firm financial outcomes.

2.2 Innovation measures

Intrapreneurial behavior is expected to influence innovation and a number of measures have been proposed as proxies for a firm’s innovativeness (Rogers 1998). IP measures, such as granted patents, have been used in studies of firm innovation with greater innovation correlated to larger numbers of issued patents (c.f. Rogers 1998). Exploratory searches of European and U.S. patent office databases indicated interesting results with Electrolux appearing to have received many more patents than Whirlpool. Additionally Whirlpool showed higher results on the ‘patent assignment database’ related to the innovation metric: ‘acquisition of technology from others’ (Rogers 1998). Given ambiguity relative to some of the initial patent data findings alternative measurements were sought.

Suggested financial measures related to innovation include firm revenue, percentage of revenue from new product development, improved products, unchanged products, capital expenditures in product development and percent of time executives spend on innovation (Rogers 1998). As noted by the Balanced Scorecard Institute, a suggested innovation measure is a firm’s Return on Product Development Expense (RoPDE), derived from standard accounting data (Malinoski & Perry 2014). RoPDE is calculated from a firm’s Gross Margin (GM) and Product Development Expense (PDE) via the formula (GM-PDE)/PDE. Given the difficulty in accurately calculating many of the suggested values from publically available archival firm data this study focuses on firm revenue and RoPDE for its analysis.

Creativity, risk taking and independence are characteristics of entrepreneurs that facilitate the birth of new ideas and products (Knoerr, Alvarez, & Urbano 2013). Given the constraints to entrepreneurial behavior in Sweden noted above and the higher Swedish intrapreneurial activity within firms we anticipate these entrepreneurial characteristics to be put to use within existing Swedish firms resulting in larger numbers of new ideas and products (innovation) compared to firms in locations with greater entrepreneurial and less intrapreneurial activity.

Leveraging the suggested link between innovation and firm revenue and the anticipated spread of the Swedish firms intrapreneurial behavior throughout the firm’s global operations the following hypothesis is suggested:

\[ H1: \text{MNCs headquartered in Sweden will have superior return on product development expense compared to firms based in locations with lower intrapreneurial activity.} \]
2.3 Revenue performance

The concept of intrapreneurship is suggested to be composed of four dimensions: the pursuit of new business areas, the creation of new products, organizational change, and boldness in the pursuit of current business opportunities (Antonicic & Hisrich 2001). While the first two dimensions are captured in our earlier hypothesis, the latter two dimensions relate to a firm’s current operations suggesting aggressive pursuit of current business opportunities to drive top line revenue growth. This is supported by Zahra (1991) who suggested that increased intrapreneurial activity will result in enhanced financial performance. These considerations suggest the following hypothesis:

\[ H2: \text{MNCs headquartered in Sweden will demonstrate greater revenue growth than firms based in locations with lower intrapreneurial activity.} \]

2.4 Systematic risk

A number of firm level characteristics have been noted that can moderate the impact of intrapreneurial behavior. Positive characteristics include a dynamic firm environment, growth-oriented strategic objectives, and clearly defined organizational values; in contrast extensive organizational controls can constrain intrapreneurial benefits (Zahra 1991). Cross-cultural considerations have also been noted to impact intrapreneurial outcomes. As noted by Antonic and Hisrich (2001) the development of intrapreneurship theories and measures have been conducted in an American context with limited cross-cultural testing. Given our earlier discussion of the collectivist roots in Sweden we suggest this cultural dimension will also impact the way intrapreneurial behavior manifests itself in firm outcomes. The existing government policies, such as labor regulations, limit Swedish firm’s ability to act in certain areas such as cost cutting (inability to fire poor performing staff). While as suggested in hypothesis 2 Swedish firm’s intrapreneurial norms are expected to enhance revenue growth, collectivist norms are expected to limit fiscal adjustment in poor economic periods. These observations suggest the following final hypothesis:

\[ H3: \text{The financial performance of MNCs headquartered in Sweden will be moderated by cultural dimensions resulting in greater systematic risk and higher Beta values than U.S. headquartered firms.} \]

3. Methodology and results

An exploratory analysis of these hypotheses was conducted in this study. A case based approach was used, comparing the firm performance of the Swedish firm Electrolux to its U.S. competitor Whirlpool. This comparison was selected for several reasons. Both firms are public companies with listings in the U.S. allowing for a direct comparison of firm results. Both firms are direct competitors and their businesses are focused on similar market areas. The firms are also both large MNCs with long histories.

With headquarters in Sweden and the U.S. the firms present the desired contrast in local intrapreneurial and entrepreneurial dimensions. The GEM data shows significantly higher levels of nascent and actual entrepreneurial behavior in the U.S. versus Sweden (among 18 to 64 year olds) with measures of 12.8% versus 6.4% respectively (2012). The Swedish GEM report contrasts Sweden’s relatively low level of entrepreneurial activity with a high rating for intrapreneurial behavior (2012).

Data on each firm was gathered from archival datasets available from financial websites such as Google Finance and company annual reports. Table 1 provides descriptive financial dimensions for each firm.

<table>
<thead>
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<th>Table 1: Corporate financial measures: Electrolux and Whirlpool</th>
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To evaluate hypothesis 1 the Return on Product Development Expense (RoPDE) for Electrolux and Whirlpool was calculated. A two year average for Gross Margin and R&D expense was used for each firm resulting in mean RoPDE for Electrolux of 13.65 (std. dev. 1.16) and a mean RoPDE for Whirlpool of 7.04 (std. dev. 0.612). A two-tailed paired samples comparison of means suggests these differences are significant (Sig 0.000 at 95% confidence interval). These observations are supportive of hypothesis 1.

To evaluate hypothesis 2 the year to year change in revenue during the years 2003 to 2013 was compared between the two firms. The mean change in revenue for Electrolux in this period was -1.1% (std. dev. 2.1) and the change for Whirlpool was 4.8% (std. dev. 3.1). A two-tailed paired samples comparison of means was unable to detect a statistical difference in these changes. Given that the descriptive statistics suggest a negative revenue change for Electrolux in this period and no statistical difference between the two firms performance on this measure the results are not supportive of the greater growth in revenue for Electrolux suggested in our hypothesis.

Finally, hypothesis 3 suggests that the financial performance of Electrolux will be moderated by Swedish cultural dimensions resulting in greater systematic risk and higher Beta values than firms headquartered in locations such as the U.S. Electrolux’s Beta of 2.13 compared to Whirlpool’s 1.90 as noted in Table 1 is supportive of this hypothesis.

4. Discussion

In the words of Charlie Karlsson\(^1\), “In Sweden as well as in Europe, you want to have entrepreneurship, yet, you don’t want to have entrepreneurs. It’s not an acceptable way to earn money. You can get rich on playing soccer or winning the lottery but not on entrepreneurship.” This quote indicates how entrepreneurs in general are perceived in the Swedish context. It directly resonates with how collectivism structurally marginalizes Swedish individuals from pursuing entrepreneurial activities. Also, we have identified numerous factors that directly influence decisions of Swedish individuals to consider entrepreneurship as a non-viable career path. Sweden’s low rate of entrepreneurial activity in spite of its high innovation is both a direct and indirect result of factors that set barriers to entrepreneurs in the region.

A possible beneficiary from these constraints on entrepreneurship is existing firms that leverage the enhanced intrapreneurial behavior of their employees. This exploratory case study suggests that intrapreneurship, like previously observed financial and control behaviors of firms, may be a headquarters site characteristic that can permeate a MNC’s global behavior. Social interaction theory is supportive of this premise; however, how strong a “signal” is required to drive such impact remains unknown. In the case of Electrolux the percent of employees based in Sweden has declined dramatically in recent years. In 1999 9.56% of employees were Swedish; however, by 2013 this percentage had declined to 3.43% (2,082 employees). Despite this overall human resource decline, ownership and senior corporate governance continues to have strong Swedish ties. In 2013 58% of shareholders were Swedish and 8 out of 10 members on the Board of Directors have Swedish ties with 5 born in Sweden, 2 former CEOs of Swedish companies and 1 on the board of multiple Swedish firms. Correlation of top management team (TMT) characteristics, such as education levels and functional roles, to firm innovativeness has been suggested in prior research (cf Bantel & Jackson 1989) and the national diversity of TMT members has been shown to positively impact firm performance (cf Nielsen & Nielsen 2013). Contributing to this literature stream this paper highlights the potential impact of TMT national characteristics on firm innovativeness and the potential benefits of TMT national focus on certain dimensions of firm performance. The home country ties of the TMT members are hypothesized to play a critical part in the country-of-origin effects suggested in this study.

Prior research shows that cultural dimensions play a role in national entrepreneurial and intrapreneurial behavior. While culture is a “sticky” construct change can occur over time. For example, despite all the

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\(^1\) C. Karlsson, Professor in Economics at Jönköpings International Business School, Jönköping University. Personal communication November 25\(^{th}\) 2013.

<table>
<thead>
<tr>
<th></th>
<th>Electrolux</th>
<th>Whirlpool</th>
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<tr>
<td>Institutional ownership</td>
<td>2%</td>
<td>92%</td>
</tr>
<tr>
<td>Revenue (2013)</td>
<td>$16.7 Billion</td>
<td>$18.8 Billion</td>
</tr>
<tr>
<td>Net Income (2013)</td>
<td>$103 million</td>
<td>$827 million</td>
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obstacles to entrepreneurship noted in the paper a more entrepreneurial friendly ecosystem is being established in Sweden. This combined with the exceptionally high value that Swedes place on existing opportunities suggests a country where entrepreneurship can flourish. Landström\(^2\) notes that there are government initiatives to teach entrepreneurship early in the education system that will have an effect in the long term. Specifically the Swedish National Agency for Education was tasked to implement entrepreneurship into the education curriculum (Skolverket 2010). These longer term initiatives can result in cultural shifts supportive of a strong future entrepreneurial ecosystem and perhaps a stronger return from current intrapreneurial initiatives.

4.1 Implications for practice

Government policies can be adjusted to better enable a local entrepreneurial ecosystem and provide additional support to longer term change in the cultural acceptance of entrepreneurial activities. Such changes should be executed in a manner to maintain continued support for strong intrapreneurial behavior where such cultural norms exist given the potential benefits of such activities. Management should also consider the potential to globally impact firm behavior based on the “virtuous” or “vicious” norms towards intrapreneurship of the firm’s country-of-origin. Conscious action, such as firm control mechanism analyzed in prior studies, may be required to optimize global behavior based on these considerations.

4.2 Limitations and future work

Based on our literature review and resulting hypotheses an exploratory case analysis was conducted in this study providing initial findings supportive of country-of-origin impacts on MNC intrapreneurial behavior. Additional data must be collected to validate our hypotheses and provide more informed guidance for policy change. Specifically our analyses are based on high level financial metrics that are known to be impacted by numerous variables that could not be controlled for in this study and that may be confounding our results. Case studies leveraging detailed firm information not available from the public archival data leveraged in this study could be extremely helpful in this regard. Measures more directly aligned with intrapreneurial behavior, such as an intellectual property study as touched upon in this research, could also prove particularly enlightening. Finally the role of specific reference groups, such as firm shareholders and board members, on country-of-origin influences could be better analyzed via large cross-firm studies where the composition of such important groups vary. Our extreme case of TMT national focus in the case of Electrolux also raises the question of the levels of diversity at which national characteristics become diffused, which could be considered in such a larger study. In general this paper suggests that country-of-origin influences may extend beyond the financial and control mechanisms studied in prior research opening a promising avenue for future research.

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Collaboration for Public Private Partnerships: In Support of an Entrepreneurial Ethos?

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**Abstract:** The purpose of this paper is to examine entrepreneurial traits, values and characteristics of public private partnerships in striving for a distinctive kind of ethos supportive to their operational efficiency. In doing so it employs the notion of collaboration as a theory vehicle for achieving policy and organisational goals. Methodology-wise it relies upon qualitative research that took place in Nigeria earlier this year. The main tool of investigation is semi-structured interviewing of key policy individuals. The paper investigates the capacity by public private partnerships to integrate entrepreneurial ethos as a way for efficient performance and management. Despite the fact that empirical evidence justifies existence of this ethos in terms of innovative interventions, partnership transformation, partnership efficiency, effective management and value creation, this comes at a cost: evidence of corruption and societal protest about increase of toll tax have been two of the most noted pieces of evidence of the public’s response to partnership work outcomes.

**Keywords:** collaboration, public private partnerships, entrepreneurial ethos, Nigeria

1. **Introduction**

It has been widely argued that entrepreneurial ethos can be integrated in organisational operation by applying a pragmatic, action oriented approach to the moral arena for sustaining innovation and value creation (Surie and Ashley, 2008). This is perhaps more evident into today’s collaborative world of organisations. Collaborative activities have become more prominent and extensive in many countries around the world (Appuhami, Perera and Perera, 2011; Selsky and Parker, 2005; Berger et al, 2004), especially when it concerns collaborations around local regeneration issues (de Bettignies and Ross, 2009; Muir, 2004; Ball, Le Ny and Maginn, 2004). Gray (1996: 58) defines collaboration as a “logical and necessary response to turbulent conditions under which organisations become interdependent with each other and offer solutions by building a collective capacity to respond to these conditions”. Due to economic and technological changes, and shrinking of financial revenues, governments around the world have responded to socio-economic revitalisation by delegating economic powers upward to global and downward to local institutions (Harding 1994; Gore 1991).

Public-private partnerships (PPPs) then as an institutional expression of collaborative efforts seem to have the capacity in representing arenas in which entrepreneurial ethos could thrive. This is what this paper argues about taking as context of empirical research the case of local regeneration partnerships in Nigeria. Evidence is based upon primary collection of data that it is envisaged to be confirmed by further qualitative research findings to be collected in the autumn 2014.

2. **Theory 1: Collaboration as an approach for achieving entrepreneurial ethos**

*What is Collaboration?*

Despite the fact that collaboration can be an integral part of an organisational structure it is debateable how accurately someone could define it. According to Sullivan and Skelcher (2002), collaboration can take different forms such as: policy networks, principal-agent relationships, social networks, community-led initiatives. In the light of this, it is perhaps worthwhile to begin with a description of collaboration as an outcome of network action. According to Hall (2000), networks refer to the development of linkages between actors (organisations and individuals) in which the relationships become more formalised upon establishing and maintaining mutual interests. In this respect, the nature of these linkages can range from ‘loose’ formations to more lasting organisational structures and relationships. Mandell (1999; cited by Hall, 2000) identifies a continuum of such collaborative efforts starting from interactive contacts between two or more actors up to a collective or network structure where there is a broad mission and joint interdependent action. Such arrangements take on board tasks that reach beyond the concurrent actions of individual operators.

Based on the above Mattessich and Monsey identify collaboration as a more
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...durable and persuasive relationship; it brings previously separate organisations into a structure with full commitment to a common mission; the sustainability of these relationships is dependent upon planning and well defined reliable communication channels operating on many levels; authority is determined by the collaboration structures and risk is much greater because each participant contributes reputation and owned resources; the latter are pooled jointly and secured for a longer term effort that is managed by the collaborative structure; product outcomes are shared and more accomplished jointly than could have individually

(Mattessich and Monsey, 1992: cited by Greer, 2001)

As Huxham argues, an essential move is to agree about the purpose of creating a collaborative scheme. In view of this, persuasions for collaborators to ensure that they have ‘concrete, attainable goals’ (Mattessich and Monsey, 1992; cited by Eden and Huxham, 2001: 374), ‘to identify and appreciate a common sense of purpose’ (Gray, 1985; cited by Eden and Huxham, 2001: 374), to involve the community (Barr and Huxham, 1996) and to create ‘a positive, purposeful relationship’ (Cropper, 1996: 82) are common between researchers as well as practitioners. In addition, arguments about having clarity of purpose (Hardy et al, 1992; cited by Eden and Huxham, 2001) and long term goals in which the relationship plays a clear role (Kanter, 1994) can perhaps give a broader picture of what is needed in order to achieve collaboration. Having said this, circumstances for attaining collaboration vary. For example, modest, low risk, collaborative arrangements are the only way forward when the environment is hostile. On the contrary, large-scale, big risk collaborative projects are needed in cases in which collaboration has previously failed.

Attributes of Collaboration

Defining relevant attributes is significant, as it can help exploring the concept of collaboration even further. This would be more explicit if it could fit into particular approaches such as when preconditions of issue-setting, direction-setting and implementation-setting occur. If these preconditions do not occur then it might be difficult to identify if collaboration has been established. In an attempt to describe collaboration and its properties Huxham (1991) argues about four characteristics which are significant for the potential success of a collaborative project. The first characteristic is commitment to collaboration and the role of the representatives of each participating group involved. If the representative to the collaborative scheme has an individualistic perspective then it is difficult to be committed to the values of collaboration. The second characteristic is linked with the successful agreement over an issue. Each of the organisations involved, although having something in common with the others, has its own particular remit and mission. In this way there is a tendency by some of the participants to become quite quickly disturbed because they feel that certain short terms problems are not being resolved. As a result, a minimum agreement over the collaborative potential is considered as essential (ibid.). A third characteristic (Huxham, 1991) is about the fruitful agreement over the participating actors. It could be suggested that participating groups do not have the same level of interest in collaboration. Moreover, they tend to be quite different in terms of size, power and financial resources. As a consequence, each participating group has a different level of ability to contribute to collaboration. Finally, the expectations of the participating groups in order for the collaborative group to flourish constitute another characteristic. This gives expression to the need for the participants to see their expectations fulfilled (Huxham, 1991). In this way tensions can be balanced by interested parties (Barr and Huxham, 1996). However, the way of seeing the potential of the collaborative scheme may vary significantly as there is not necessarily an authority relationship between the participating groups. All the about would need a certain degree of organisational ethos in order to be applied to the case of entrepreneurial activities. This could be achievable, as we can see in the next section.

Collaboration for Achieving Entrepreneurial Ethos

It has been argued that entrepreneurship can be seen as a “societal phenomenon”, which draws attention to results of entrepreneurial behaviour that ultimately defines the heterogeneity of environmental conditions (Fuller et al, 2007). In this respect, we might want to take a social constructionist view under consideration of how entrepreneurship operates so that a distinctive moral space would be allowed to interfere (Anderson and Smith, 2008). Having said this, Llewellyn et al (2007) argue that there seem to exist two different types of entrepreneurs regarding the development of ethos throughout the years: an older one based upon the Weberian proposition that described the ethical character of the entrepreneur as firmly oriented in protestant temperance and reliability, shrewdness and devotion to family and business; and a contemporary one about
an entrepreneur ascribed as a human being of obsession with danger and risk taking, of preoccupation with breaking rules. Perhaps the latter just suggests life norms that society goes through today in which an entrepreneur of this type would not be characterised as a persona-non-grata but quite the opposite.

On the contrary, while individualism and free market rules might be useful in acquiring efficiency, the need for intervention to receive equity and access can be proof of the failure of the price system. Additionally, values are intrinsically determined by the economic system, which deals with the allocation of resources to satisfy individuals’ preferences (Surie and Ashley, 2008). Moreover, it has been accepted that the logic of governing ethics in entrepreneurial firms is philosophically different from that in operationally hierarchical firms. The latter, because of their emphasis on specialisation of labour, centralisation, and conformance with authority, offer little in the way of opportunities for role-taking or responsibility for the consequences of their decisions. On the other hand, entrepreneurial organisations require continual interaction with others. In this way, relationships within and between groups focus on mutual trust, interdependence, broad dispersal of control and responsibility, and conflict resolution via bargaining and mutual problem-solving (Solymossy and Masters, 2002).

Nevertheless, someone will have to accept the suggestions that bringing people together can be seen as an important aspect of creating an entrepreneurial ethos in an organisation. As Vangen and Huxham argue (2003) helping people communicate, for example in a face-to-face interaction is key for empowering them. This is because such ethos can pursue the continuing dialogue of action and interaction entrepreneurial processes really need in order to survive and flourish as it explained in the case of public-private partnerships in Nigeria in the next section.

3. Theory 2: Collaboration in developing and sustaining entrepreneurial ethos for public-private partnerships

Table 1: Collaboration criteria that indicate entrepreneurial ethos and potential implications they produce (Osikhuemhe Okwilagwe, 2014, an adapted version of a model she has been utilising for her PhD studies)

<table>
<thead>
<tr>
<th>Collaboration Criteria</th>
<th>Potential Implications for Public-Private Partnerships that Indicate Entrepreneurial Ethos</th>
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<tbody>
<tr>
<td>Clarity and Realism of Purpose Goals</td>
<td>Innovative Interventions</td>
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<td>Resource Sharing</td>
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<td>Information Sharing</td>
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<td>Commitment and Ownership</td>
<td>Partnership Transformation</td>
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<td>Resource Sharing</td>
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<td>Information Sharing</td>
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<tr>
<td>Collaborative Communications</td>
<td></td>
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<tr>
<td>Developing Confidence and Maintaining Trust</td>
<td>Partnership’s Efficiency</td>
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<tr>
<td>Developing Confidence and Maintaining Trust</td>
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</tr>
<tr>
<td>Engaging Community</td>
<td>Effective Management of Partnerships and Sustainable Improvement of the Local Community</td>
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<tr>
<td>Collaborative Governing</td>
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<tr>
<td>Engaging Community Participation</td>
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<tr>
<td>Clarity and Realism of Purpose Goals</td>
<td>Creating Value</td>
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<td>Resource Sharing</td>
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<td>Information Sharing</td>
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<td>Collaborative Communications</td>
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<td>Developing Confidence and Maintaining Trust</td>
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The number of public-private partnerships (PPPs) in both developed and developing countries has increased significantly in the last twenty years (Appuhami, Perera and Perera, 2011; Selsky and Parker, 2005). Pioneered in the United Kingdom, the concept of PPPs emerged from a government point of view as being fundamental to its public sector reform programme across wide areas of public policy (Couch et al, 2010). In recent years, the variety and extent of PPPs have widened from international partnerships to include local and national concerns (Beauregard, 1998; Selsky and Parker, 2005). In these PPPs, individual organisations collaborate to
address challenges facing various sectors such as education, transportation, health care, infrastructure, environmental sustainability and local regeneration (de Bettignies and Ross. 2009).

In an attempt to identify patterns that could promote and sustain entrepreneurial ethos the model in Table 1 is used. It offers a range of criteria that could be regarded as collaborative policy and operation elements. These elements strongly indicate that collaboration can offer differentiated ethos to normal hierarchy structures, as it was explained in section 2.

4. Methodology

This paper refers to the dissemination of a pilot study’s findings and in this respect it can/should be linked with further research. The findings came up from 14 interviews that were conducted in Nigeria between February and April 2014. Via an on-going correspondence and snowballing technique applied in three organisations 7 further interviews were conducted outside the rearranged 7 ones. Of the 7 organisations contacted, 3 were from the public sector (this included government institutions, external experts and consultants) and 4 from the private sector (this included top management from financial institutions and other external advisors). The interviews were conducted on the premises of each organisation and they varied between 42 and 125 minutes.

Although the primary purpose of this investigation was to justify collaboration as the core element in the life cycle of a public-private partnerships the research findings offer the opportunity to detect importance of having entrepreneurial ethos as part of this process too. As Denscombe (2010) asserts interviewing should be aware of opinions, feelings, emotions and experiences as well as that some issues are more sensitive and rather personal than others. Issues of this kind seem to have applied to the actual interviewing process that took place when a member of the authoring team met PPP officials in Nigeria. In addition, a significant part of findings especially the ones referring to the policy context of partnership development in Nigeria are based upon secondary data collection.

5. Collaboration and entrepreneurial ethos in Nigeria

The perceived need for PPPs in Nigeria reflects (amongst others) local regeneration reforms. Nigeria is recognised as the second largest economy in Africa and the largest in sub-Saharan Africa, in spite of this, the mismanagement of the country’s resources has greatly constrained the country’s economic growth and development (Olaseni and Alade, 2012). This has led to insufficient funding by both the federal and state governments in maintaining local infrastructure and service provision (Adedeji et al, 2005). With responsibilities for addressing local regeneration issues passed from federal to state level and with the states each year expected to do more with less financial funding some of them have been looking to include partners from other sectors closest to these issues in the design and implementation of solutions (Lasker et al. 2001). Moreover, the beginning of the “third world debt crisis” raised significant concern for United Nations financial donors such as the World Bank and the International Monetary Fund (IMF) as well as the Organisation of Economic and Cooperation Development (OECD) (Miraftab, 2004). When policy makers in a country are faced with a new crisis, there is usually the trend to use or adopt solutions that have been implemented in the past or implemented in another country (Couch et al, 2010). The prescribed solution for governments in developing countries has been to initiate certain economic adjustments such as public expenditure cutbacks, decentralisation, privatisation, and public-private partnerships (The World Bank 1990; USAID 2013). Regarding the latter option their use for policy implementation has been seen as paramount.

This research investigated PPPs for local regeneration in Nigeria that have been pioneered by the Lagos State government and Federal Capital Territory Abuja (The World Bank, 2011). Furthermore, the country’s Minister of Finance announced in the 2013 budget that there was a need for more investment in regeneration projects. He indicated that the national government recognised that Nigeria’s local regeneration projects deficit remains one of the binding constraints to growth in the economy (The Budget Office, 2013). Okonjo-Iweala (2013), states that the strategy is to prioritise regeneration projects investments in the budget, and also to leverage additional external financing for these investments in the country. There are also plans to expand the use of PPPs which will attract co-investors from home and abroad such as pension’s funds.

From the discussion above, the importance of having public-private partnerships in place in Nigeria is very evident. The core issue is to investigate, analyse and explain to what extent partnership operation allows for
development of a relevant entrepreneurial ethos that can shape their performance. Research findings support this, as it can be seen in Table 2. Collection of primary data was held from a major PPP project in Lagos State (the construction of the Phases I, II and III of the Lekki - Epe Toll Road) which has been the first of its kind at this level. In this respect, interview participants were extensively involved in the development of contractual arrangements and in the operations of the PPP and played various roles in decision making. It was be accident then that a number of interviewees declined to respond to particular questions, or go into details and preferred instead to give superficial answers. It can be argued though that despite these incidents data collection was generally well-completed.

**Table 2**: Collaboration criteria and findings that indicate entrepreneurial ethos within public-private partnership work in Nigeria

<table>
<thead>
<tr>
<th>Collaboration Criteria</th>
<th>Potential Implications for Public-Private Partnerships that Indicate Entrepreneurial Ethos — Findings from the Pilot study in Nigeria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clarity and Realism of Purpose Goals</td>
<td>Innovative Interventions: The importance (sanctity as it was noted) of the arrangement</td>
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<tr>
<td>Resource Sharing</td>
<td>Partnership Transformation: Participants to have necessary collaborative capabilities</td>
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<td>Information Sharing</td>
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<tr>
<td>Commitment and Ownership</td>
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<td>Resource Sharing</td>
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<td>Information Sharing</td>
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<td>Collaborative Communications</td>
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<td>Developing Confidence and Maintaining Trust</td>
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<tr>
<td>Developing Confidence and Maintaining Trust</td>
<td>Effective Management of Partnerships and Sustainable Improvement of the Local Community: Investors attempt to recoup the costs and make returns ALTHOUGH... local residents seek improvement of their day-to-day lives</td>
</tr>
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<td>Engaging Community</td>
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<td>Collaborative Governing</td>
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<tr>
<td>Engaging Community Participation</td>
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<tr>
<td>Clarity and Realism of Purpose Goals</td>
<td>Creating Value: Serve not only the shareholders’ value but also the whole society</td>
</tr>
<tr>
<td>Resource Sharing</td>
<td>BUT corruption is a major concern</td>
</tr>
<tr>
<td>Information Sharing</td>
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<tr>
<td>Collaborative Communications</td>
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<td>Developing Confidence and Maintaining Trust</td>
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</table>

According to findings PPP ownership in Nigeria typically rests with the government. Having said this, regulations give the right to a private investor of applying for a form of lease. Typically then while the government would retain the responsibility for issues like social settlements and risk of work construction it is up to the private investor to maintain the actual project and receive the consequent financial benefits so that they become responsible for the project’s management. As a private sector consultant contended "there is a major consideration beyond profits beyond money; the respect for the agreement that has been reached, so for me those are the two key issues: Profitability and [most importantly] sanctity of the deal".

With regard to how partnership transformation can be achieved a public sector partner argued that:

"I said one of the ways you ensure delivery is that the people you bring to do the delivery have the capability, which comes from a lot of things such as the delivery of policy or that people are happy every time to support your service. When you get that, your sense of integrity would also ensure that you [the partnership] also are self regulating [and not the government]"

Deliverability that would consequently bring actual delivery of outcomes comes up as a main issue for partnership efficiency according to the findings. In this respect, participants argued that partnership structure as well as allocation of risk constitutes issues that matter significantly. Additionally, allocation of responsibility between the different partners is an element that can promote a great sense of entrepreneurial ethos. Moreover, it is the attribute of partnership management that can warrant sustainability of partnership work in long-term. Participants emphasised on the fact that "there is usually a maintenance period, over which the investors seek to recoup the cost and make a reasonable return... reaching a point where they would have the asset back... the guarantor in this case must likely a public entity in this case or government or otherwise".
Notwithstanding, things do not work as such every time as: "The erroneous believe that where people used to spend 3 hrs on the road, they would now spend 30mins then they would be happy and they would be willing to pay the toll fare" although "some protested about the toll fares. Due to that protest the government was forced on the one hand to slash down d rate by almost 50% and this [of course] led to revenue reduction". The entrepreneurial ethos cannot be sustained all the time, accordingly.

In discussing the Lekki - Epe Toll Road project, participants compared it with other past and current PPP arrangements. A range of issues were raised more importantly regarding the need for a more cohesive and comprehensive regulatory and legal framework, transparency in the selection of partners, accountability of the PPP to general public, importance of guarantees and the huge reliance on contractual and memorandum of agreements to cover issues relating to ownership and commitment, trust and conflicts. Moreover, they suggested that a number of issues tend to reoccour such as: need for having private sector participation in place; the growing need for more PPP projects in areas of infrastructure development and local regeneration; necessity for the government to seek and engage more expert advice in terms of PPP arrangements; need for better community engagement and participation; better clarity of roles and responsibilities of individual partners; issues around corruption and self-interest; better monitoring procedures throughout the lifecycle of a PPP.

"Ultimately we believe it is a model that would help to serve our purposes as well as the nation's purposes. Of course there is another very important thing as well, it is not just about doing projects to optimise share holders' value. As an organisation we are very committed to making our own decent contribution to the society, in ways we believe we can assist African societies, including Nigeria... [as] infrastructure helps to promote economic development and growth" (from a participant from the private sector).

The latter statement emphasises on the ability of partnerships to create value and therefore potentially significant entrepreneurial ethos, one that can change the way organisations work in Nigeria. Nonetheless, endemic problems keep being in place such as corruption because it is "anything that boxes the system, something that is at the low end of the spectrum as opposed to best practices".

At the end of the day, it might be that "we have to put more resources into doing research, to find out from the communities, as opinions were sought but not comprehensively enough. If partnership arrangements were done properly they would have been able to uncover some of the issues that propped up later...[for example] there must be another road local road that people must pass as an option, you cannot force people to pass our toll road, like it is done in developed countries". The last phrase by a private sector consultant perhaps epitomises the significance of having a new ethos in place, one that can support development of innovation through partnership work one that should also take into account the specific Nigerian political and social settings.

**6. Conclusions**

Further discussion is probably necessary in order to establish a holistic view about the meaning of the encountered findings. In brief, these findings can be presented as: a) Ownership of partnership arrangements in Nigeria typically rests with the government and this consequently creates restrictions into the scope and ability of other sector participants; b) Deliverability of policies comes up as a main issue for partnership efficiency; c) There exists an expressed ability of partnerships to create value and therefore potentially significant entrepreneurial ethos however this would need to be enhanced further.

The latter questions the steady existence of entrepreneurial ethos in partnership work, the core element of this investigation. The complexity of issues that shape entrepreneurial organisations require continual interaction with others can impact of the continuity of this particular ethos. Nevertheless, entrepreneurial ethos applied via partnership work is a very "flexible" notion to be regarded as a normative value.

Regarding future steps a potential research would look for themes that could include: need for private sector participation and for the government to seek and engage more expert advice in terms of partnership arrangements; need for a further enhanced community engagement and participation; clarification of roles and responsibilities of individual partners; issues around corruption and self-interest;
When it comes to the real question about the actual value of having partnerships in place it is encouraging to mention what a private sector partner said that:

“I think they [partnerships] have a future, as there is no other choice: that is the good thing. The bottom line is that the financial requirements of infrastructural development in Nigeria vis a vis the resources available means that whether the government likes or not they would have to continue to consider PPPs”.

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Supply Process Optimization Using Hubs for Materials

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Abstract: Globalization of world economic processes has intensified in present years, especially on FMCG markets. That makes production companies pay much attention to goods and materials standardization at their plants. Meanwhile for products with low shelf life companies search possibilities to increase freshness of their products at the shelf. That leads to complicated production and materials supply schemes (several plants), which do not operate in an optimal way. In the article, the innovation model of materials flow optimization is analyzed for a company with territory-spread structure of production capacities. Several stages of innovation development and implementation are explored: define, development, implementation, post launch analysis. Complex economic effect to the business processes was evaluated. Innovation helped to increase materials turnover, decrease purchasing price and risk of shortage of materials that are used on several plants. Hub for materials is a network of transitional warehouses between suppliers and plants of usage. To solve a problem of a great variety of places of hubs allocation, determine their quantity and transportation schemes, genetic algorithms were used. They helped to find optimal supply models. In the optimization model, following parameters were considered: Different kinds of transportation, their costs and capacities; Different places to allocate hubs for materials; Materials planning parameters (minimum order size, price levels, transportation conditions); Suppliers location; Forecast of materials consumption at each plant; Several points of loading trucks from suppliers and several point of uploading trucks from hubs to production plants. Using suggested model an optimal logistic scheme of materials supply for production company was created. The model determined number of hubs for materials and their locations, helped to increase materials turnover and truck fill rate, decrease purchasing prices and risk of materials out of stock. Suggested schemes were tested at Danone Russia (24 factories in the country) where showed significant results and benefits. Special KPIs were created to measure efficiency of innovation implementation.

Keywords: hub for materials, supply optimization, procurement management, organizational innovations

1. Introduction

Economic crisis that started in 2008 for most trade companies in Russia brought significant changes to sales trends. Instead of double digit growth, they faced close to zero dynamic what is still valid for 2014. In such case, the only way for further development and competitiveness on market is to focus on innovations in every possible area of business. Those enterprises who invest in innovations, research and development on the one hand receive competitive advantages. But on the other hand it is very important to evaluate real efficiency of innovation before starting to spend money on it. In Russia the average expected payback period for innovation implementation is 2-4 years.

Unfortunately the level of innovation activity among Russian companies is low, according to National statistical agency Rosstat, in 2012 only 11.3\% of all enterprises in Russia declared expenses for innovations (9,1\% for technological, 3,0\% for organizational innovations and 1,9\% companies included in their budgets expenses for marketing innovation and 1,3\% for ecological).

The structure of expenses for innovations (Rosstat www.gks.ru, 2012) shows that main expenses were made for technological innovations (98,5\% of all expenditures for innovations). While expenditures for organizational innovations were only 0,8\%, 0,4\% for marketing and 0,3\% for ecological. At the same time, one of the most actual topics for Russia is low labor productivity comparing to developed countries which is 2-4 times lower. Organizational innovations can help reduce the gap in labor productivity, making Russian companies more competitiveness in world trade process. In the article bellow organizational innovations are considered for materials procurement process. Innovation created, estimated and implemented in Danone Russia - FMCG company with complicated production processes. A special attention is paid for studying the efficiency of innovation implementation and on post-launch analysis.
2. Case review

Danone Russia operates 24 plants in Russia, stores more than 2500 materials and 750 SKUs of finished products. Company is a leader in Russia in the market share of milk products (22% in 2012), its core portfolio are dairy products in the categories: modern cheese and yogurts, traditional curd and sour cream, UHT milk. Most of the finished goods have a very short shelf life from 6 to 40 days. This market is rapidly developing in Russia, average rate of increase in absolute terms is 5,8%, yearly turnover 10 billion euro and over 120 000 employees. Company also plays an important social function, providing fresh dairy products to babies, which are guaranteed by law.

Analyses of the internal data of the company in the period January 2011 – December 2012 shows that average materials stock turnover was 43,6 days and 26,5 million euro which is 3-4 times higher than in the other countries. At the same time, orders to suppliers are placed by each plant procurement specialist with no coordination with other plants. In this case, it seems logical, that company can win good discounts from its suppliers, if orders are placed in an arranged way. Another aspect that seems to be not optimal in the current materials procurement scheme is low truck fill rate (58%, www.danone.ru, 2011-2012). Thus, company has several goals to achieve:

- increase materials stock turnover;
- get extra price discounts from suppliers due to orders placement management;
- increase truck fill rate;
- minimize materials write offs due to pack or ingredients changes.

These goals can’t be delivered using current organization structure and instruments for procurement planning. They need break-through changes to all current processes and resources. Innovation suggested and implemented by consulting company is described below. The project that helped to estimate and implement hub innovation started from the first stage “define”. The main aim of that stage is to determine in general if this innovation can bring positive economic effect.

3. Hubs: Model overview

The core reason of low efficiency of procurement is little integration between Danone Russia plants. Frequently orders to the same suppliers and same materials are placed in chaotic order, what negatively reflects the purchasing price, stock turnover and trucks utilization. Innovation suggested using hubs for materials planning and delivery to plants.

Hub is a managing structure of a network company that centralizes purchasing of finished products or materials (Carter R.J., 1985). It helps to get best purchasing prices, fast reaction to a changing market needs and increase goods turnover (Дыбская, 2002). Supply planning using hubs is getting more and more popular for network companies all around the world. Thus, common warehouses are turning from just a place for physical keeping of goods to centers for optimization of products and materials flow (Лукинский, 2008).

One of the pioneers in the hubs implementation in daily supply chain operations was Wal Mart Company. In late 1980\textsuperscript{th} it realized how expensive it was to store finished products in the warehouses of its supermarkets and worked out new model of supply using hubs for goods (www.supply-chain.org). This organizational innovation turned out to be a really break through achievement that rapidly was repeated by its competitors. Such model provided following advantages (Christopher M., 1987):

- Enabled extra place for trading in supermarkets;
- Provided efficient stock management and deployment on the whole supply chain.

Demand aggregation for finished products at hub level also helped retailer to reduce its stock level by 30% and decrease probability of shortage (Cooper J., 1995).

Now in many countries, including Russia yearly conferences and forums take place, where mostly retailers’ representatives share their experience in using hubs. Companies operate either through their own hubs or use service of logistic providers (3-PL). Researches in supply chain determine two main types of hubs, depending on average lead time from it to its clients: American type with optimal distance to clients 400-500km and European with optimal distance 2-3 times lower (Langley et al, 2008). In American hub type, orders are
prepared in the evening and are delivered to clients during the night time (Gattona J.L., 1998). In Russia most of the companies use American type of hubs due to significant territories.

Researches determine two main types of hubs: enclosed and open (Coyle et al, 2003). Enclosed hubs are used only by one company that operates with them and in open hubs model warehouses are used by several clients. For trade network companies more popular and preferable type is open hubs, in this case the average warehouse fill rate is close to maximum capacity and products turnover is high. For production companies if hubs are used for materials flow management, usually enclosed hubs model is used (Arkhipov et al, 2011).

In spite of increasing number of conferences, scientific applied researches and publications at this topic, most of the focus is concentrated on using hubs for finished products what is useful for retail companies. Meanwhile, insignificant attention is paid for studying hubs for materials (Архипов, 2013). Such models have their specific features and differences from classical hub models. That explains the novelty and potential of further researches of such models, their development and implementation in Russia.

4. Specific features of supply processes in Russia

Main specific of supply processes in Russia is poor development of transport infrastructure and low reliability of local suppliers. Average deviation in lead time when using rail way is more than 8 days and average speed of materials flow inside the country is 17,8 km per hour (www.marketcenter.ru). Another Russian specific is long distance between production plants and customers, low concentration of population in most of the regions. Due to huge distances dairy companies have several production plants, because usual requirements from retailers are to deliver products with at least 70% freshness. Spread of production volumes between several plants has a negative impact on materials turnover: 44 days in Russia, 12-16 days in USA and Europe (www.danone.com). Suppliers’ service level that shows a percentage of orders fulfilled on time, in the exact quantity and perfect quality is also lower, than average in the developed countries (only 78% of orders in 2011-2012 were perfect, while in US and Europe this KPI was close to 98%).

The main indicator of supply chain efficiency is customers’ service level that shows the percentage of orders from the clients that were fulfilled at once. Here Russia is close to developed countries level (table 1).

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Russia</th>
<th>Europe</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average distance from clients to milk plant, km.;</td>
<td>868</td>
<td>229</td>
<td>276</td>
</tr>
<tr>
<td>Average distance from suppliers to milk plants, km.;</td>
<td>637</td>
<td>289</td>
<td>309</td>
</tr>
<tr>
<td>Average speed of materials flow across the country, km/hour;</td>
<td>17,4</td>
<td>33,5</td>
<td>31,8</td>
</tr>
<tr>
<td>Materials turnover, days</td>
<td>31</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Suppliers service level (SSL), % of perfect orders</td>
<td>78</td>
<td>96</td>
<td>94</td>
</tr>
<tr>
<td>Customers service level (CSL), %</td>
<td>94</td>
<td>97</td>
<td>97</td>
</tr>
</tbody>
</table>

Russia was one of the world’s leaders in growth of milk products consumption till 2012. Further industry development is limited by fresh milk shortage. Companies concentrate in innovations that bring fast profitability. One of such project is implementation of hub model for materials flow management. Great variety of materials which have different logistic parameters requires their many-dimensional classification analyses to be executed firstly. It will help to estimate the expected benefits of innovation and its economic effect.

5. Many-dimensional classification of materials stock at milk products manufacturing company

Many-dimensional analysis was done to determine structure homogeneous groups of materials by their logistic and planning parameters. This data will be used for proper estimation of economic benefits and effects of innovation implementation.

Danone Russia data was used for 2010-2012 years. It was collected from 22 plants by 8 main indicators. Territory structure of company Danone Russia is showed in figure 1.
General quantity of suppliers is 249, 54% supply only single plant, 15% suppliers deliver their materials to 2 plants and 31% of suppliers supply 3 and more plants.

Materials turnover analysis showed that tin and functional ingredients have the lowest turnover (75-90 days) while corrugated, preforms, and ferments have the highest turnover (2-8 days). Thus for further analysis the following indicators were included:

- $x_1$ - number of production plants that consume material, pcs;
- $x_2$ - number of finished products, which bill of materials contain this material, pcs;
- $x_3$ - lead time, days;
- $x_4$ - number of month since the begging of material’s usage, pcs;
- $x_5$ - material turnover, days;
- $x_6$ - material forecast accuracy, %;

Materials testing for anomalous observation using Grabbs criteria and criteria of Tietjen-Moore (Айвазян и др., 2001) helped to determine such observations, mainly for forecast accuracy indicator. Most materials which were detected as anomalous are used for 1-6 months only; they were excluded from further study and formed a special cluster “new materials”. Indicator #4 excluded from next step analysis.

For normalized values of remained indicators many-dimensional cluster analysis were done, that helped to divide materials into three structurally homogenous clusters by values of selected indicators:

First cluster “Unique local materials” (11% of total stock price) included materials with the highest value of forecast accuracy; they are used on one plant only for single product. Second cluster “Unique national materials” (47% of total stock price) contains materials that are used on several plants, but they are included into bill of materials of a single product. They also have average level of forecast accuracy and low turnover. Third cluster “Materials of mass consumption” (36% of total stock price) was formed by materials that are used on several plants for production of several finished goods, with high turnover and good forecast accuracy. Forth group of materials “new materials” (6% of total stock price) was generated on the previous step of cluster analysis. It characterizes by very low forecast accuracy (figure 2).
Materials from a first cluster that are consumed only on a single plant can by supplied to plants through hub, but that will bring only increase in lead time, also these materials don’t have a problem of low turnover. So it is recommended to keep them on a regular standard supply scheme. Third cluster materials are mostly fast-movers and are produced by regional suppliers that are located closely to production plants (corrugated, paper labels, films, etc.). The best recommended way for Danone Russia to organize their delivery is to implement vendor managed inventory (VMI) type of procurement.

The only cluster, for which hubs can be implemented, is second cluster. It is the biggest group in value that can generate the best productivity after supply scheme change. Based on this preliminary analysis, it was proved that hub innovation can really show a good result and the management of the company took decision to move the project to the next stage “develop”. The aim of this stage is to estimate the complex effect that innovation will have on economic processes in the company. This estimation is used to make planned indicators values after innovation implementation. It also helps to take a decision to transfer the project to a next stage “implement”. In the next chapter the model of hubs is described for the “Unique national materials” with estimation of economic benefits after innovation implementation.

6. Hub model for materials procurement to plants

After the project of hub innovation implementation was moved to the stage “develop” a real efficiency of innovation should be estimated. The areas where company can gain benefits were described above. But it is obvious, that hub model will require changes in organizational structure, IT systems development, and mathematic model creation. To determine these figures and compare them with the effect from positive changes, a mathematic model was created.

In the second cluster “Unique national materials” were included materials that are used at several plants but are included in the bill of materials for a single product only: fruit preparations, sleeves for bottles, carton cups, etc. The main specific of these materials is that they can be relocated from plant to plant. Average turnover of materials of this cluster is very low (57 days), but their share is huge (47% in value). The main reason of low turnover is uncertainty: production volumes can be unpredictably relocated from plant to plant depending on fresh milk balance, technical issues or lack of capacity. Without centralized planning, when each plant places separate order for these materials, it also negatively reflects the purchasing price.

To estimate hub model the following assumptions were done (Ballou, 1999):

- three kinds of transportation are available: rail way, ferries and auto routs;
- when using auto transport several truck tonnage available (20t, 12t and 8t);
- two temperature conditions (standard tent and fridge cameras);
- truck can have up to three places of loading at several suppliers and several hubs/plants of uploading;
as a place for hub location, only existing warehouses are taken into account (warehouses of plants and products – 54 storage locations).

Thus, to solve the problem, the following objective function should be estimated:

\[
J = \sum_{i=1}^{N} \sum_{j=1}^{M} d_{i,j} + \sum_{j=1}^{M} \sum_{k=1}^{L} s_{j,k} + \sum_{f=1}^{F} u_f \times 0.3 \rightarrow \min
\]  

where \(d_{i,j}\) - is a cost of transportation from N suppliers to M plants taking into account the transportation scheme using hub and possibilities to make consolidated delivery;

\(s_{j,k}\) - Stock management expenses (operational free cash flow and warehouse administration);

\(u_f\) - cost of losses due to underproduction.

In equation (1) losses from underproduction was taken with coefficient 0.3 because on average only 30% of what were under produced turned out to be real sales loss, other volumes are substituted for another milk products.

The problem has a great variety of possible solutions (more, than \(2.7 \times 10^{38}\)), so to find an efficient supply scheme a genetic algorithm was used. It allows to start a process of directed search of possible solution that will have the best value of the objective function. Following steps were done according to rules of genetic algorithms usage:

- created a way for solution coding that uniquely determine the value of objective function;
- created sets of basic first generation of possible solutions (so called populations);
- determined the rules of population evolution;
- started a continuous process of new generation;
- created a rule of algorithm stoppage.

Using genetic algorithms to solve economic problems gains accelerating interest and becomes an object of scientific researches in Russia (Орехов и др., 2004) and in other countries of the world (Ronald et al, 2009). Main advantages of this method is that it gives several options that are very close to each other in the value of objective function, but provide absolutely different results. This gives a possibility to decision-makers to choose the best option also taking into account other factors that were not included in the initial model. Examples of possible solutions coding are shown in table 2.

**Table 2: Principles of solutions coding**

<table>
<thead>
<tr>
<th>Material</th>
<th>Supplier</th>
<th>Type of Transport</th>
<th>Point of upload #1</th>
<th>Point of upload #2</th>
<th>Type of delivery</th>
<th>Plant number</th>
<th>Code of solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0 - direct</td>
<td>0</td>
<td>1-1-1-1-0-0-0-0</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>0 - direct</td>
<td>0</td>
<td>1-2-1-1-2-3-0-0</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1 - through hub</td>
<td>3</td>
<td>1-3-2-2-3-0-1-3</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>N</td>
<td>K</td>
<td>M</td>
<td>1</td>
<td>9</td>
<td>0 - through hub</td>
<td>16</td>
<td>N-K-M-1-9-0-1-16</td>
</tr>
</tbody>
</table>

where N – number of plants, K – number of materials, M – number of suppliers, code 1-2-1-1-2-3-0-0 means that for plant#1 material#2 from supplier#1 will be delivered by transport type#1, truck will also visit plant#2 and plant#3, direct delivery (not through hub). The whole matrix containing all materials for each plant is regarded as one solution.

On the next step of research two populations of possible solutions were generated, each 1000. For each solution the value of objective function was calculated. Based on Russian roulette principle solutions were selected and they took part in new generation creation. After 1000 iterations, solutions from population#1 and
population were merged that helped to further improve the value of the objective function. Average values for each generation on every iteration are presented in figure 3.

![Average value of the objective function during genetic modelling](image)

Figure 3: Average value of the objective function during genetic modelling

After 2250 iterations improvement of the objective function from generation to generation became insignificant, thus the algorithm was stopped. As a result of the modelling the solution was selected that had the lowest value of objective function. This choice offers supply scheme where some of the existing warehouses of Danone Russia plants operate as hubs, and some warehouse continue materials stock management using standard supply scheme (supplier-plant).

The suggested decision provides following changes after innovation implementation:

**Table 3:** Business processes involved in changes after innovation implementation

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT system development – 2,8 mln. euro</td>
<td>Purchasing price decrease – 1,2 mln. euro per year</td>
</tr>
<tr>
<td>Human resources of higher level – 0,3 mln. euro</td>
<td>Stock turnover increase – 0,2 mln. euro per year</td>
</tr>
<tr>
<td>Mathematic model creation – 0,9 mln. euro</td>
<td>truck fill rate – 0,8 mln. euro per year</td>
</tr>
<tr>
<td>Master data collection and support – 1,1 mln. euro</td>
<td>Write-offs for design changes 0,7 mln. euro per year</td>
</tr>
</tbody>
</table>

Hubs for materials planned indicators after innovation implementation:
- payback period will be 1,7 years;
- Net Present Value of project for 7 years 215,9 million euro;
- Initial rate of return 18,9%.

Based on these theoretical values of key indicators, decision makers transferred the project to “launch” stage. This stage lasted for 7 month, what was exactly as planned. Real results of the innovation are described in chapter below.

**7. Innovation efficiency: real results**

Suggested organizational innovation was implemented and tested in Danone Russia plants starting from the third quarter 2013, and showed great results, which are presented in table 3.

**Table 3:** Values of Indicators before and after hub implementation in Danone Russia

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Real value in 2012</th>
<th>Theoretical monthly value, suggested by model</th>
<th>Real observed monthly value in Q3 2013 – Q2 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials turnover, days</td>
<td>41,8</td>
<td>29,8</td>
<td>33,4</td>
</tr>
<tr>
<td>Materials write-offs due to marketing changes, m. RuR</td>
<td>91,4</td>
<td>33,3</td>
<td>42,9</td>
</tr>
<tr>
<td>underproduction due to materials shortage, %</td>
<td>0,83%</td>
<td>0,23%</td>
<td>0,44%</td>
</tr>
<tr>
<td>utilization of transport (truck fill rate), %</td>
<td>74%</td>
<td>90%</td>
<td>87%</td>
</tr>
<tr>
<td>average weighted purchasing price, % vs. last year</td>
<td>-13%</td>
<td>-9%</td>
<td></td>
</tr>
<tr>
<td>Administrative expenses (human resources, IT systems, warehouses), mln. euro</td>
<td>5,1</td>
<td>5,0</td>
<td></td>
</tr>
</tbody>
</table>
As described in table 3, real results for all indicators improved significantly after implementation of hub model for materials, but their real values are still worse than theoretical estimations. It happens due to influence of random factors on market sales trends, low production reliability of some lines (during Q3 2013 there were 42 cases of production volumes relocation between plants due to technical or quality issues). Materials turnover increased due to bigger purchase orders from hub. It also positively reflected materials write-offs due to marketing changes (new pack designs, formulas of products, etc.). Among main positive changes is decrease by 9% in average weighted purchasing price and increase of average truck fill rate by 87%.

Implemented new supply scheme required rather big expenses for IT system development and organization innovation. Main new requirements for system were to have at any time correct data about production plans, bill of materials for all SKUs, current materials stock level, open orders for suppliers. New type of planning using hub also changed organizational structure: every plant used to have 1-2 procurement specialists, responsible for materials supply. After switching to planning using hubs 18 procurement specialist were remained and located in 6 hubs, it helped to create good communications flow between material planners.

Suggested supply scheme using hubs is very sensitive to volumes or suppliers changes. Thus it should be reviewed (recalculated) regularly. Each model recalculation does not require extra costs.

8. Conclusions

Organizational innovations development and implementation is very important for Russian companies and can help national enterprises increase their competitiveness on the world market. Such innovations also stimulate labor efficiency that is still lower in Russia, than in the other developed countries of the world. One of the streams of organizational innovations is supply chain process development, where hub models starting to gain increasing interest from production and trade companies. Hubs are a network of warehouses that operates as a temporary location for materials storing between suppliers and plants. They play the role of materials or goods flow managing operator, responsible for best price, stock turnover, materials write-offs.

In the article hub model of materials procurement from suppliers to production plants was regarded from several aspects: stages of implementation, types of materials that can be supplied through hubs, model creation and best supply scheme calculation using genetic algorithms, analysis of values of key performance indicators before and after hub model implementation. Implementation of hub supply model for materials was tested in Danone Russia Company that has 24 plants in the country.

The results obtained during many-dimension analysis of materials at warehouses of Danone Russia plants showed that materials stock is not homogenous by logistic indicators, so it was separated into 4 clusters. During the research it was proved that hub model can bring real benefits only when it is applied for materials of the second cluster “Unique national materials” – materials that are used on several plants and are included in the bill of materials of a single product. Such materials have slow turnover, low forecast accuracy mostly due to often production volumes relocation between plants and huge share (47% of all stock in value).

In the research a special approach offered to determine optimal number of hubs and places of their allocation. Genetic algorithms are used to search optimal options. The offered choice was implemented in Danone Russia and helped to decrease significantly purchasing price and materials write-offs due to product or pack designs changes, increase materials turnover and average truck fill rate. At the same time model is very sensitive to changes of the input data and needs to be recalculated at least once a quarter.

This method of research is not unique and can be easily modified for using and implementing in any other company that has several plants with the same materials needed for production. Further globalization of trade will make such models more important for transnational corporations.

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Regulating to Facilitate Innovation? Nanotechnologies and the Dilemma of EU Institutions

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Abstract: The objective of the paper is to examine if and how EU regulation impacts the role of the EU as a facilitator of innovation. The EU vows to create an innovation-friendly environment under its Europe 2020 strategy program. At the same time, through its REACH regulatory framework that spearheaded international regulation of chemicals, it seeks to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances, and the replacement of the most dangerous chemicals currently in use. It now explores widening the scope of REACH to include nanomaterials, and many see this as a way of curbing innovation. The paper builds on recent work on the emergence of a regulatory framework for nanotechnologies to take stock of the current situation and to explore how further regulation may influence innovation and the shaping of new markets for nano-based materials. Our methodology rests mostly on archival work, completed by some focused interviews. Archival work includes the study of a comparative database of existing regulatory frameworks, both inside and outside the EU, a synthesis of public statements, reports and public inquiries intended to measure the potential impact of regulation on innovation, as well as a study of the corporate and annual reports of CAC 40 firms. The CAC 40 (Cotation Assistée en Continu) is a benchmark French stock market index, which represents a capitalization-weighted measure of the 40 most significant values among the 100 highest market capitalizations on Euronext Paris. CAC 40 firms are all operating under EU law and are illustrative of how markets could shape around the development of nanobased materials. The paper aims to shed some light on the roles and challenges of institutions as facilitators of innovation. By focusing on the impact of regulation on the strategic management of innovation it adds new perspectives to the important literature devoted to the study of the sources of innovation. It also contributes to the strategic management literature, as well as to the policy literature.

Keywords: innovation, REACH, EU regulation, business development, nanomaterials, R&D

1. Introduction

This paper is about the emergence of new societal norms governing technological innovation. It uses the empirical field of the development of new nano-based products to explore the interactions between policy-making and innovation. Studying the relations between the institutional environment and entrepreneurship in the field of nanotechnologies (Auplat, 2010) noted that these relations had become an area of scholarly scrutiny only towards the beginning of the twenty first century because the entrepreneurship literature had until then tended to assume a positivist approach by focusing on the individual-opportunity nexus in entrepreneurship without paying much attention to contingencies. Although Campbell (1992) had already pointed years before that entrepreneurship was not a purely psychological phenomenon, and that policy makers could influence the level of entrepreneurship, scholars like Shane (2003) noticed that there was a paucity of theoretical or empirical research discussing the relationship between the institutional environment and the discovery of opportunity.

Schumpeter’s (1934) and then Drucker’s (1993) work were essential in helping academics as well as practitioners grasp the connections between innovation and entrepreneurship. Although the two streams of literature shaped independently as distinctive fields of research, a large number of scholars consider that they are intrinsically interconnected and that sustained entrepreneurship cannot happen without continuous innovation (Timmons and Spinelli, 2008). Therefore, better understanding of the links between innovation and policy-making is also crucial to support entrepreneurship and competitiveness.

As a policy maker, the European Commission considers that innovation is at the heart of competitiveness, and that it should be supported by strong financial commitments, as well as rooted in the concept of sustainable development (Brundtland and World Commission on Environment and Development, 1987). Indeed, in its landmark document Europe 2020: A strategy for smart, sustainable and inclusive growth the European Commission (2010) put forward two mutually reinforcing priorities:

- The development of an economy based on knowledge and innovation for smart growth.
The promotion of a more resource efficient, greener and more competitive economy for sustainable growth.

It also proposed as a major target that 3% of the EU’s GDP should be invested in R&D.

The notion that innovation should go hand in hand with resource efficiency and a greener economy is at the heart of much debate. Porter’s research (1980, 1990, 2008) has had a strong focus on competitiveness, and much of his work analyses the links between innovation and competitiveness. Porter and van der Linde (1995) examined more specifically the connections between regulation and competitiveness, and their publication led to the well-known ‘Porter hypothesis’ that strict environmental regulation can help improve commercial competitiveness. Although opponents of strict environmental regulation contend that it stifles innovation because of the added costs it entails, Porter’s hypothesis suggests that it does the contrary. This happens through a process called the innovation effect: by triggering the introduction of cleaner technologies and environmental improvements, environmental regulation leads to more efficient production processes. In the end the cost savings achieved by better efficiency compensate the costs induced by compliance and innovation.

According to UNEP et al. (2005) environmental regulation is a system of treaties, conventions, statutes, common law, and policies that concern the protection of the natural environment as it is impacted by human activity. Some environmental laws regulate the quantity and nature of impacts of human activities while others seek to assess possible impacts before the human activities can occur. The precautionary principle underlies much of environmental regulation. It is a moral and political principle that states that if an action or policy might cause severe or irreversible harm to the public, in the absence of a scientific consensus that harm would not ensue, the burden of proof falls on those who would advocate taking the action.

In this context, the purpose of this paper is to examine if and how EU regulation serves as a facilitator of innovation. To do so, we focus on nanotechnology regulation, and we seek to answer the question: ‘What are the links between French nano-regulation, EU nano-regulation and innovation?’ We choose France because it passed a mandatory nano-legislation that was a first not only for the EU, but for the world.

Why focus on nanotechnologies? OECD (2009) defines nanotechnology as a collective term for a set of interlinked sciences and technologies which contribute together to the understanding and control of matter and processes at very small scales (typically in the range of 1-100 nanometres, one nanometre being one billionth of a metre). Nanotechnology is therefore essentially the engineering of matter down to the level of individual atoms. For reasons that remain partially unexplained today, when particles of a given chemical substance are of nanometric size, they present properties that are not observed at a larger scale, when they are in bulk. The range of changes in the properties of elements is extremely broad and scientists are only beginning to explore a new world of possibilities where they can design new products which possess the specific characteristics they want them to have. Today, nanoproducts on the market – in other words those which contain specific man-made nanoparticles – include self-cleaning glass or textiles, reinforced tires or bumpers, cements or paints with particular properties, cosmetics and healthcare products, food, beverages, electronic components etc. Available forecasts suggest a global market for nanotechnology products potentially reaching 3 trillion USD in 2015 and creating some 2 million new jobs worldwide (OECD, 2009, Lux Research Inc., 2007). Alongside a wide range of likely societal benefits like providing renewable energy, clean water, and improving the environment or human longevity and health, nanotechnologies are extremely interesting because they are very diffuse technologies that develop globally in diverse industrial sectors. Taking into consideration the patenting activity of the largest R&D industry players Delerme et al. (2010) showed that a majority of the world largest R&D actors (as accounted for by the UK DTI scoreboard) were involved in nanotechnologies, covering all fields from electronics to food, so the field of nanotechnologies appears as particularly relevant to a study of innovation.

The very differences between materials in their nano- and bulk- formats that make them of interest in new applications also suggest that these materials may interact differently with ecosystems and living cells. This raises questions linked to the management of the unknown and of potential harms to the environment or to human beings. Nanotechnologies pose new challenges to policy makers because they possess entirely new properties, and because it is therefore difficult to evaluate the way they react during their life cycle. There are two major reasons for this. Firstly, scientists are only beginning to develop nanostructures in a stable and
measurable way and toxicity assessment standards and protocols are still largely non-existent (United Nations Secretariat, 2009, Wiesner and Bottero, 2007). Secondly, nanoparticles are so small that it is very complex to trace them and to assess their inherent risks. One speaks here of monitors as well as of modelling capacities. Methods to analyse their impact on humans and the environment are still in the making and regulation is a key issue, mostly over the necessity – or not – to devise new laws that apply specifically to nanotechnologies.

2. Methods

In order to explore if and how EU regulation that bears on nanotechnologies affects innovation, we study the evolution of where CAC 40 firms locate their R&D centres globally. The link between innovation and R&D, as well as the importance of the geographical location of R&D in a globalized world has been documented in the literature (Gerybadze and Reger, 1999, Doz, 2012). Besides, nanotechnologies have been described as diffuse technologies that require integration to fulfil their economic promises (Avenel et al., 2007) and most key industrial players carry out nano-related activities in their R&D centres (Hernandez Guevara et al., 2013). We posit that if CAC 40 firms feel that EU regulation has a negative impact on their freedom to innovate, either by restraining some fields or research, or by enforcing costly and restrictive compliance measures, they will opt to relocate R&D centres outside Europe. The CAC 40 (Cotation Assistée en Continu) is a benchmark French stock market index, which represents a capitalization-weighted measure of the 40 most significant values among the 100 highest market capitalizations on Euronext Paris. Euronext Paris is itself part of the Euronext Group, one of the major stock exchanges globally. Traditionally, the CAC 40 index represented the most powerful French companies and it is almost exclusively composed of French-domiciled firms. Taking our information from institutional and company websites, annual reports and analysts’ reports, we listed all the various locations of R&D centres, in the reference dates of 2007 and 2012. We chose year 2007 because it preceded the 2008 financial crisis and was therefore not affected by it, as shown by figure 1.

![Figure 1: One-year R&D investment and net sales growth](image)

Note: For 1496 out of the top world 2000 companies in the Scoreboard with data for the whole period.

Source: The 2013 EU Industrial R&D Investment Scoreboard, European Commision, JRC/EC RTD.

Year 2007 also marked the beginning of the marketing of nanobased products in a measurable way, since production before that year was too small to be analysed in a significant way (PEN). Year 2012 was chosen as the closest to the time of writing. Because there is always a gap of at least one year to obtain corporate information of the type needed, data gathered in 2013 and 2014 was too incomplete to be useful. We surveyed the 40 firms, and excluded 8 firms for which the study was not applicable because their activities did not involve any technology R&D (see annex).

To study the evolution of regulation and analyse what is specific about the regulatory context of the EU and of France we drew from Auplat’s (2012) study of the regulatory environment of nanotechnologies. We updated the information with the most recent developments concerning nanoregulation, in the EU and worldwide.
3. Nano regulation

Whether EU regulation is part of environmental regulation can be debated: we posit that it is because all EU regulation must respect the precautionary principle (Commission of the European Communities, 2000) (p 13):

"Following the example set by the other members of the WTO, the Commission considers that the Community is entitled to prescribe the level of protection, notably as regards environmental protection and human, animal and plant health, that it considers appropriate. Recourse to the precautionary principle is a central plank of Community policy."

It appeared from Auplat’s 2012 survey that there was no comprehensive international mandatory regulation for nanotechnologies. The United Nations Environment Program (UNEP) introduced the Strategic Approach to International Chemicals Management (SAICM) at the 2002 World Summit on sustainable development. SAICM was conceived as a global policy framework aiming to promote chemical safety around the world and its “2020 goal” was adopted as part of the Johannesburg Plan of Implementation. SAICM’s overall objective was to achieve the sound management of chemicals throughout their life cycle so that, by 2020, chemicals were produced and used in ways that minimized significant adverse impacts on human health and the environment. In the early 2010s SAICM meetings started producing non-binding resolutions on nanotechnology, but in 2014 SAICM had not produced any binding regulation.

The EU was the most advanced organization to enforce a binding law of international impact: EU Regulation 1223/2009 on cosmetic products came into force in 2013 (European Parliament, 2009). This law – the first international law with some parts specifically designed for nanotechnologies – included a review of the safety of nanomaterials. All cosmetic products were subject to a safety assessment and to a premarket notification and approval procedure. A new and important feature of the regulation was that in order to establish clear responsibilities, every product must be linked to a “responsible person” who was responsible for ensuring compliance with the regulation, and who must keep a product information file for a period of 10 years after the date when the last batch of the cosmetic product was placed on the market. The “responsible person” must have an address in the EU. It could be the company that manufactured the cosmetic, or had it manufactured, or the local office or agent for a manufacturer based outside the EU. If there was no local agent for a non-EU manufacturer, then the first company importing the product into the EU was the “responsible person”.

The regulation also required traceability of a cosmetic product throughout the whole supply chain, as well as clear labelling including the name and address of the responsible person, and the presence of all ingredients containing nanomaterials, with their names followed by (nano). For a summary of the differences between the situations before and after the enactment of the EU cosmetics law, see www.ec.europa.eu, “summary of changes introduced by EU Regulation 1223/2009 on cosmetic products”.

The other law that originated in the EU was REACH, Registration, Evaluation, Authorization and Restriction of Chemical Substances - EC 1907/2006 – 2006 (European Union, 2006). REACH is a comprehensive regulatory framework which was introduced by the European Commission in 2006 to replace some 40 existing legal acts and to create a single system for all chemical substances in Europe. Its main objective was to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances, and this included the plan to find substitutes for the most dangerous chemicals in use. The law entered into force on 1 June 2007. One of its characteristics was that it transferred the burden of proof for demonstrating the safe use of chemicals from EU Member States to industry.

REACH has two major components. Starting in June 2008 and before the deadline of June 2018, all firms that manufacture or import more than one ton of a chemical substance per year are required to register it in a central database, the European Chemical Agency (ECHA). Besides, all new chemical substances that were produced or imported in the EU after the cut-off date of 1981 have to undergo a strict risk assessment process. This means that all chemical substances produced before 1981 do not need to undergo the safety assessment process again, and that firms that produce or import less than one ton of a given chemical per year do not need to register these substances. The REACH provisions have been planned to be phased-in gradually over a period of 11 years because of the complexity of the process and because of the need to find replacements to some chemicals that were considered too dangerous to be retained.
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REACH is a general framework and it does not apply specifically to nanomaterials. Critics of the law say that because most nano substances are so small, they are produced in quantities that are below one ton per year, which means that they go unregulated. They also criticize the fact that there are no specific provisions for them considering their novel nature. A general review of the scope of REACH including a review of the specific information requirements took place in 2012, and a new public consultation was organized in 2014 to identify and develop the most adequate means to increase transparency of nanomaterials on the market.

REACH can in fact apply to substances produced or imported in volumes below 1 ton per year if they are considered to be of very high concern. This means in effect that risks from certain nanoscale substances could be addressed through REACH if they were identified as being “substances of very high concern” as defined in Article 57, for example as being persistent, bio-accumulative and toxic (PBT) substances. Although REACH had still in 2014 no specific provision for nanotechnologies, the modification introduced in 2008 by Regulation EC 987/2008 opened the way to nano-specific regulation. Indeed, Regulation EC 987/2008 established that some chemicals which used to be exempt from regulation because they were considered well-known and safe (Regulation (EC) No 1907/2006, Article 2(7)(b)) had to be removed from the lists of exemption (annexes IV and V). This concerned, among other substances, carbon and graphite. The chemical structure of carbon and graphite was well known. Yet it was judged that there was insufficient data on their forms at the nano-scale to consider that “their use caused minimum risk because of their intrinsic properties”. So the substances registered as forms of carbon or graphite at the nano-scale on the European Inventory of Existing Commercial chemical Substances (Einecs) or on the Chemical Abstracts Service (CAS) had to be removed from the list of exemptions and be treated as new substances.

France took EU regulation one step further, and introduced the strictest law in the world concerning nanomaterials. This came as part of the Grenelle 2 law package, in the French ‘Code de l’environnement, L 523-1 to L 523-5’) (French Parliament, 2010). The full title of this specific regulation translates as Book V: prevention of pollution, risk and nuisances. Title II: chemicals, biocides and nanomaterials; Chapter III: Prevention of risks for health and the environment resulting from exposure to nanoparticles”. As of July 2013, the law required manufacturers, importers or distributors of nanomaterials in France to inform relevant authorities, and to provide information about the substances involved on a specific website called R-Nano (https://www.r-nano.fr/). The requested information included intended use of substance, quantities involved, identity of the professional users, and danger relative to exposure in terms of health or of environmental risks. The data provided could be made available to the public.

4. Discussion and conclusions

Our hypothesis is that if environmental regulation impacts innovation negatively by encouraging firms to locate R&D centres in countries that are not affected by this regulation, then French firms will displace their R&D centres away from France. To test this hypothesis, we surveyed where the 32 CAC 40 firms that had R&D centres had set up their research centres in 2007 and in 2012. We surveyed the 40 firms of the CAC 40 index, and excluded 8 firms for which the study was not applicable. In 2007, the 32 firms that we retained had a total of 164 R&D centres worldwide. This number rose to 229 in 2012. This increase of nearly 40% shows the importance of the perceived role of R&D centres in corporate strategy.

The introductions of the EU cosmetics regulation and of the French Code de l’Environnement L 523-1 to L 523-5 were accompanied by a change in the geographical location of the R&D centres of the CAC40 firms. In 2007, 45% of the research centres were in France, but in 2012, there were only 41% of them. The drop was even larger in relative terms, considering the overall increase in the number of R&D centres.
This change seemed to indicate a trend toward moving out of the too strict regulation. However, things are slightly different if we look at a more global perspective.

Indeed, the CAC firms did establish R&D centres outside France, but they did not massively leave the EU zone. On the contrary, in 2012, 59% of the R&D centres of the CAC 40 firms were located in the EU as opposed to 51% in 2007. When they offshored their R&D, CAC 40 firms clearly looked for diversification, as they spread between the Americas, Asia, and some growing business in Africa.

The conclusion of this study is that nano-regulation does have an impact on innovation. However, the impact is not the same for EU regulation as for French regulation, and EU regulation seems in a way to boost innovation while French regulation stifles it. This can be explained by one major factor: the size factor. When regulation happens at different levels, from the local one to the international one, the terms “international”, “regional”, “national” and “local” usually refer to the bodies which pass the said regulations, not to the areas covered by them. For example, “Regional regulation” refers to regulation passed by a regional institution, like the EU, which includes regulatory bodies of different nations united by a specific agreement. On the whole the geographic scope of the regulation corresponds to the level at which it is passed: national regulation will apply to a specific country, and regional regulation to a region (like the EU). However, the geographic scope of some regulations goes beyond that of the body that passed them. To continue with the example of EU regulation, when a specific law targets the products or substances manufactured or imported in the EU, its scope may in
effect be much larger since it may impact producers globally. Indeed, it is often too costly to run separate supply chains, and manufacturers who wish to do business with the EU may have to adopt EU regulation for all their production processes. This is what is happening with cosmetics. The stricter EU nanoregulation for cosmetics is in fact affecting all cosmetics producers globally, and once producers start testing their products to comply with EU regulation, they tend to adopt the same protocols for their global production. However, with France, the situation is different: the geographic scope of the French nano decree¹ relative to the Code de l’environnement is wider than France since it requires manufacturers, importers or distributors of nanoparticulates in France to fill the R-Nano file wherever they operate. The problem is that while the size of the EU market is large enough to jeopardize a firm’s business if it cannot sell on this market, the size of the French market is small, and so producers of nanoparticulates will probably prefer to do without it rather than risk having their data exposed to public scrutiny, which might endanger competitive advantage based on original processes. Indeed, one of the most controversial aspects of the French decree is that the data provided by firms can be made available to the public.

A good illustration that EU regulation may serve as a facilitator of innovation in spite of the constraints it involves is the decision of the Organization for Economic Cooperation and Development (OECD) to terminate one of its programs, called Cooperative Chemical Assessment Program (CoCAP). This program has long been working to assess the hazards of chemicals across international lines. OECD has now decided that CoCAP has served its purpose and must be replaced by a different organization at the end of 2014. One of the stated reasons for the change is that the activities of the EU’s REACH program have rendered CoCAP’s current activities unnecessary. By introducing a large-scale framework adopted de facto by the European market, EU regulation sets rules that govern innovation and EU countries have a competitive advantage by being ready for the new rules. Besides, a number of countries outside of the European Union have started to implement REACH regulations or are in the process of adopting the framework (Croatia, Serbia, Switzerland, Turkey and even China are considering such a move).

This paper is still at an exploratory stage. However, it indicates that when the EU decides to work as a whole entity, it can act as an environmental regulator and facilitate innovation at the same time. The lesson to draw is to move as a large block and not as a small entity. The French initiative in this respect looks out of touch with reality, because the additional constraints it imposes apply to a market that is very small. French CAC 40 firms are becoming more and more global, and they have well understood this. This is why they decide to reduce their R&D activities in France and to strengthen their presence in other EU locations.

Acknowledgements

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¹ Décret n° 2012-232 du 17 février 2012 relatif à la déclaration annuelle des substances à l’état nanoparticulaire pris en application de l’article L. 523-4 du code de l’environnement
Annex 1: List of CAC 40 firms

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References

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The Relationship Between Patents and Firms’ Innovation Activity: The Case of Russia

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Abstract: In many respects the paper reaffirms that innovation activity is not uniform in space and time. The paper aims to identify the most widespread types of intellectual property applications by Russian companies at regional level. Three the most widespread types of invention patents applications during 2000-2004 and during 2005-2006 are exposed and analyzed. The first is directed towards innovation creation on the basis of patents. To gain competitive advantages firms use patents to introduce new products to the market. In the second case, firms use intellectual property rights to build barriers to protect market from new competitors. This strategy belongs to entry obstacles making and the protection of already reached advantages. Finally, the third type is characterized by the absence of active intellectual property applications in core activity. The general and particular trends are determined for the exposed types of behavior. In particular, one of the general trends is the reduction of the number of firms that use patents to create innovations with the lapse of time. The reduction is the most considerable for the firms which least tend to create innovations based on patents. However, the consequences of these influences are insignificant for enterprises which have been actively involved in the innovation process and have high professional skills. In addition, one of the general trends observed in this study is the decreasing of efficiency of intellectual property creation by innovative firms over time. The commitment of enterprises to the chosen type of behavior has considerable impact on the efficiency of intellectual property creation. So, the enterprises, which follow certain type of behavior throughout the ten-year period, are more active in registration of inventions in comparison with the firms which have changed this behavior. It is shown that the types of intellectual property application are connected with sequence of innovation stages which pass the enterprises for innovation launch. Thus after periods of knowledge accumulation (the third type of behavior) and innovation creation (the first type of behavior) begins the period of large-scale innovation diffusion. During the last period the enterprises protect the returns from their innovations by means of building market entry barriers (the second type of behavior).

Keywords: IP, patent, strategy, innovation, innovation cycles, Russia

1. Introduction

Most economists no longer consider patents to be the primary drivers of innovation activity (Lerner, 2009). One major conclusion of empirical research is that the patent system provides an incentive for firms to innovate by reducing the risks of innovation. However, this conclusion holds true for only a portion of companies holding patents; other firms use patents for purposes unrelated to the formation of offensive innovation-based competitive strategies (Hall and Dietmar, 2012).

Many firms use the market power afforded by patents to follow protectionist strategies aimed at maintaining and strengthening existing competitive advantages. A firm may also decline to use a patent for innovation purposes if the patented result is beyond the firm’s area of interest or if it is impossible to commercialise the patented intellectual property (IP) in the near future. In addition, a firm may refuse to exploit a patent due to limited resources available to the firm for the patent’s commercialisation; in this case, the firm owning the patent is likely to license the IP to an entity that is financially able and willing to assume the risks associated with innovation (Hall and Ziedonis, 2001; Lemley and Shapiro, 2007). Moreover, because of the considerable profit potential inherent in intellectual property, it often serves as means of raising capital (Hall and Dietmar, 2012). The possession of a patent gives rise to opportunities for a firm to enter into various business ventures and/or licensing agreements (Bessen and Meurer, 2009; Liotard, 2000), and the existence of a patent portfolio can serve as a means of placing pressure upon the other party during license negotiations (Larcheveque, 2007).

Based on the above information, it is possible to delineate four main strategies for IP use:

- The use of IP to acquire new competitive advantages through innovation activity. In this scenario, the dominant position obtained by a firm as a result of a patent enables the firm to support its monopoly position by investing in R&D and obtaining new patents.
The use of IP to protect a market from new competitors by erecting barriers to entry, i.e., to maintain a firm’s existing competitive advantages. In this case, the patent is often unused in operating activities and instead used only to block other firms from accessing the patented technology.

The sale or license of IP to obtain income.

The use of IP to increase capitalisation and/or to create attractive conditions for joint business ventures.

In addition to the above-listed strategies, the concept of patent trolling should also be mentioned. Patent trolling occurs when a firm obtains a large number of patents for the sole purpose of reselling the rights to other interested organisations (Golden, 2007; Lemley and Shapiro, 2007; Reitzig et al., 2007).

The main objective of this research is to identify the most widespread IP strategies employed by Russian enterprises at a regional level. The regional level is selected for detailed analysis because of the strong influence of regional characteristics on patent and innovation activities (Pilyasov and Kurizina-Korovskaya, 2009).

An additional aim of this paper is to determine the correspondence between the generally accepted patent strategies described above and the strategies that are most often employed in the various Russian regions. To identify regional patent strategies, this study reveals the most widespread behaviour of regional companies relating to the use of patents. In addition, the non-prevailing behaviour, i.e., the behaviour that is not illustrative of the majority of regional enterprises, is analysed. The relationships between the prevailing types of patent behaviour and innovation activities are also identified.

2. Data and procedure

For the purpose of identifying the prevailing types of IP behaviour in Russian regions, the eighty-three regions of Russia are divided into groups according to the similarity of firms’ actions relating to the use of patents. A number of patent and innovation indicators are used to cluster the regions. Note that the following hypothesis is accepted: innovative firms are likely to use patents in innovation activity, whereas non-innovative firms use patents to further alternative goals. Accordingly, indicators that show the connection between patents and innovation activities are considered (i.e., indicators that reflect the level of innovation activity based on patents and the scale of innovation processes based on patents). In addition to indicators that characterise the behaviour of an entire group, indicators that describe individual firms’ participation in the IP creation process are analysed. These indices, which reveal differences between the individual firms within a group, show the respective inclinations of innovative and non-innovative companies to seek patents.

The crucial component of the IP creation process is the availability of resources. Two specific components are studied in this paper: financial resource capacity and research potential capacity. To estimate the efficiency of resource exploitation, the following indices are used: the productivity levels of innovative and non-innovative firms in the area of IP creation and the average invention patent cost for innovative and non-innovative firms. It is understood that companies use both internal and external sources of knowledge for IP creation. The internal source of knowledge is in-house R&D, and the external source of knowledge comprises purchased intangible technology assets. Either or both of these sources may form the basis of IP creation. Therefore, the internal cost of IP creation is calculated as the cost of in-house R&D, and the external cost is estimated as the cost of purchased intangible technology.

The following indicators are used in this paper:

- The share of innovative firms among all patent-active firms (SFi/a)
- The share of all invention patent applications that are submitted by innovative firms (SPI/a)
- The average number of invention patents per one patent-active innovative firm (API), i.e., the inclination of innovative firms to seek patents
- The average number of invention patents per one patent-active non-innovative firm (APni), i.e., the inclination of non-innovative firms to seek patents
- The average number of invention patents submitted by innovative firms per 1000 researchers (APIr), i.e., the IP creation productivity of innovative firms
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- The average number of invention patents submitted by non-innovative firms per 1000 researchers (APnir), i.e., the IP creation productivity of non-innovative firms
- The ratio of in-house R&D costs to the number of invention patent applications filed (Rin)
- The ratio of the purchase costs of intangible technology to the number of invention patent applications filed (Rex).

To identify the most widespread type of IP behaviour in a particular region, all regions under consideration are divided into clusters using k-means clustering. In addition, the values of the above-listed indicators are normalised to enable a comparison of corresponding indicator values. The data used in the study were collected through Russian innovation surveys conducted from 2000 to 2009. These surveys collected data from a representative sample of more than 26,000 Russian firms representing 44 industries and 8 size-classes and regions. Clustering is performed separately for two periods: 2000-2004 and 2005-2009. As a result, three clusters are obtained. Each cluster displays the specific prevailing behaviour throughout the period under consideration. Although the clusters’ composition is not constant, the clusters’ features are unchangeable (see Figure 1 and Figure 2). In other words, each cluster corresponds to a certain type of IP behaviour that is independent of the time period.

Figure 1: Cluster results for the period 2000-2004. The graph shows average values

Figure 2: Cluster results for the period 2005-2009. The graph shows average values
3. Types of IP applications in Russian regions

We now turn our attention to the analysis of the most widespread types of IP behaviour for each cluster. The most widespread IP behaviour in the first cluster corresponds to the first IP strategy described above. Specifically, the most widespread patent behaviour in this cluster is innovation activity based on patents. Therefore, the firms most active in patent creation are innovative companies that seek to win the market by means of developing and introducing new products. The majority of patent applications were submitted by innovative firms (80% and 76% of the sample in the first and second periods, respectively). The inclination to seek patents and the productivity level of IP creation in this cluster are the highest among all clusters; the average number of invention patents per one patent-active innovative firm is more than 5.4 patents, and the average number of invention patents submitted by innovative firms per 1000 researchers is 200 in the first period and 138 in the second.

Non-innovative firms in the first cluster exhibit a different type of behaviour. Although they show the same considerable inclination to create IP and the same high IP productivity levels, their behaviour is likely aimed at implementing the second or third strategy described above. For example, non-innovative firms with less resource availability may choose to sell or license invention patents to obtain income therefrom while avoiding the high risks involved in the commercialisation of inventions. Other non-innovative firms may use patents to protect a market from new competitors; these firms have no need for production process reconstruction or product updates.

Only a quarter of firms in the first cluster exhibit behaviour that differs from the prevailing behaviour. These companies are characterised by considerable efficiency in IP creation during the first time period. Specifically, the average number of invention patents per firm is 2.6 and the average number of invention patents per 10000 researchers is 46. These values are 36% and 41% higher, respectively, than the values of the analogous indicators in the second time period.

The most widespread type of behaviour of the second cluster is targeted at achieving the second strategy identified above. This type of behaviour seeks to protect markets from new competitors by using invention patents to create barriers to entry. Many enterprises that engage in this type of behaviour use external resources to obtain patents, which allows them to exploit the successful developments of other firms to enhance their own inner potential. Firms in this cluster are the least likely to use patents to innovate. The share of invention patent applications submitted by innovative firms (43% and 12% in the first and second periods, respectively) is significantly lower than the average values across Russia. In addition, IP productivity and the inclination to apply for patents are both relatively low. In sum, there is almost no motivation to innovate based on patents during the period under consideration.

Despite the fact that innovative firms account for 40% of firms in the second cluster, they are not active in patenting. Moreover, the innovative firms in this cluster that are active in patent creation are disinclined to seek invention patents, opting instead for different intellectual property, such as useful models. This is not the prevailing behaviour in the second cluster, but it is rather widespread nonetheless.

The most widespread type of IP behaviour in the third cluster is not explicitly directed toward any of the above-mentioned strategies. This behaviour is characterised by low patent activity and an absence of significant differences between innovative and non-innovative firms. Enterprises in the third cluster rely on internal resources in the IP creation process, and the IP creation process is ineffective for all firms in the cluster. Although the costs of patent creation are high, IP productivity and inclination to patent are lower for this cluster than for the first and second clusters. It is noteworthy that increased innovation activity in the third cluster appears to promote increased IP creation.

Although more than half of the patent applications filed by firms in the third cluster were submitted by innovative companies (75% and 65% for the first and second periods, respectively), firms in this cluster demonstrate low efficiency in the invention creation process. Specifically, IP productivity values are less than half the average values, and in-house R&D costs are more than four times higher than average. The relationship between invention patent creation and innovation activity among innovative firms can be found by comparing the results of the first and second clustering; specifically, a greater inclination to use patents to
innovate in the first period corresponds to a higher inclination to file for patents and a higher IP productivity level in the second period.

4. The main tendencies of invention creation

In this section, the dynamics of the clusters’ cores are investigated. To identify the general and particular trends of firms’ IP behaviour, we introduce the concept of a cluster stability core. The cluster stability core comprises the regions that remain within the same cluster during both the first and second time periods.

First, general trends detected in all clusters will be considered. One of these trends is a reduction in the scale of patent use for new product introduction in the second period (from 2005 to 2009). In addition, a lower scale in the first period corresponds to a greater reduction in the second period. For example, in the first cluster, in which the use of patents for innovation purposes is considerable, the reduction in patent use for new product introduction between the first and second periods is only 3%. In the third cluster, in which patents are used for new product introduction to a lesser degree than in the first cluster, the reduction is 18%. Finally, in the second cluster, in which invention patents are almost never used for innovation, the decrease in this indicator is more than 55%.

The second general trend is a decrease in the inclination of innovative firms to patent. However, the significance of this phenomenon decreases as firms’ innovation activity levels in the first period increase. The foregoing facts indicate that the influence of negative external conditions on the use of IP to innovate depends on the original extent of a firm’s involvement in innovation activity. The influence of external conditions is strongest for enterprises that use invention patents to innovate least often. Companies that innovate to the fullest extent and that have developed skills and qualified personnel demonstrate a smaller response to external conditions.

For all regions, including regions in the clusters’ cores, non-innovative firms show an increase in IP productivity over time. The greatest increase in productivity occurs in the second and third clusters, in which the prevailing behaviour is not patent-based innovation. Note also that there is no increase in non-innovative firms’ inclination to seek patents despite the increase in IP productivity, with one exception: non-innovative firms in the second cluster demonstrate growth in both IP productivity (4.6 times greater) and inclination to patent (1.9 times greater).

In addition, the following regularity is observed for all clusters. In most cases, the IP creation process is more effective for regional firms entering a cluster stability core than it is for enterprises entering a variable part of a cluster. In other words, firms that display stable behaviour during the period under analysis are more effective IP creators than enterprises that display changes in behaviour.

In addition to the general trends, there are also some tendencies specific to each cluster. We will consider some of them. Enterprises within the clusters’ relative cores are characterised by a certain stability of behaviour. Changes in their respective indicators have no essential character and do not exceed 20%. However, there are two exceptions to this observation: the ratio of in-house R&D costs to the number of invention patent applications filed and the ratio of the purchase cost of intangible technology to the number of invention patent applications filed, which increase by 50% and 40%, respectively, for firms within the cluster cores. This indicates that enterprises in the cluster cores must invest more in both in-house R&D and the acquisition of intangible technology to preserve the status quo.

The prevailing behaviour of the second cluster undergoes more essential changes. As a result of the decrease in patent-based innovation activity, an increasing number of firms begin to use patents to create barriers to entry. Moreover, firms in the cluster core show a 43% decrease in in-house R&D costs, a 61% decrease in intangible technology acquisition expenses and a three-fold increase in productivity. This suggests that during the second period, which includes the crisis years, enterprises within the cluster core tended to cut costs related to the erection of barriers to entry.

Enterprises in the third cluster are characterised by the following changes in prevailing behaviour: First, there is a 29% decrease in the inclination of innovative firms to seek invention patents. In contrast, non-innovative firms seek 4.6 times more patents and nearly double their IP productivity in the second period. These findings
suggest that non-innovative firms not only cut costs but also erected barriers to entry to make it more difficult for other firms to penetrate the market.

5. The relationship between patenting and innovation activity

It is possible to estimate the stability of prevailing cluster behaviour based on the size of the cluster’s core. Each of the second and third clusters has a core that is more than twice the size of the first cluster’s core. In other words, prevailing behaviour has reached a greater stability in the second and third clusters. Specifically, 67% and 63% of the regions contained in the second and third clusters, respectively, remained the same in both periods, whereas only 29% of the regions belonging to the first cluster remained constant (see Figure 3).

The change in regional prevailing behaviour may be caused by two factors. First, it is possible that modifications to firms’ models of innovative behaviour cause the prevailing behaviour to change. This change may be related to certain external influences.

Second, the multistage process of innovation activity may influence transitions between clusters. In these cases, changes in the prevailing behaviour regarding IP use may enable the successful completion of a particular stage of the innovation process.

The first factor is most significant for firms in the first cluster. External conditions exerted a negative influence on firms’ innovation activity during 2005-2009 (Ernst and Young, 2012; Andreev, 2011; Malycheva and Shestakov, 2012). As a result of the decrease in companies’ innovation activity, the majority of firms in the first cluster stopped using IP for innovation purposes.

![Figure 3: Stability of the prevailing types of behaviour](image)

By passing through the phases of the innovation cycle, firms participate in the sub-processes of innovation. According to Pavitt (Pavitt, 2003; Pavitt, 2006), the innovation sub-processes comprise three overlapping phases: the production of scientific and technological knowledge, the development of products and methods to respond to and influence market demand, and the translation of knowledge into working artefacts. A change in the prevailing type of IP use is indicative of firms passing through various innovative sub-processes.
Changes in prevailing behaviour correspond to consecutive transitions between clusters. Transitions between clusters are associated with the innovation cycle, in which successful innovation is followed by an innovation diffusion period. Firms that transition from the first cluster to the second cluster demonstrate this phase of the innovation cycle, i.e., the transition from the period of IP creation and introduction to the period of innovation diffusion, in which IP is used for market protection.

Return innovation transitions are also possible. A return transition occurs in the following scenario: the growth of a product’s popularity in the market gives rise to the desire of other market players to copy the product. As a result of the increase in market participants, competition increases and diffusion takes place. All of this causes the income of firms making the product to decrease. To distinguish itself from competitors, a firm has to transition back to the use of IP to create a new product, and the cycle begins anew. This particular transition corresponds to a transition from the second cluster to the first cluster.

A firm does not possess sufficient potential to innovate without a preliminary investment in research projects. Therefore, it passes through the subsidiary phase of the innovation cycle, which entails a transition from the second cluster to the third one. Firms that pass successfully though the third-cluster phase have accumulated sufficient potential to innovate based on IP. The successful completion of the third-cluster phase is indicated by a transition from the third cluster to the first one. In addition, a return transition (from the first cluster to the third one) reflects a situation in which the firm failed to reach its goal and must return to the previous phase, i.e., investment in R&D. Note that the absence of any direct transitions from third cluster to the second cluster reflects the fact that a firm can only diffuse an innovation that is successfully created in the first phase. Note also that the stability of the prevailing behaviour (i.e., the share of regions belonging to a cluster’s stability core) does not contradict Pavitt’s concept about the three innovation sub-processes. Transitions between clusters correspond to the linear model of sub-process connections. Non-linear connections between the sub-processes are not possible to identify within the context of this research.

6. In conclusion

It is known that innovative activity is not uniform in space and time. The results of this research confirm this statement in many respects (Miller and Friesen, 1983; Pol and Carroll, 2004; Irwin, 2010). Types of IP use are widely discussed in the scientific literature. In this paper, the three most widespread types of IP use among Russian enterprises are revealed and analysed. Two of them correspond to types of IP use that are discussed in the literature.

The first type of patent use is aimed at patent-based innovation. Firms use patents to introduce new products to the market to gain a competitive advantage. The second type of patent use is directed at the creation of entry barriers to prevent competitors from entering. This strategy aims to protect a firm’s existing competitive advantages. The third type of widespread IP use is characterised by the absence of active intellectual property use in core business activities. This type of patent use is not commonly discussed in the literature.
General and particular trends relating to firms’ IP uses are revealed. One notable general trend is the decrease in the number of firms that use patents for innovation purposes. This reduction is most significant among firms that are disinclined to innovate based on patents in the first place. In contrast, the impact of this trend is insignificant for enterprises that are actively involved in innovation processes and that possess high-level professional skills. Another general trend observed in this study is the decreasing efficiency of innovative firms with respect to the creation of intellectual property.

The commitment of an enterprise to a particular type of behaviour has a considerable impact on the efficiency of intellectual property creation. Accordingly, enterprises that demonstrate a consistent type of behaviour throughout the ten-year period are more active in patent registration than firms that behave inconsistently. This study shows that a firm’s intellectual property use is related to the innovation cycle that a firm follows to launch an innovation. Thus, after periods of knowledge accumulation (the third type of behaviour) and innovation creation (the first type of behaviour), the period of large-scale innovation diffusion begins. During the last period of the cycle, firms protect the returns on their innovations by creating market entry barriers (the second type of behaviour).

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References

Innovation, Design and Competitiveness: A Synthesis Based on Portuguese Case Studies

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Abstract: In recent years, the case study methodology has become popular in the study of firms and their routines. It is what is meant by the “method of cases” that will be used to analyse the following two business cases (lighting business and footwear business). The emphasis will be placed in design management. Contextually, we are facing cases of innovation and entrepreneurship (business initiative and enterprise development) based on a design-driven approach. Design thinking is indisputably a catalyst for innovation. Then, the design is assumed as the enhancer of the customer’s “experience”, aligned with general management, R&D, marketing and sales and operations. The paper will focus on two case studies (lighting business and footwear business), highlighting: a historical, economic and strategic background; the design management function; and the impacts of design. From these case studies one may conclude that the sustained growth and the level of competitiveness attained were favoured by the use of design at the generation of ideas stage, during the production process and even in the marketing and customer service. Further in-depth integration of design in the company’s global structure and sustained investment in design “people” (competencies), for instance, are the necessary conditions for building the future of this Portuguese SME. Design is a core competency, allowing to reach the design driven innovation perspective.

Keywords: design, innovation, entrepreneurship, case study

1. Introduction

As Keller (2004) states, innovation can be considered as a combination of invention, design and marketing. For a company, creativity is the generation of ideas, design is the “formatting” of ideas and innovation is placing those forms in new and/or different contexts. Therefore, design falls within the “creation-production-consumption” triangle (Walsh 2000) and corroborates the empirical proof that design is linked to the performance of the business (Hertenstein et al. 2005; Walsh et al. 1992; Roy and Riedel 1997). As Hollanders and van Cruyssen (2009) state, creativity and design are connected to innovation, since creativity contributes to the expansion of usable ideas, and design increases the possibility of those ideas achieving commercial success.

Recently, the notions of “design management”, “design thinking” and “design-driven innovation”, presented, respectively and by way of example, by Mozota (2003), Brown (2009) and Verganti (2009), have defined a broad and highly promising field of current and future work in the area of the creation of value, quality of life and sustainability.

These two case studies are included in a public research project (FCT): “Design as a Company’s Strategic Resource - a Study of the Impacts of Design” (DeSid). In this research project, the case studies were preceded by an extensive “online questionnaire” in order to contribute to the grounding of an overview on the status of design in the Portuguese manufacturing industry, namely, to assess the impacts of design on competitiveness. According to the nature of the project where these case studies is inserted, the emphasis will be placed in design management.

The central issue in this paper (case studies), in the context of SMEs, is to assess whether the use of design in all the significant dimensions of the company (in the value chain) fosters growth in the turnover, productivity and profitability. In short, the aim is to identify the main points of contact between the design management process and the sustained levels of competitiveness. This is our intention with the “case study methodology” which will be used below to study: the company Climar, S.A.(a Portuguese SME in the lighting business) (see Barata, J., 2011) and Savana, Lda (a Portuguese SME in the footwear industry) (see also Barata, J., 2012).
After some short references on the methodological approach (section 2) and some notes on design and competitive advantage (section 3), a brief analysis of the online survey results (DeSid research project) will be presented (section 4). However, the paper will focus on the two case studies (section 5 and section 6), highlighting: the business general background; the design management function (companies’ position in relation to design, investment in design and recent initiatives in the field of design and marketing); and the impacts of design (turnover, internationalization and sustainability). We conclude the paper with section 7.

2. Methodology: The case studies approach on design and innovation

Case studies can be an ideal tool for the necessary combination between an analysis and an interpretation of facts, in the sense that it is possible to find an explanation for the “how” and the “why” of a certain phenomenon in its own real context. In particular, in areas about which little is known or where there may be less experience, conducting case studies of carefully selected companies may present itself as a very useful way of obtaining internal knowledge of the companies’ routines and their decision-making procedures (Yin, 1994; Stake, 1995). In this perspective, the aim is much more about finding and discovering relevant business information than about testing relationships by analytical processes. Accordingly, in recent years, case studies have become a rather popular method for studying companies, and these have been particularly widespread within postgraduate training courses (see Barata and Batista, 2012).

3. Design and competitive advantage

As was made clear, design has proved its impact on companies and nations. According to Borja de Mozota (2002), design management research results can be classified as follows (a large majority of references is quoted from Borja de Mozota, 2002):

- Design improves the performance of the innovation policy and of the communications policy of the firm (Hertenstein and Platt, 1997; Bruce et al. 1995);
- Design improves the global performance of the firm; it is a profitable investment (Hertenstein et al., 2005; Roy, 2000; Potter et al., 1991; Rothwell et al., 1983);
- Design is a profession that creates value on a macroeconomic level (Danish Design Center, 2003; Design Business Association, 1990);
- Design improves the competitive advantage of a country in the international competition. It develops exports (Sentance et al., 1997; Rothwell and Gardiner, 1983) and it favors technology transfer (Ayral, S., 1990);
- Design can help the restructuring of an economic sector in regional economic policy (Guimaraes, et al., 1996; Lovering, 1995).

Differentiation by designers creates value perceived by customers (Borja de Mozota, 2002, p. 92). However, the literature suggested the idea of a strategic dimension of design that goes beyond its differentiating dimension. We must see design as a facilitator, differentiator, integrator and communicator (Hayes, R., 1990).

4. The DeSid research project

The DeSid research project was created with the main purpose to make a diagnosis of the use of design inside the Portuguese manufacturing Industry. The project arose from the necessity to gather data about the design situation inside Portuguese companies since that characterization was never done. An online survey, addressed to a sample of 1505 Portuguese manufacturing companies, was developed and launched by the DeSid research project.

The questionnaire that was created had six sections: I) General Characterization of the Company; II) Perception of the Importance of the Use of Design; III) Identification of the Drivers and Enablers of Design Used by the Company; IV) Attitude and Action of the Company’s Management towards Design use; V) Company’s Evaluation of Design Results; VI) Barriers to the Use of Design. The questionnaire requested information concerning the activities of design and its role in the company business. The responses are circumscribed to the activity in the years 2005 to 2007.

DeSid survey allowed us to understand in broad terms the way business field evaluates the role of design and designers. It is important to underline that the use of design in more than about 66% of the respondent
firms has a history of less than 19 years. The relationship of design and innovation is also relevant since for the majority of firms the first mental association with design is precisely ‘innovation’.

The main drivers for the use of design in the companies are the ‘image/reputation’ followed by the ‘innovation ability’. Furthermore, designers still operate mostly at the operational level having almost no participation in the strategic level of design’s intervention.

The relatively low level of design education affects/denounces the way firms acknowledge design and its potential role in business. An upgrade in employees’ qualifications could be an important step to boost design inside firms as a more efficacious resource similarly to what happens in the North European countries (Design Council, 2004; and Designium, 2005 studies).

In general terms, one may conclude that economic-financial aspects were most likely to be considered “barriers.” Nevertheless, when assessing the impact of design, the responding firms held aspects of an intangible nature in high regard (firm image/reputation, customer satisfaction, etc.). Firms valued the development and introduction of new and better products in this present context of global competition. This approach will be instrumental for future design and innovation.

5. Design and innovation at Climar

5.1 Recent highlights in the field of design, marketing and innovation

“Innovation is a process that extends to all areas of a company; it is impossible to innovate only in one sector or another of the company’s activity” (J. Sucena). The main highlight in terms of design, interacting heavily with marketing and innovation, was the construction of a showroom par excellence and which basically served to crystallise Climar’s intention: the desire to be a company that leads and innovates.

This space was developed with the aim of presenting what Climar does best by activity or by theme. It is therefore divided into seven areas (with a total of 650 m²) where the “new lighting solutions” are presented, these being projects which include the state of the art, that is, the company’s most recent and innovative offers, as well as a large room of around 450 m² where one can see all the decorative lighting solutions which are geared towards the hotel industry and shopping centres.

The concept contained in the slogan “new lighting solutions” represents the company’s efforts to radically change the design, manufacture and use of lighting devices, considering them to be elements that enlarge areas or the objects which are the target of this illumination.

According to local observation and analysis of the data, it can be seen that innovation constitutes a key element in the competitive positioning within the lighting solutions market, and differentiation through design is the touchstone on which Climar’s strategy rests. “Design – whether communication design or product design – is one of the mainstays in the process of innovation” (J. Sucena).

5.2 The company’s positioning in terms of design

The company recognises the importance of design in the qualitative leap it made between the 1980’s and 1990’s and the new millennium, in particular, in the process of internationalisation. As is only right, design cannot be given all the credit, but must share it with the investment that was made in technological innovation, in production flexibility – powerful CAD/CAM systems – and the training of the human resources, with the aim of offering differentiated products and with optimised time to market. Until quite recently, Climar was developing three new products a week, on average.

Besides innovation and design, as previously stated, Climar also developed the client service component which has been crucial in maximising the benefits obtained.

Like other companies which have been the object of case studies and which have shown vitality in the area of design and innovation, one may note investment in relationships with the main state and private educational and research establishments which promote design in general and product design in particular.
5.3 Design management at Climar: Investment in design

Having developed their efforts, the company was then able to concentrate on responding to the continuous challenge of surpassing the clients’ expectations, in a cycle of evolution which is only within reach of the best and most well-prepared companies, sustained by “fundamentals” and “back to basics” with regard to industrial management, flexibility, speed of service, innovation, creativity, efficiency and effectiveness of response. As a result, Climar has managed to map out its own route, doing so in a coherent and serious fashion with a commitment to the aims and needs of its clients.

At Climar, all staff members have special importance, whether they are developing, researching, producing or promoting products. “Companies are nothing more than a reflection of the people who work in them” (J. Sucena).

The uninterrupted improvement in working conditions, the continuous training and the raising of awareness as to the development processes – the “design” of the industrial process – have proved to be crucial, for example, for Climar to be able to attain extremely low levels of toxic industrial waste, with the aim of increasingly reducing the environmental impact generated by the company’s activity.

Finally, special reference must be made to the after-sales service which is constantly gaining in efficiency and effectiveness.

By way of a conclusion on the results of the investment in design and innovation, we can state that three types of production have co-existed at Climar for almost twenty years: standard products, added value products and “solutions”:

- **Standard products**, in which multiple machines mass produce a certain type of production on an assembly line;
- **Added value products**, which are produced by different assembly cells, each of them requiring a small number of people, able to produce and test in sequence. Given their specific nature, as a rule, these products leave Climar in smaller batches;
- **Solutions**, products with a strong service component which are mostly presented and “tried out” in a special pavilion (showroom), and represent lighting solutions.

The company’s design dimension has been sustained by a range of inter-related factors. At the heart of these factors we may highlight the following:

- Presence at international fairs, for the *in loco* observation of critical information for design, with special mention for those held in Germany – an innovation factor which is highly valued by companies in Portugal;
- Frequent challenges resulting from orders coming from architects, designers and investors (“demanding clients”, as a competitiveness factor);
- Trend benchmarking, via in-depth research and assessment of the main international trends noted, for example, in Flos, Artemide or Nelly Rodi’s trends catalogue; and
- Development of own means and resources, namely:
  - A specialist engineer in industrial management charged with designing new projects, aided by a designer (from IADE);
  - Three staff members responsible for communication design, charged with working with the media (media entities, press releases, advertisements and publicity – and anything that might result in “15 seconds of fame” for the brand) and attending fairs;
  - Engineering office for the development of clients’ specific projects in conjunction with the commercial department; and
  - Outsourcing of an established external designer for very specific areas.

5.4 Discussion

In synthesis, this case study revealed:
Shareholders

António Mota, Eduardo Sucena and José Sucena (brothers). All are mechanical engineers.

Background

Created in 1977, as a convectors heater company, Climar abandoned this production in 1982 in order to specialise in lighting solutions, initially focused primarily on the production of ferromagnetic ballasts, which were also abandoned in 1988. From that year on, the company has been engaged in constant innovation: the inclusion of condensers for the suppression of electromagnetic interference in all products (1996); development of the first luminotechnical calculation programme (1997); adoption of the first automatic electrification machines (2000); specialised technical lighting in conjunction with architecture offices (2002); new markets of hospital trunking and ceiling lighting (2004).

The process of innovation began with José Sucena’s entry into management, in 1989, while still in his last year of his mechanical engineering degree, specialising in industrial management. The introduction of a culture of new management, innovation, quality and internationalisation (we can also do this; look for a market; not be afraid of failing; it is more important to know why we have lost an order than to know why we have won) opened the doors to the increased rejection of standardised production and the adoption of innovative and specialised lighting products and systems (around 500 references).

Design Management

This direction set the scene for an increased design dimension within the company, strengthened by:

- Requests for orders by architects, designers and investors;
- Presence at international fairs;
- Benchmarking of the main international references (Flos, Artemide, and Nelly Rodi trends catalogue);
- The existence of its own means, namely: one engineer (industrial management, Universidade de Aveiro) charged with designing new projects, aided by a designer (from Instituto de Artes Visuais e Design - IADE); three staff members responsible for communication design (media and fairs); an engineering office for the development of clients’ specific projects in conjunction with the commercial department; use of an external designer for specific areas.

Impacts

- Growth in turnover (from 5 million euros in 1997 to around 10 million euros in 2010);
- Penetration of international markets (Spain, Germany, Belgium, Norway, United Kingdom, Angola, Middle East);
- Sustainability and development of the company.

The company has no specific methods for measuring the impact of design on the business performance. The fact that the company does not have implemented analytical accounting also contributes to an obvious limitation in measuring performance in general and, particularly, with regard to design.

One of the main aspects for discussion that may be highlighted is the apparent lack of definition with regard to the insertion of design within the organisation of companies. That is to say, design is sometimes referred to as non-innovative activities, since innovation is understood to be, by its nature, strictly technological; on other occasions, design is referred to as merely creative activities, reducing it to conception (“the conceptual side of the expression”, Damerell 2007). In both cases, the company ultimately has some difficulty in using design as a facilitator and motivator of innovation and competitive success. The actual holistic nature of design – which, in itself, constitutes potential -, particularly in the context of SMEs, is responsible for this difficulty in the management and organisation of the “design function”.

It also seems relevant to mention that, according to the particular case studied, the concept of design may converge significantly with the concept of innovation, especially when there is virtuous interaction between
the design and the designers and the management of the company in the adoption of an innovative approach in all substantial areas of the business (Danish Design Centre 2003).

6. Design and competitive strategy at Savana, Lda

6.1 General characterisation of the company

Savana, Calçados Lda, is a "young" company founded in 1988 by the current managers and owners (using 100% Portuguese capital). Based in Revinhade (Felgueiras), in the north of Portugal, it is exclusively dedicated to the production of children's shoes. It employs around 110 workers, mainly young people (below the age of 30) with a low level of education (most of whom have not completed secondary level education and have received on average a total of six years of schooling). The age of the company’s managers is around 40 years, and their level of schooling is also around six years (UM-CMF, 2007).

Only a small portion of the production is under the company’s own label and more than 90% corresponds to production for major brands (Maximo Dutti, Next, etc.). The company's market is dispersed across 18 countries, mainly the UK, the Netherlands and Spain. In recent years, exports have fluctuated between 51% and 75% of production.

During our visit to the company premises, the CEO, José Fernandes, stated that the organisation of production, layout and size of the plant and the adoption of new technologies were important to capture foreign orders. To this end: *Even knowing that I may have a excess of personnel, this additional capacity generates, for customers, an idea of ‘security’ in the feasibility of production, providing more business.*

Savana’s main initial strategy was to focus on children’s footwear, due in part to the lower requirement of upfront investment and lower costs of raw materials (working capital), and also because of the reduced competition in the market at that time.

The company is now dedicated to the so-called "risk product market", characterised, basically, by fast responses and small production batches. Benefiting from one of the most competitive production costs in Europe, one of Savana’s distinguishing factors is the ability to provide services for the implementation of projects and development of products, allowing the client to trust in an effective output (capacity, delivery time and quality).

6.2 Positioning of the company concerning design

The designers – both internal and external – are identified as professionals who generally lead new initiatives in the specific area of the new design and innovation projects. Currently, the technical training of the company’s two designers is modeling and styling at Vocational Training Centre for the Footwear Industry.

The technology centers (in the context of the interface institutions of science and technology) and the customers (as part of the value chain) are the main external agents to the company involved in design processes. It is recognised that investment in design at Savana has recorded a significant increase in recent years, standing at about double for the industry average established in the DeSid survey (DeSid Project, 2011). The company does not specify objective impediments or barriers to the implementation of design activities. In a pragmatic assessment, the company considers the cost reduction per unit of output, increasing sales and increasing profit as the main results of the implementation of design. Recently, Savana has received several awards, including the Instituto de Apoio às Pequenas e Médias Empresas e à Inovação (IAPMEI) Award for Leading SME (footwear industry) and the Gabinetes de Apoio à Promoção da Propriedade Industrial (GAPI) Award (design). In a study on the region of Felgueiras (UM-CMF, 2007), Savana was noted as being a successful company.

6.3 Discussion

Today, in Portugal, the importance of this export-led sector is clearly emphasized in the economic policy goals, particularly with the signing, on May 3, 2011, of the Memorandum of Understanding on Specific Economic Policy Conditionality (EU/ECB/IMF). A visit and study was undertaken of a company (SME) that is part of an industry which is clearly exposed to international competition – tradable goods– and that has been focusing on
intangible factors of competitiveness. Besides being technological equipped at an above-average level, the company enhances production economies and uses production management (layout, work organisation, flexibility, etc.) as an approach, not only for cost optimisation, but also as a specific driver of differentiation particularly in achieving above-average reputation in the business of subcontracting.

As mentioned before, becomes defined in this production area, the notion of “design as a global process”, assuming the design as a "competitive factor of the company's business" (Brown, 2009). Equally, the development of its own brand products – still clearly a minority area of economic and productive expression - may constitute a launch ramp, leading to a growing process of “innovation by design” – either in its own products or in the services provided to its customers, who are mostly foreign companies. Broadly speaking, design contributions can be seen in the innovation of processes and the innovation of products and services.

7. Concluding remarks

In the Climar’s case study, in the context of a highly competitive economic period, the objective will be to offer “lighting solutions” as an “experience” and “new meaning” for consumers and markets (Verganti 2009).

The company has no specific methods for measuring the impact of design on the business performance. The fact that the company does not have implemented analytical accounting also contributes to an obvious limitation in measuring performance in general and, particularly, with regard to design.

One of the main aspects for discussion that may be highlighted is the apparent lack of definition with regard to the insertion of design within the organisation of companies. The company ultimately has some difficulty in using design as a facilitator and motivator of innovation and competitive success. The actual holistic nature of design – which, in itself, constitutes potential - is responsible for this difficulty in the management and organisation of the “design function”.

It also seems relevant to mention that, according to the particular case studied, the concept of design may converge significantly with the concept of innovation, especially when there is virtuous interaction between the design and the designers and the management of the company in the adoption of an innovative approach in all substantial areas of the business (Danish Design Centre 2003).

From Savana’s case study one may conclude that the sustained growth and the level of competitiveness attained were favoured by the use of design at the generation of ideas stage, during the production process and even in the marketing and customer service.

From a theoretically more structured point of view, this paper, through a case study, tried to bring together the main aspects of the design activities in the company value chain. Design is a growing function within Savana structure. Nowadays, design strategy is located, essentially, as a differentiating driver within new product development and, markedly, at production management level suited to subcontracting operations (layouts, flexibility, reliability, etc.). Design is now an economic competence that creates value, fundamentally, on the primary activities of the value chain. Design allows Savana to increase its market share and sell at appropriate price, boosting the exports level.

Also, greater assessment of the organisational insertion of the “design function” into the company, namely, the defining of a consolidated design structure (department, etc.) and the continuation of investment in “design people” will be necessary conditions, among others, for the competitive development of this Portuguese SME.

Finally, from these case studies one may conclude that the sustained growth and the level of competitiveness attained were favoured by the use of design at the generation of ideas stage, during the production process and even in the marketing and customer service.

Further steps, desirably, must be done towards a design strategy as a coordinating function (support activities: vocational training, technology and innovation management, procurement, etc.) and as a transforming positioning (value system: new markets, customer orientation, open innovation, etc.). In sum, design as a core competency, allowing to reach the design driven innovation perspective (Verganti, 2009).
In short, greater assessment of the organisational insertion of the “design function” into the company, namely, the defining of a consolidated design structure (department, etc.) and the continuation of investment in “design people” will be necessary conditions, among others, for the competitive development of this Portuguese SME.

In the context of a new economic era, these case studies demonstrated how the design strategy could expand the pure “good” to complex “service”. These design-driven approaches are echoed in the “societal-driven innovation and entrepreneurship”.

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References


Strategy, Innovation and Internationalization in SMEs: The Implementation Issue

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Abstract: Innovation and internationalization, along with strategy formulation, due to their relationship of mutual interdependence, are widely referred to as decisive factors for the sustainable growth of SMEs. In this article we aim to study the relationships between strategy, innovation and internationalization and its effects on business competitiveness, filling a gap in terms of the knowledge concerning these interactions, which is diffuse or inconclusive. Failure rates related to strategy, innovation and internationalization are high, with correspondingly high costs for companies, and we postulate that they are linked to aspects of implementation. As companies enter or consider each one of these dimensions of the business, they will incur in increasing costs if there is a poor implementation of strategy, innovation and internationalization. However, despite their importance, many SMEs do not have structured processes of strategy, innovation and internationalization. This may be particularly true in micro, entrepreneurial enterprises, which are the subject of this study. The determination of the causes and determinants, as well as the tools that companies use in designing their processes of formulation and implementation of strategy, innovation and internationalization, are extremely important in order to identify the factors and determinants that have major impacts on business performance, and explain how these effects occur or act. The importance of this issue is increasing, namely at the European level, because the market in each country is generally too small to allow the return on the investment made in developing a new product, so internationalization comes as a natural path to follow, once the innovation process is properly consolidated, based on a coherent, visionary and sustainable strategy. Many new firms initiate their activity with an explicit eye on internationalization and products designed for foreign markets should be prepared to compete at a global scale, supported by a clear differentiation strategy. This article is a case study of fifteen Portuguese micro enterprises (less than ten employees). The share of micro enterprises in the total business sector in Portugal is approximately 95,59%. Entrepreneurship has been encouraged by several policies, and new firms, with new approaches and skills, have surged. Our sample includes new firms and firms that were created several years ago, and spans several sectors of activity. We will examine, in the light of the main literature about the issue and in a critical way, the strategy, innovation and internationalization processes of these firms, and interpret them under the assumption that implementation aspects are critical to their performance and hence to their survival in a hyper competitive global industry. The results of the study provide the ground for the proposal of a diagnostic assessment tool, which aims at performing an enquiry into the firm’s existing methodologies and practices related to strategy, innovation and internationalization, and thus allowing a more rigorous and systematic interpretation of the interactions of those processes. The diagnostic tool provides the basis for the proposal of adequate tools that the can be implement to better coordinate those processes. This assessment tool may be applicable to more mature SMEs as well, helping organizations improving their strategy processes.

Keywords: strategy, innovation and internationalization management, entrepreneurship, diagnostic assessment, scoring model, organizational change

1. Introduction

In this paper, we intend to provide an overview about the interaction between the processes of formulation and implementation of strategy, innovation and internationalization, since there are few studies that integrate these issues and analyze the interdependence between these areas of knowledge, despite the explicit recognition that the three areas are closely related and that it is difficult to understand one of the processes without understanding the interrelationships with the other processes.

Despite the recognized importance of these areas, particularly on the issue of competitiveness based on smart specialization, Portuguese business practices in those three areas are largely deficient, due to a high orientation of Portuguese firms to domestic demand. This orientation has proven disastrous for many companies, due to the constraints that the small internal market crosses, associated with the fact that almost all of the Portuguese firms are SMEs, particularly micro enterprises. The share of micro enterprises in the total business sector in Portugal represents 95,59%, and the phenomenon called “entrepreneurship” is very present.
Managers have at their disposal several tools for planning, but nevertheless, the implementation process reveals itself as the decisive factor for the success or failure of a company's performance, and it turns out that there is a lack of understanding of the interaction between the components of strategy, innovation and internationalization and the use of appropriate tools

The development and structuration of a diagnostic assessment tool applied and experimented in those enterprises, in terms of existing methodologies and practices related to strategy, innovation and internationalization, could allow a more rigorous and systematic interpretation of the interaction of those processes. Hence, the proposal of adequate tools for the management of SMEs to coordinate those processes, helping organizations to improve their strategy, innovation and internationalization processes, which are critical to increase their competitiveness.

We begin this work with a critical review of the existing literature about the concepts related to strategy, innovation and internationalization. Then we identify the methodology adopted in this work and finally the results are analysed under the light of the research questions.

2. Conceptual framework

A common interest between academics and practitioners is to try to understand why an organization has success in their interaction with its environment and how they can manage this process (Axelsson & Easton, 1992).

This issue is visible in the concept of strategic management (also called “policy” or “strategy”) defined by Rumelt, Schendel & Teece (1994), which is related to the course of an organization, including the issues that are at the heart of top management preoccupations and those who are associated with the reasons why a business succeeds or fails. Hitt, Ireland & Hoskinson (2011) states that “the strategic management process is the full set of commitments, decisions, and actions required for a firm to achieve strategic competitiveness and earn above-average returns”, or in other words, it is the successful formulation and implementation of a strategy that creates value.

Behind those definitions, there are three key strategic questions that each firm asks herself and that need an answer: (1) Where are we today?; (2) If nothing will change, where will we be in one, two, five or ten years? Will the answers be reasonable? (3) If the results are not satisfactory, what actions should management take? What are the advantages and risks involved?

Thus, we can resume strategy as set of management decisions and actions that determine the long-term performance of a company. The basic elements constituting the cycle of strategic management are the analysis of the environment, the formulation and implementation of strategy, assessment and monitoring. In the case of the analysis of the environment, the elements that compose it are the analysis: of the general environment, of the industry, of the competition, of the organizational structure, of the corporate culture and of the resources that the company has at its disposal.

The process of strategy formulation is closely linked to the progress of long-term plans in order that a company deals effectively with the opportunities and threats that it faces in its environment, in light of its strengths and weaknesses. Strategy formulation is then made by the mission, objectives, strategies (comprehensive description of how the company will achieve its mission and objectives) and policies (which are lines of action that will support decision making).

Strategy Implementation is related to the execution/implementation of strategies through the explanation of programs (activities necessary for the completion of a plan), budgets (programs in financial terms) and procedures (sequential steps that describe in detail how to perform a specific task or function).

Assessment and control are processes that allow the tracking of activities and results of the company in order to be able to compare the actual to the desired performance, allowing the introduction of measures to mitigate the observed deviations.
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Hitt, Ireland and Hoskinsson (2011) argued that the strategic management process has three strategic dimensions: strategic inputs, actions and outcomes. After a company determines its key competencies, resources and capabilities, based on internal and external environment analysis, it defines its mission and vision statements (strategic inputs). Then, in order to achieve profitable results (strategic outcomes) it must establish a set of actions, integrating strategy formulation and implementation (strategic actions).

Strategy formulation issues are related to competitive rivalry and competitive dynamics, business and corporate level analysis, the international dimension, and cooperative issues and mergers and acquisition strategies. Strategy implementation issues are related with corporate governance, organizational structure and controls, strategic leadership and strategic entrepreneurship.

Furthermore, to define and implement a structured process of strategic management and innovation, it is important that the organization defines how it creates, delivers and gets value, which is generally accomplished by drafting a business model. The business model is like a plan for a strategy to be implemented through organizational processes and systems structures (Osterwalder & Pigneur, 2010). To Afuah and Tucci (2003) is a “system that is made up of components, linkages between the components, and dynamics […] a set of which activities a firm performs, how it performs them, and when it performs them”. According to Hamel (2000), the model of an enterprise can be simply described as the “way of doing business” or his “business concept” so that it can sustain the survival and/or growth of the firm. According to Morris (2009) “a business model is therefore a description of a whole system, a combination of products and services delivered to the market in a particular way, or ways, supported by an organization, positioned according to a particular branding that, most importantly, provides experiences to customers that yield a particular set of strong relationships with them. Further, a business model describes how the experiences of creating and delivering experiences and value may evolve along with the changing needs and preferences of customers. And it says how you make money, what people are willing to pay you for.”

But strategy and innovation are distinct concepts both in terms of definition and function, being innovation a source of competitive advantage (Dobni, 2010). The continued growth of the importance of innovation is also related with is capacity to make changes in the competitive position of firms. Thus, innovation and strategy are complementary (Dobni, 2010), and feed on each other.

Innovation begins with signs of changes in the organizational environment. The major challenges faced by institutions are related to the comprehension of the factors that are behind them and to develop appropriate response strategies (Tidd, Bessant & Pavit, 2008; O’Sullivan & Dooley, 2009). The selection and adoption of innovation is a fundamental process of strategy implementation.

Research on adoption of innovation is scattered, since there are few comparison studies or innovation experiences (Cooper, 1998), particularly regarding the return of inputs and reportedly underutilized technologies, since the adoption and efficient use of new technologies is an important aspect of the development process and the existing knowledge about the different characteristics of the process is unstable (Foster & Rosenzweig, 2010).

Small companies use preferentially product innovations to achieve competitive advantages, while large firms use other tools, such as economies of scale, learning curve effects, diversification and investment in new projects (Salavou, Baltas and Lioukas, 2004).

The entry mode choice in a foreign market is a challenge and a critical decision, and will have a great impact in the company’s performance. Researchers have identified a large number of practices and models concerning the entry choices modes that a firm could adopt, but there is not an agreement on which is the best entry strategy in foreign markets (Nakos, 2011).

A widely known model on internationalization processes is the Uppsala process model developed by Johanson and Vahlne (1977). This model reveals two patterns of the internationalization process: (1) the establishment of a chain, which represents the gradual order that firms follow in their international operations: no regular export; independent representative; sales subsidiary and manufacturing; (2) Companies make their investments in the markets that they can better understand in order to reduce the uncertainty in new markets – the notion of psychic distance. This concept is related to factors that hamper information flows between
firms and the market, such as differences in language, level of education, business habits, cultural environment, legal environment and political systems.

The Uppsala model was updated by the authors (Johanson and Vahlne, 2009) to incorporate the effect of networks on the internationalization process, acknowledging that learning processes of companies, and their commitments, are as much linked to the network of relationships as to national institutional aspects.

According to Alem & Cavalcanti (2005), another behaviourist model is suggested in the literature, the IModel (Innovation – Related Internationalization model), originally developed by Bilkey and Tesar (1977), and with contributions from other authors such as Czinkota (1982), Andersen (1993), Cavusgil (1980) and Reid (1981). This model points to various stages of the export process, in which each one is an innovation for the company by anticipating the trends, whether in the foreign markets, or in the domestic markets.

Another important model that explains the shape of internationalization is the Eclectic Paradigm of Dunning (1980), or the OLI model (Ownership, Localization and Internalization) which is based on a rational approach in which companies, on their approaches to foreign markets, are looking particularly at three types of competitive advantages, associated according to the highest probability of economic profit (Barcellos, 2010): (1) Companies (Ownership) Advantages, including the access and /or ownership of resources that create value, (2) Advantages of Location, including those provided by the places where they settle and finally, (3) Internalization Advantages, which are those related to intramural production advantages, instead, for example, of advantages related to association agreements with local companies.

The identification of organizational characteristics and the strategy that enable companies to improve their innovative approach are nowadays, with the challenge to internationalize their activities, essential to increase their competitiveness.

3. Methodology

We use the case study methodology as valid way of exploring existing theory and as a exploratory way to provide an integral vision and a general understanding of a phenomena (Yin, 2009). This study relies on data collected from the study of fifteen micro enterprises (less than ten employees). These micro enterprises are start-ups or early stage companies that entered a business incubation program. They are from different sectors, whose activities ranges from media, software development, construction, 3rd sector services, human resources services, marketing, surveillance and safety services, to biosciences and touristic web services platform.

In this research, we analyze the strategy, innovation and internationalization processes and their relationships. Following a literature review, forty five in-depth interviews were conducted with managers of those companies, which constituted the main instrument of data collection. It was possible to relate the empirical data with several ideas advanced by the literature.

The methodology is not prone to generalizing the results, due to the specificity of the context, but it highlights a set of good examples concerning the actual state of the art about the business practices on strategy, innovation and internationalization activities.

This paper presents only some preliminary results that support our arguments. Work is in progress regarding the experimentation of a diagnosis assessment tool, the development and structure of a framework for analysis that allows a more rigorous and systematic interpretation of the interaction of those processes, as well the proposal of adequate tools for the management of SMEs to coordinate those processes.

4. Analysis and discussion

Seen as a critical success factor to increase the economic development of any nation, policy directives have led to an almost generalized adoption of specific measures, including the implementation of organizational structures (science parks and start-up incubators near the university premises) in order to promote the so called entrepreneurship phenomena. After successfully applying to a business incubator program, companies have at their disposal a range of services provided by the incubators, in order to provide expertise to accelerate the growth of the business, by enhancing and developing the skills of entrepreneurs, and especially,
helping the entrepreneurs to expand their vision of the market. This is the main distinguishing feature of incubators regarding the services provided to start ups.

The business program incubator, besides providing administrative support services (physical spaces, logistics, information, communication, broadband), also provides management support services (business creation, business plan, business vision, training, facilitating access to financial instruments, expert advice), in order to create management competences and network contacts. In the present case the elected areas of management support and intervention were: strategic management, innovation, business plan, marketing and internationalization.

As we mentioned before, through this work we aim to analyze the strategy, innovation and internationalization processes and their relationships, and to achieve this objective we created a framework that integrated those concepts. The objective of this framework was to support the generation of innovative business ideas, testing their potential and viability, based on the development of entrepreneurial attitudes and skills of the participants, with the use of specific tools and methodologies to provide the creation of sustainable and innovative businesses. The framework is presented in Figure 1.

![Figure 1: Innovation framework for SMEs (authors)](image)

The first step on this framework was the phase called “Kick Off” and Diagnosis. This is an important phase, because the intention here is to establish the adequate conditions to the beginning of the process, namely: (1) Getting the final alignment on objectives and scope of the project; (2) Defining and mobilizing the Team Project; (3) Mobilize stakeholders; (4) Planning the work and resulting products in stages; (5) Conducting a Preliminary Diagnosis; (6) Introducing the diagnostic results to Team Project. In order to review the operations of the companies, a first diagnostic assessment tool for business, products and processes innovation was developed to help Top Management in their business evaluation, identifying the Top priorities areas of the intervention. This tool covers the twelve following areas: (1) Concept and Business Structure; (2) Business Differentiation; (3) Product Differentiation; (4) Services Differentiation; (6) Markets Differentiation; (7) Knowledge management and external environment positioning; (8) Internal environment knowledge management; (9) Models and perception of creative management; (10) Structure, project planning and control; (11) Technical and economic feasibility study of the project; (11) Valuation, recognition, protection and certification of the results of the project; (12) models for innovation management. The aggregated results of a first in-depth interview with all the firms included in the case study are presented in Figure 2.

As the net graph in Figure 2 shows, and according to the perspective of the evaluator, with the exception of the internal environment knowledge management, all areas questioned had poor/negative results on a scale 1-5.

The poor score in the variable related with the valuation, recognition, protection and certification of the results of the projects (1,67), combined with the other dimensions, seems to indicated that the firms do not have the criteria and the potential that investors and the literature values, such as competitive advantages, promoters profile, a structured strategic plan, markets and market segments well identified, among others. Some Business Models must be redefined. Some firms do not have funds to invest in growth. Business ideas, competitor analysis and proof of concept were also rather underdeveloped and a perhaps excessive focus in the domestic market dominates the picture. After the presentation of the results of the diagnosis and the presentation of the intervention plan, only six firms continued to the second phase.
Five point Likert scale:
1: incipient/no analysis/no differentiation
2: poor/occasional analysis/attempts at differentiation
3: moderate/infrequent analysis/some differentiation
4: good/regular analysis/differentiation not stabilised
5: well structured/systematic analysis/with differentiation

**Figure 2:** Diagnosis aggregated results

The second phase, The Design/Business review is designed to allow support for reflection, and the specification and implementation of practices and procedures for: (1) Selection of Ideas and Value Proposition; (2) Strategic Analysis (3) Strategy and Costs and (4) Business Model.

This phase begun by reviewing the business models through the process of strategy formulation, but after the initial consultancy sessions, it was found that besides not having structured practices of strategic management and innovation, there was a huge lack of knowledge related with those areas, including related areas like marketing, cost management, project management, project evaluation, knowledge management, business models and internationalization. This is a situation that many new start up firms face.

In the meantime six new firm entered the process. Their fields of activities ranged from medical devices, energy management, consultancy and implementation of projects in the areas of geology, hydrogeology and geophysics, media, ships repair and jewellery. In order to promote a deep reflection and provide the key concepts to all the companies, a new diagnosis assessment tool was developed, which integrates those concepts. Particularly, we adapted the Business Model Canvas, developed by Osterwalder & Pigneur (2010), and integrated in the base model strategy, creativity management, project management, costs management, internationalization, project evaluation, knowledge management, technological surveillance, cooperation and foresight, intellectual property and organizational structure issues. The Business Model Generation (BMC) is a widely used tool on entrepreneurship labs, whose concept aims at sharing a common language that allows easy describing and manipulation of business models as a way to create new strategic alternatives. The model is formed by nine basic blocks, based on four main areas of a business: (1) customers; (2) supply; (3) infrastructure and (4) financial viability. Those blocks are constituted respectively by: (i) Customer Segments; (ii) Value Propositions (iii) Channels; (iv) Customer Relationships; (v) Revenue Streams; (vi) Key Resources (vii) Key Activities; (viii) Key Partners and (ix) Cost Structure. The building blocks of a business model give origin to the so called Business Model Canvas, which is a practical tool that fosters clarity, debate, originality and assessment of new and existing business models (Osterwalder & Pigneur, 2009).

Our Diagnostic assessment tool consists on a scoring model of eleven components, were each component is composed by fifteen questions, in a total of one hundred and sixty five questions. We label nine of our blocks with the same terminology of BMC, adding in each one of these blocks more questions in order to promote business reflection by the part of the firms and a better comprehension of their actual situation and desired
situation. We also added two new blocks: Strategy and Project Management. So, this diagnosis model is composed by the following blocks: (i) Strategy; (ii) Customer Segments; (iii) Value Propositions (iv) Channels; (v) Customer Relationships; (vi) Revenue Streams; (vii) Key Resources (viii) Key Activities; (ix) Key Partners, (x) Cost Structure and (xi) Project management. The key areas of this assessment tool are: (1) Strategy; (2) Creativity management; (3) Customers; (4) Supply; (5) Infrastructure; (6) Project Management and (7) Internationalization.

At this moment, we are testing and experimenting this tool, so work is in progress and at this moment there is no reliable data in order to properly analyze the tool.

The third stage of the framework, called Strategic Planning, will consist on the support for reflection, the specification and implementation of practices and procedures for: (1) The Mission, Vision and Policy Organization; (2) Strategic and Operational Objectives; (3) The Strategic and Operational Planning; (4) Organizational Structure; (5) Communication; (6) Involvement of the Management on Analysis, Improvement and Innovation.

The fourth stage of this process, called Value Chain Processes will consist on support for reflection, the specification and implementation of practices and procedures: (1) Customer Relations; (2) Relations with Suppliers and Key Partners; (3) The Implementation/Provision of Product/Service; (4) Interfaces Management and Knowledge Production; (5) Ideas and Opportunity Management and Evaluation; (6) Project Risk Assessment; (7) Planning Project; (8) Relationship with Employees; (9) Infrastructure and Work Environment.

The fifth stage of the framework, called Monitoring, Measurement, Correction and Improvement processes will consist on support for reflection, the specification and implementation of practices and procedures for: (1) The Product/Service Monitoring; (2) Monitoring Operational Performance and Innovation; (3) Data Analysis and Performance and Corrective and Preventive Initiatives.

Finally, the last stage, called Assessment and Delivery, will consist on the evaluation of the degree of achievement and final delivery of the initial objectives.

5. Conclusion

One of the main results of this research was the realization that entrepreneurial managers need an appropriate conceptual framework to guide them on the design or review of their Business Model.

New firms face, generally, important entry barriers, such as the lack of credibility by the market, the lack of financial and human resources and the lack of strong partnerships. In addition, the internal management practices are also deficient in many respects. In order to circumvent these difficulties, firms will have to act on the factors that they can manipulate, and these include the products and services offered by the firm, that ideally must be prepared to compete on a global scale, based on a strong differentiation strategy with an high innovative content, and the systematization and structuring of the innovation process inside the organization, which is an extremely important factor that increases considerably the probability of success.

The insufficient knowledge of evaluation methodologies and techniques is often a constraint in the decision processes of SMEs. Small firms say that a major barrier to implementation of an innovative idea is the lack of an appropriate valuation technique and, very often, are guided by intuition and experience (Ordoobadi, 2006). Thus, it assumes significant importance the establishment of appropriate metrics for evaluating investments in new technologies and a systematic process of technology management (Drucker, 1993) according to the nature of the technology and its level of maturity.

As we see in this case study, by the Diagnosis Aggregated Results, it seems that the lack of a strong differentiation strategy is a main issue missing in almost all inquired start-ups, and a key barrier that hampers the growth and competitiveness of these firms. The little importance given by managers to the innovation process, which is reflected in the number of companies that have renounced to the innovation consultancy (after the initial diagnosis) and the lack of knowledge in related areas such as strategy, marketing, project evaluation, cost management and internationalization activities, seems also to be factors that contribute to the aggregated results achieved.
Companies seem to be mostly concerned with short term profits, rather than creating long-term value. The lack of resources, namely financial and human resources, could explain the managers’ focus on short-term profits but the failure may also be related to internal implementation issues (Barbosa and Romero, 2013).

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Innovation and Sustainability in the Social Economy: A Case Study of Organizational Change of a Social Portuguese Organization

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Abstract: In Europe, the Social Economy is responsible for about 10% of the European business sector, with a share of about 6% in total employment (about 11 million people), revealing an industry that will be called to give a greater contribution to the current problems of unemployment and social cohesion in Europe due to the ongoing social and economic transformation. However, research on the phenomena of the Social Economy still lacks in many respects, concerning, for example, its role in the development of local, regional and national competitiveness. There is a lack of methodologies, tools and indicators appropriate to the social economy. This could be caused by the complexity and diversity of the organizations, on one hand, which is a barrier to their comparability, and on the other hand, to its late and recent recognition on the production of public services. Changes on public policies, the economic and financial crisis, the spread of unemployment and poverty, brings to the light the importance of these organizations, which are ceasing to be residual in economic terms, and are becoming, alongside the State and the Market, a mainstay of the economy. This article is a case study of a Social Economic Organization, where we will examine, in the light of the literature on strategic management, and innovation, its organizational change, which was critical to ensure its survival. Through this case study we intend to increase the understanding and the knowledge on the main motivations, barriers and facilitating factors leading to the improvement of the quality of the services, and the efficiency of the management of the Social Economy Organizations, which contribute to its competitiveness and sustainability. The case study highlights a number of best practices in the design of structured innovation processes, which were supported by the Portuguese Program Q3-Qualifying the Third Sector, which may help similar organizations to improve their innovation and organizational processes, which are essential to increase their competitiveness and sustainability.

Keywords: innovation, strategy, social economy, nonprofit sector, alternative economy, organizational change

1. Introduction

In this case study we look at the process of organizational change in a non-profit institution. We begin this work with a brief review of concepts related to social economy and to strategic management and innovation, in order to define the analytic framework used throughout the paper. Then we identify the adopted methodology and, finally, the case of the Luis Bernardo de Almeida Foundation will be described and analyzed.

2. Conceptual framework

According to CASES (2010), the term Social Economy is ambiguous because it accommodates a wide range of concepts, such as the “third sector”, “non-profit sector”, “social economy”, “alternative economy”, among others. It is very difficult to establish a single concept and define the frontiers of Social Economy. For instance, the Portuguese national statistics office (INE) and the non-profit institution CASES (Antonio Sergio Cooperative for Social Economy) use the definition proposed by CIRIEC (2012) on the pilot project Satellite Account of Social Economy for Portugal (SASE)-2010:

"Set of private firms, formally organized, with autonomy of decision and freedom of membership , created to meet the needs of its members through the market , producing goods and services , ensuring financing , where the process of decision making and benefit or surpluses sharing is not directly linked to capital or contributions of each member, but corresponding to each member one vote . The Social Economy includes also private entities formally organized, with autonomy of decision and freedom of membership that produce non-market services for households and whose surpluses, if any, may not be appropriated by the economic agents that create, control or finance them."

In Europe, Social Economy activities contribute to about 10% of the output of the European business sector, with a share of about 6% in total employment (about 11 million people), revealing an industry that will be called to give a greater contribution to the current problems of unemployment and social cohesion due to the social and economic transformation under way.
In Portugal, this sector, according to INE and Cases (2013), comprises Cooperatives (2,260 units); the Mutual Societies (119 units); a network of charities known as Santa Casa da Misericórdia (Holy House of Mercy) (381 units); Foundations (537 units) and Associations and other organizations in the Social Economy (52,086 units), involving 55,383 organizations, with a share of 5.5% of the total paid employment, representing a proportion of 2.8% of the gross value added.

According to Soares et al (2012) two thirds of the expenses of these organizations are related with the cost of goods sold and materials consumed (including the cost of food), staff costs, services and utilities costs. On the other hand, they indicate on their budget a great proportion of State contribution. The Social Economy Sector is facing a huge set of challenges and weaknesses, which include, among others, the following: (1) the high dependence on financial support from the state; (2) the requirement to fulfill a set of criteria and rules imposed by the State, in order to maintain public support, particularly in terms of professionalism, quality and accreditation; (3) sustainability in a context of economic crisis, with a probable reduction in support and growth of social problems; (4) the need to reinvent their business models in order to avoid chronic shortages; (5) professionalization of top management; (6) economies of scale; (7) the qualifications of employees; (8) leadership; (9) equipment and facilities; (10) ICT integration; (11) demographic change; (12) asymmetries in population distribution.

To face these challenges and weaknesses it is imperative to improve the quality of the services and the effectiveness of management, thus contributing to competitiveness and sustainability. The following areas are particularly important: (1) forms of organization and management; (2) value chain of services; (3) integration of ICT; (4) improvement of procedures for quality certification; (5) development of internal skills: training and development for leaders and training for employees; (6) models of inter-institutional cooperation.

The Social Economy organizations need to rethink their operating logic, without, however, neglecting the purposes for which they were established, so it seems particularly relevant the establishment of structured practices on strategic management and innovation. These weaknesses can be addressed through a program to support the development and qualification of individuals and organizations, integrating actions of training and consultancy.

To Rumelt, Schendel & Teece (1994) strategic management (also called “policy” or “strategy”) is related to the course of an organization, including the issues that are at the heart of top management preoccupations and those who are associated with the reasons why a business succeeds or fails. Hitt, Ireland & Hoskinson (2011) states that “the strategic management process is the full set of commitments, decisions, and actions required for a firm to achieve strategic competitiveness and earn above-average returns”, or in other words, it is the successful formulation and implementation of a strategy that creates value.

The basic elements constituting the cycle of strategic management are the analysis of the environment, the formulation and implementation of strategy, assessment and monitoring. The analysis of the environment includes analysis of: the general environment, the industry/sector, competition, organizational structure, organizational culture and the resources that the organization has at its disposal. The process of formulation of strategy is closely linked to the progress of long-term plans in order that an organization deals effectively with the opportunities and threats that it faces in its environment, in light of its strengths and weaknesses. Strategy formulation is then made by the mission, objectives, strategies, (comprehensive description of how the organization will achieve its mission and objectives) and policies (which are lines of action that will support decision making). Strategy Implementation is related to the execution/implementation of strategies through the explanation of programs (activities necessary for the completion of a plan), budgets (programs in financial terms) and procedures (sequential steps that describe in detail how to perform a specific task or function). Assessment and control are processes that allow the tracking of activities and results of the organization in order to be able to compare the actual to the desired performance, allowing the introduction of measures to mitigate the observed deviations.

Hrebiniak (2006) argued that managers know little of strategy implementation and they are not trained to implement strategy, only to plan. Another problem is related to the general conviction that strategy implementation plays a minor role in terms of the hierarchy of strategic actions, being more adequate for lower levels of management, forgetting that management commitment is essential to a successful implementation. The author also argues that the top six obstacles that managers face are: (1) inability to
manage change; (2) poor or vague strategy; (3) not having guidelines or a model to guide implementation efforts; (4) poor or inadequate information sharing; (5) unclear responsibility and accountability; (6) working against the organizational power structure. The case study addressed in this article shows the importance of such items.

Strategy and innovation are distinct concepts both in terms of definition and function, being innovation a source of competitive advantage. The continued growth of the importance of innovation is also related with is capacity to make changes in the competitive position of organizations. Thus, innovation and strategy are complementary and feed on each other (Dobni, 2010). According to the Oslo Manual (2005), which establishes the guidelines for the collection and interpretation of data on innovation, developed by the OECD: "An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations”. The Social Economy Organizations develops essentially services, which have a set of characteristics that distinguish them from the goods: (1) Intangibility; (2) Heterogeneity; (3) Simultaneity; (4) Perishability. According to Dantas & Moreira (2011), and Booz , Allen and Hamilton, cited by Edvarsson et al (2000) innovation in services can be classified into categories that range from "Worldwide new services" to "Cost reductions".

Organizational change is the process of converting an organization from its current state to a desired future state (Sullivan, 2009). All innovation results in change, but not all change is innovation. The core techniques for managing organizational change include: (a) Strategic planning: The changing areas are called objectives or strategies and are intended to guide the teams in the development of ideas or projects to achieve objectives; (b) Performance Evaluation: Assign measures or indicators to critical aspects of organizational performance; (c) Management of Creativity: Generating ideas or problem solving; (d) Project Management: Need to effectively manage multiple tasks and initiatives; (e) Knowledge management: How to effectively manage change for managing the information associated with the change;

Furthermore, to define and implement a structured process of strategic management and innovation, it is important that the organization defines how it creates, delivers and gets value (business model). The business model is like a plan for a strategy to be implemented through organizational processes and systems structures. The application of this concept is new in the area of Social Economy. Some of these conclusions are applicable to the present case study, as shown below.

3. Research method

We use the case study methodology as a valid way of exploring existing theory and as a exploratory way to provide an integral vision and a general understanding of a phenomena (Yin, 2009). In this research, we analyze the organizational change operated on a Social Portuguese Organization. Following a literature review, eleven in-depth interviews were conducted with managers in Luiz Bernardo de Almeida Foundation. It was possible to relate the empirical data with several ideas advanced by the literature.

The methodology is not prone to generalizing the results, due to the specificity of the context, but it highlights a set of good examples concerning the key factors for the establishment of an effective innovation and sustainability strategy for social economy organizations.

4. Organization profile

The Luiz Bernardo de Almeida Foundation (from now on, LBAF) is located in the county of Vale de Cambra and was established in 1957 in order to fulfil the testamentary disposition of Commander Luis Bernardo de Almeida. Its heritage consists on the assets of its founder and the other values acquired throughout its existence.

The institution started functioning with a nursing home in 1972, and in 1985 implemented a Home Support Service, directed at the elderly. This service was one of the first to be created at the District level. The institution also has manages a Day Centre, where the beneficiaries are also elderly people that are independent in terms of mobility. In 1999 an Office of Family and Community Support was created. In October 2004, a nursery school was built. The Family Support Service is directed at kindergarten level children.
5. The process of organizational change

The process of organizational change begins when the board of LBAF took certain decisions that proved to be crucial for the survival of the institution. These decisions were followed by an application to the so-called Q3 Program (Qualifying the 3rd Sector), a national program that aims at developing skills and organizations of the 3rd sector, improving the quality of their services, the effectiveness of management and contributing to their competitiveness and sustainability through participated and sustained processes of consultancy and training. The aim of the board was to ensure the sustainability of LBAF, and the improvement of the quality of services. There was a strong belief that the organization had a poor organizational performance, which was translated into weak economic and financial results and on poor service provision, so it would be extremely important to know the causes of this poor performance in order to mitigate or even eliminate them.

The Q3 Program had other advantages, besides cost, which include an integrated, impartial and experienced vision by an external and recognized entity, that would identify the main problems that the institution was facing and provide a framework to manage the actions to mitigate or extinguish those problematic situations, through actions of training and consulting made to fit the organization profile, its size, the problems identified and the defined objectives. The Q3 Program involves a strong partnership between some important organizations in Portugal: AEP (Chamber of Commerce and Industry), Fenacerce (National Association of Social Solidarity Cooperatives), Minha Terra Federation (Portuguese Federation of Local Development Associations), CPCCRD (Portuguese Confederation of Culture, Recreation and Sport communities), UTAD (University of Trás-os-Montes and Alto Douro), among others. The intervention follows a model, which involves several phases: recruitment and selection, conducting a diagnosis, preparation of a development plan, implementation measures, review plan and recommendations. All activities are evaluated externally and internally validated, and all actors (consultants and trainers) have certified skills in order to act in accordance with the procedures to ensure the quality and effectiveness of the intervention. The intervention on the organization had a duration of about one year and followed the steps described below.

6. Organizational diagnosis

This phase began with the signing of the Development Contract - the document which defines the commitments between the organization and the organization that manages the intervention in order to promote the desired organizational development of the beneficiary of the intervention.

The organizational diagnosis is essential because at this stage all the problems are identified and the goals that are the target of the intervention are defined. It is, therefore, necessary to resort to the holders of the knowledge of the organizational reality, elements that experience the daily life of the organization and make the exploration of problematic situations. The idea is to maximize the participation of the whole organization in gathering problems, where the consultant only assumes the role of a listener/agent/moderator.

In the realization of the organizational diagnosis, the main reference activities that sustain it are: (1) Listening to people; (2) Documentation review, (3) Sectoral framework and context; (4) Problem tree; (5) Current Situation/Desired Situation; (6) Objectives Tree.

In addition to listening to people, there are also, at this stage, activities that promote their participation in all stages of the process: (1) Meetings with Top Management; (2) Meetings/contacts with an internal facilitator; (3) General Sessions held for the entire organization. On the analysis of the tree problem, a key tool of the diagnosis, it was found that the general problem of LBAF was a poor organizational performance. Seven intermediate problems were identified as causes of this general problem: poor organizational structure; poor planning of activities; poor management practices in human resources; scarcity of financial resources; poor implementation of quality and a lack of employee skills, having been detected 85 terminal problems as causes of these intermediate problems.

To analyze the organizational structure, five basic components of it were considered (Mintzberg, 1999), where some terminals problems of LBAF were fit:

- Strategic level: the strategic level comprises the organizational decision makers, here materialized in the board function. The problems identified relating to this component were, among others: poor strategic management and reduced operational presence of the board.
The Technostructure: comprising the rules and procedures for managing the behaviors of employees. In this component were identified, among others, issues of horizontal and vertical differentiation, which were manifested in a poor communication between hierarchical levels and lack of team spirit; problems of formalization as a poor definition of roles and tasks and also problems located at the level of centralization, such as an excessive number of tasks and responsibilities centralized in the Technical Director.

- The Support Staff: includes employees that are not directly involved in producing goods or services. However, they have the responsibility to support the primary activities, such as, for example, cleaning and feeding. In this field, several problems were detected, including deficient HACCP and cleaning practices.

- Intermediate Level: includes managers who make the connection between the strategic level and the operational level. We can include the services and technical direction, as well as the sector supervisors. In this component, problems such as poor management of teams (inadequate control range), lack of sectoral meetings, lack of performance evaluation and a poor distribution of tasks were identified.

- Operational Level: includes all employees of the institution running the production of goods or services. Here problems were also detected, among others, difficulties in interpersonal relationship, resistance to change and lack of a training plan.

Although the weaknesses of each component of the structure were identified above, the weak points in this structure, in general terms, were due to a slow level of organizational response compared to environmental changes, to inter-departmental communication difficulties, to a restricted vision of the organizational objectives, to a lack of unity of command, to a difficulty in determining the extent of the authority and competence of managers and to inadequate control range.

7. The process of implementation

7.1 The development plan

In this section the development plan established to bring change to the organizational structure is presented, showing the main results of the actions made. A summary of the evaluation of these actions is made in the next section.

The Development Plan establishes the training actions which allows the transition from the current situation to the desired situation. The plan is based on the following tools: (1) Actions tableau; (2) Actions tableau by activities; (3) Project Planning by Objectives Matrix; (4) Implementation Schedule. In the development plan we look for appropriate and feasible solutions to solve the problems of the current situation and achieve the goals of the desired situation. Resort was made to the technical expertise of the consulting team and the elements of the organization, seeking to expand the use of the knowledge hold by these elements, and using creativity to find the most appropriate, diversified and financially encompassed solutions.

Under the Q3, all the predicted actions are of a training nature, and may fit into the following types:

- Employees Qualification: within this typology the following training activities directly related with the problems of organizational structure identified above were established: (1) Operations Management; (2) Interpersonal and conflict management; (3) Quality Management - Food Area and (4) Customer Service.

- Implementation of improvement projects: within this typology, the following training activities aimed at solving problems related to organizational structure were established: (1) Strategic Management Practices; (2) Quality Management System; (3) Cooking Techniques; (4) Geriatrics; (5) Team management and (6) Human Resources Management.

- Thematic workshops.

The development plan was pre validated by the management and was discussed with everyone in the organization before the final version, benefiting, therefore, of the participation of all in the definition/specification of the actions to implement. The presented development plan solely corresponded to the set of eligible actions under the Q3 Program, although the board itself drawn up a set of own actions in order to simultaneously eliminate or mitigate problem situations not eligible by the Q3 Program.
7.2 Implementation schedule

A timeline was stipulated for the implementation of training activities leading to the resolution of identified problems, which had a duration of five months. The entire project had a one year duration, and it was composed with about one hundred hours of consultancy and two hundred and forty hours of training activities.

7.3 Implementation of the development plan

In the initial diagnosis eighty five terminal problems were detected that resulted in eighty-five goals. Thirty of these were not achievable by conducting training activities, so the eligible objectives supported by Q3 funds were fifty five. These resulted in twenty-three results to be achieved. In addition to the actions recommended in the Q3 Program, eight actions were established in conjunction with the board of the organization, in order to achieve the objectives not covered by the Q3 Program. An activity tableau of ten actions/activities was prepared, but it was possible to perform one more action in addition to the initial proposal (Management Control).

8. Results of the actions

8.1 Results achieved

All twenty-three expected results were achieved. In addition to these, the intervention allowed for several changes, which affected several areas of management and operation of the organization, particularly with regard to its organizational structure. From the results achieved, it is particularly important to stress those that are most directly related to the organizational structure. A new organizational structure was defined, whose main goal was to move from a mechanistic bureaucratic structure to a horizontal structure. The main motives which governed the development of this type of structure were related to greater customer proximity based on speed, efficiency and quality of services, a greater flattening of the organizational structure, the search for competitive advantage in a turbulent external environment, the creation of real teams and the facilitation of collaboration, a greater emphasis on operational processes as a creator of value, a delegation of work to the lowest level.

In order that the implementation of the new organizational chart was successful, the chart was redesigned, adding activities and services actually rendered by the organization and which were not reflected in the older chart, having as a direct result the ability to clearly define the roles, tasks and responsibilities of each member in the organization

It was also implemented a methodology for evaluating the individual and team performance and development, identifying the training needs of each element in order to maximize their performance at the individual level or at the level of working groups. In order to simplify procedures and minimize the resistance of employees in its implementation, two training actions were undertaken in quality management systems, and the organization decided to move forward in the implementation of the ISO 9001: 2008 standard in its five dimensions.

A final observation is due related to the conduction of training activities directed to all managers, in order to develop skills in implementing effective leadership, and two training activities designed to improve the skills of employees in teamwork and conflict resolution.

8.2 Summary of actions assessment

In order to know if the problems were solved and what improvements the organization experienced, the opinion of the organization leaders and the facilitator were sought considering the Actions or Activities implemented and the most important results, either in the immediate or short term. There was a strong commitment in the implementation of the Actions and in achieving the expected results, which led to a successful result. All the implemented measures were considered very important by the leaders and the facilitator. The measures that were believed to have a greater impact in the organization, and that fitted the problems related to the Organizational Structure of LBAF identified above, were the following:

- Quality Management System
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- Quality Management-Food Area
- Strategic Management Practices
- Human Resources Management

Regarding the results achieved which had the greater impact, they are those derived inherently from the above actions:

- Implementation of Quality Management System in Social Responses
- Implementation of HACCP System
- Strategic objectives definition
- Organizational Structure Restructuring materialized in the design of a new organizational chart, with a consequent redefinition of roles, tasks and responsibilities.

9. Conclusion

In this section, we present the perspective of the Board of LBAF about the strengths and weaknesses of the Q3 model intervention, and the results of the external evaluation, conducted by UTAD (University of Trás-os-Montes), of the implementation of the programme.

The board recognized that the positive aspects or strengths far outweigh some of the negative aspects or existing weaknesses. The managers interviewed even had some difficulty in identifying negative aspects or weaknesses of the intervention. The concentration of the implementation of the various steps/activities within a relatively short period of time, five to six months, was the weak point mentioned by the interviewees. This resulted, for example, in the reduction of the availability of time by managers and employees in the implementation of the actions, which in some periods was very demanding. In general, the strengths of the intervention were highly valued by the leaders of the organization.

The Q3 project increased motivation and the degree of participation of the people in the organization; it identified in a clear way the existing needs; it improved internal operations (e.g., by redefining organizational structure, new processes and services); it forced members of the organization to look inward and to look for solutions; it allowed new learning through training focused on very specific needs; it allowed to have an enlarged, both external and internal, vision. Essentially, the project’s strong point was the creation of favourable conditions for change in the organization which, as mentioned above, involved large parts and several dimensions of the organization.

The methodology of participatory action training, implemented by external elements with facilitation skills and processes in the field of management, as well as sensitivity and experience in the context of non-profit organizations, is an efficient and effective tool for organizational change, adaptable to various circumstances. However, their success depends largely on its appropriation by the organizations, through the commitment and participation of managers, technicians and employees. In addition, the state of necessity and awareness of the urgency of change in organizations is also a factor of great importance (Batista and Cristovão, 2011).

Finally, the final evaluation report of the implementation of the Q3 Program, conducted by UTAD in partnership with CETRAD praised the implementation of the Q3 program in LBAF, considering it an example of best practice in implementing change that crossed several fields of management and operation of the organization. It highlighted the participation of the leaders, including the Board, its commitment and permanent participation (it followed daily activities, being present in the training sessions), the degree of employee involvement, which was marked by adherence to the process and the interest and potential that they saw on it.

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Disclosure and Expropriation of Business Ideas: The Case of an Open Business Ideas Contest

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Abstract: The emergence of business pioneers in the online knowledge market of business ideas challenges the traditional view on disclosure mechanisms in the design of business ideas. The present addresses alternative approaches to leverage disclosure and access to capital market and, by doing so, it examines the value of business ideas per se in the open innovation age. The research consists in a survey about disclosure mechanisms in the context of an experimental online business ideas contest organized in the Balearic Islands. Entrepreneurs sharing online their ideas were surveyed and in-depth interviewed to ascertain the extent to which the risk of expropriation was a concern and also, to explore the actual realm of business idea property according to the subjective perception of entrepreneurs. The results indicate that the elements that were regarded by respondents as non-shareable variables differ in each case, but most answers relates to a complex array of information asymmetries regarding specific business knowledge, implementation strategy and business model evolution over time. The paper aims at identifying relevant variables and interrelations in this needed construct of protection of business ideas in what could be regarded an early stage in the age of open entrepreneurship.

Keywords: disclosure, business ideas marketplaces, appropriation, absorptive capacity, business model, perceptive knowledge

1. Introduction

Are good business ideas a dime a dozen? Similar expressions may have been heard from business practitioners often. However, such a view is not consistent with traditional business culture. Business idea protection (and discretion) has invariably been mandatory and inherent business common ground. Mutual self-interest is the common dominator behind most licensing contracts, as it is in other business contracts, including those regarding business ideas (Trotts & Hartmann, 2009). However as open innovation and knowledge marketplaces are coming of age, there has even been in recent years academic requests on the necessity of an eBay for business ideas (Dushnitsky & Klueter, 2011). Such a new, ultimate frontier in open innovation has already been crossed. Ideas4all.com, Worthldea.com IdeaDemocracy.com, Entrepreneurs.com, BusinessOportunity.com and a few more webmarkets are becoming, since four years ago, pioneers in the online knowledge market of business ideas as virtual marketplaces. These webpages facilitate the listing, search, exchange and even co-creation of knowledge assets in the form of innovative business ideas. These platforms act as open innovation intermediaries. Each of these companies has differentiated business models and operative particularities, but they have in common the focus on collective thinking and crowdsourcing as a source of innovation specifically regarding business ideas (together with other categories such as challenges and social initiatives). “Ideators” share business ideas, “navigators” vote the ideas and any person may contact the “ideator” to co-create together. Despite information asymmetries and many other drawbacks (Dushnitsky & Klueter, 2011), business ideas for funding and sale webmarkets are thriving and they promise to stay, as their steady growth makes it plausible. These platforms are the most recent and ambitious modality of open innovation and crowdsourcing; historically, intermediary platforms had avoided to consider business ideas as a possible core of their webmarkets. Since more than 15 years ago dozens of open innovation platforms were created. These converged upon Research and Development (Innovection, IdeaConnection, PRESAN, Innoget, NineSigma), Marketing & Design (CMNTY Corporation, Innovation Exchange, Idea Bounty, Guerra Creativa, Brand Tags, Battle of concepts, eYeka; Zooppa; Spigit). The proliferation of these networks brought about more recently new ventures addressing more general, collective intelligence and prediction co-creation (Lumenogic, Ushahidi, Kaggle, Chaordix) and, to a lesser extent, complete innovation platforms (DataStation, Big Idea Group), launching innovation contents and idea hunts. Crowdsourcing competitions also started to appear, typically related to social and tribe realms. Business ideas marketplaces are a younger development in the open innovation context. Its scope and serviceability is still limited. Furthermore there is a lack of available research on the profile of persons sharing their ideas and it is reasonable to have doubts on the universality of these marketplaces at the present time. Are they basically feed by fad followers? Are committed entrepreneurs active? Is equally relevant in each field of business activity? The lack of descriptive investigation results in a picture that is not clear, but still blazing.
The emergence of this novel phenomenon of business ideas marketplaces posits a challenge to conventional business thinking. Its absence in the market for more than a decade whereas other open innovation and crowdsourcing intermediaries thrived can be justified by many reasons. The ability to achieve efficient trade in knowledge is a function of several factors including search costs, information asymmetries, and the threat of knowledge expropriation (Dushnitsky & Klueter, 2011). Different disclosure mechanisms become central in the design of business ideas for funding or sale webmarket. The need for advise (and funding) must be balanced with safeguarding goals. In open innovation environments -and specifically in business ideas social networks-expropriation is assuaged in a limited way by the detection and leverage of mutual interests. Shared ideas by entrepreneurs in this marketplaces are typically in an earlier stage, incomplete, still vague and open to different growth options, in need of further elaboration. Blaise & Perotti (2008) and Dodgeon (1993) emphasise the need for collaboration at the early stage of the entrepreneurial process since creation is a process that relies on the interaction between individuals. At this juncture, the missing expertise cannot be identified ex ante, but, nevertheless, circulation of ideas is most efficient in ensuring their elaboration (Hellmann & Perotti, 2011). Hellmann (2006) analysis of the process in early-stage new ideas points out at the need to pair resources with specific criteria. However, since non-disclosure agreements are not pertinent in a webmarket context, such an open circulation is a menacing one for many entrepreneurs.

In the next sections literature related to open entrepreneurship -starting from open innovation- is examined. Cognitive and subjective -especially the ones related to perceptive capacity- variables are introduced in this context in order to conceptualize the shareable condition of the elements of a business model. This will be the analysis object in the research section, with the specific aim to create a construct of business protection in the open innovation age.

2. Literature and objectives

Management literature has paid much attention on the importance of exploiting new sources of knowledge to outperform their competitors. Slater and Narver (1995) concluded that market-oriented organisations achieve that because of the learning and market orientation. This view was progressively leading to a more cooperative and open innovation approach. Chen et al. (2006) suggest that collaborative activities are critical for ensuring an adequate response to changing external environments and knowledge creation. External knowledge sourcing is becoming more determining for several reasons: reducing time-to-market, grasping emerging technologies with the potential to disrupt market leaders’ positions and sharing costs and risks (Vanhaeverbeke et al. 2008). Chesbrough coined the term “Open Innovation” in 2003, describing how companies have shifted from so-called closed innovation processes towards a more open way of innovating (Chaston & Scott, 2012; Chesbrough, 2003, 2007). Prieem et al. (2012) suggest that successful innovations can be consumer driven rather than resource or technology driven. Furthermore and even beyond that, as Bell and Dyck (2001) argue, this type of routines may underpin a less materialistic-individualistic approach to strategy. Such an approach fits the open innovation principles. Ideators are, to a large extent, demand-side voices and their principles are, presumably, far from the materialistic-individualistic approach to business.

The effect of contextual variables in open innovation dynamics within business ideas webmarket could be regarded analogous to the one in business clusters. These mechanisms require high levels of trust-based social interaction that traditional cluster theory postulates (Staber, 2009) and that is something that business ideas marketplaces do not ensure. Multiple questions arise on that regard. Which models or approaches can be a guide in order to leverage disclosure and access to capital market? Are we entering a new age regarding the value of business ideas per se? Is borrowing brilliance an already socially structured routine?

The act of sharing business ideas partially—depending on the extent to which certain details are disclosed—reduces the intrinsic value of “entrepreneurial innovation” in the sense of an entrepreneur’s discovery of new combinations of resources that disturbs a process of equilibrium (Choi, 1995; Gick, 2002), which anyone can capitalise. The conditions in which a firm produces competitive advantage according to the resource-based view (Barney, 1991) relate to value and rareness. Open innovation marketplaces reduce per se the degree of rareness of the business ideas (regarded as resources), since these are identified and combined with limited screens. Hence, open innovation is bent to alter important assumptions from traditional views, including the resource-based theory. The integration of such a theory and the existing ones on entrepreneurship has become a recurrent object of research in recent years (Álvarez & Busenitz, 2001; Foss et al., 2008), providing in the process relevant insights in the re-definition of the boundaries of resource-based theory. An extension of it
has been suggested in order to include cognitive and subjective inputs from individual entrepreneurs (Foss et al., 2008). Entrepreneurs have individual-specific peculiarities (not only traits but even processes and perspectives) that facilitate the recognition of new opportunities. Business ideas webmarkets create new combinations of resources, depending on which interactions take place among ideators and agents. Eesley et al. (2011) theoretical attempt to create a bridge among capabilities-based literature and more recent theories of the firm from organizational economics suggests that combination of resources between ideators and individuals with managerial expertise is pertinent, especially if functional diversity refers to specific realms (R&D capabilities and contracting). However the types and quality of interaction and absorption required ideally in open innovation for business ideas remain a black box.

The concept of absorptive capacity (Cohen and Levinthal, 1990) -defined as the ability to assimilate and replicate new knowledge gained from external sources- deals with the ability to recognize, value and exploit external sources of knowledge (Dyer and Singh 1998). Its implications regarding business ideas are unexplored so far. The relational view of the firm -its ability to establish and manage inter-organizational ties- gains importance (Vanhaverbeke et al., 2008). However absorption capacity of firms in relation to external business ideas is quite different from absorption related to sheer technology and, therefore, interaction patterns for such an interaction should be re-defined. These are, among others, issues unresolved by open innovation (Trott & Hartmann, 2009). Resorting back to the principles of open innovation may be useful since it is coherent to consider that they should also play an important role in the design of the required interaction between agents in this new open channel. The survey in the present piece of research will focus on elements such as connectivity, challenge and collaboration, which underpin the open innovation approach.

In this direction, a possible shortcoming of the open innovation model -lack of adequate feedback or feedforward mechanisms (Trott and Hartmann, 2009)- is especially relevant in the context of business ideas webmarkets, since the channels and techniques to co-create in open innovation are basically designed for scientific, objective knowledge. A business idea may be regarded a perceptive knowledge. The influential insights from Boisot’s model on knowledge (1998) suggest that entrepreneurship is a function of knowledge and attitude. Ihrig et al. (2006) describe the entrepreneurial process as the development of knowledge, in which subjective perceptions are a central element. Interestingly, Davidsson (2005), embracing a process view on entrepreneurship, claims that success in the two entrepreneurial processes (discovery and exploitation) are dependant on the match between the key elements of entrepreneurship: the individual(s), the environment, and the idea. Perception and a singular focus are essential ingredients in this recipe. Similarly Foss et al. (2006) emphasise the impact of both heterogeneity of managerial mental models and shared team experiences in entrepreneurial teams. The empirical research in this paper attempts to analyse, firstly, the general perception and expectations of ideators on desired interactions to co-create from their ideas with external agents.

Beyond interaction and perception tuning to co-create, a second element that the present research aims at focusing on is the adjacent set of elements of a business idea and its instrumentality to protect the venturing. Deconstructing the concept of a “business idea” can be helpful in this context. A successful company has always started with a compelling business idea. In the age of open innovation what used to be the first milestone –the business idea- in the process of founding a company could become just a non-rare resource. The characteristics of a promising business idea are well known: it fulfills a customer need –a problem is solved, it is unique and innovative, it provides focus and it promises profits. Disclosure changes everything. Hence, a different perspective is required to analyse a business idea value. Beyond –but embedded in- the business idea, the concept of business model has emerged as a recurrent topic in entrepreneurship. Business models are abstract, complex concepts, conceived to understand and communicate not only the selected ways of “doing business” but the structures and strategies that underlie those ways of doing business (Lambert, 2012). Elements such as value proposition (service domain), value in return, customer (market conditions, segments), channels, other entities- strategic partners, value adding constitute the existing business model frameworks (Hedman & Kalling, 2003; Osterwalder et al., 2009; Hamel 2000; Weill & Vitale, 2001). The extent to which entrepreneurs are willing to share in open webmarkets these type of insights is an uncharted question, but it is reasonable to assume –and verifiable unequivocally in the existing marketplaces- that “ideators” have incentives to do it. Many practitioners claim that “execution and time-to-market is what really matters and makes a difference”. The business model elements constitute the set of “secrets” that entrepreneurs have in mind to develop an actual business: the execution recipe. It remains unclear which of these elements in the
business model framework are more shareable and which ones are more likely to be regarded by entrepreneurs as secretive pieces whose disclosure would mean being dispossessed of their venturing ideas. A business model is useful for describing existing business concepts and for translating strategy into process (Zott et al., 2011), but no research is available on their nature and role in the open innovation context. McGrath (2010) argues that business model analysis provides a sense of action, and a dynamic perspective that challenges positioning view and, also, resource-based view. McGrath’s discovery driven approach has implications regarding the willingness of entrepreneurs to disclose elements of the business model since it provides an outside-in focus, emphasising the centrality of experimentation in the discovery and development. This approach suggests certain unconventional levels of disclosure (from ideators) in order to initiate fruitful dialogues with agents. Encouraging others to challenge the viability of a business model is likely to become a growing routine. A conceptualization of the shareable condition of a business model becomes a central topic and it will be analysed in the research.

3. Research and methodology

In order to analyse these aforementioned objects of research – required interaction in open innovation for business ideas and the conceptualization of the shareable condition of the elements of a business model -, the present piece of research addresses the topics in the context of an experimental online business ideas contest organized by the University of the Balearic Islands, alongside two local Business Organizations (www.eticentre.wakasolutions.com) in 2014. The contest was about social innovation ideas. Eighty-three ideas (out of 242 in all) were discarded because of the lack of business orientation: it was not a contest of social economy ideas. The research was defined with two stages. In the first one all entrepreneurs sharing online their ideas (in a system in which the most voted ideas by visitors of the webpage were selected to become finalists in the contest) were surveyed. Responses were obtained from all of them, 159 in all. Information regarding age, academic background and actual commitment to the idea development were collected. Eighty-seven respondents were students, although only 32 of them admitted a high commitment to the actual development of the project and they were already engaged in their operative execution. The questionnaire focused on their adherence and/or apprehension to/against open innovation for their own business ideas. In addition an explicit question was made in order to ascertain the extent to which the risk of expropriation was a real concern for them. Neither actual entrepreneurs nor mere students expressed high concern for expropriation (only 3 of them held high concern and 5 moderate concern). In the results no correlation was found in relation to age, gender, family business background, academic background or commitment to the execution of the idea. Intense and moderate adherence to open innovation and their principles was expressed in almost all the cases (72 and 78 cases). The rest of the questionnaire concentrated on the exploration of the actual realm of business idea property according to the subjective perception of entrepreneurs. The few respondents with some expropriation concerns mentioned different defensive strategies for sharing their ideas: low disclosure, vague redaction, lack of specific references to marketing, networking and strategic alliances. The actual elements that were regarded by the research subjects as not shareable differ in each case, but most answers point to a complex array of information asymmetries regarding specific business knowledge, implementation strategy and business model evolution over time. A considerable percentage (more than 112 persons out of 152) of the respondents –the ones without concern regarding expropriation- rationalized their standpoint by arguing that their business idea, despite open disclosure, was still of their own since aspects such as commitment (79), visions (74), market knowledge (70) or specific combinations of marketing strategies (68) were still their secret keys for the realisation of the projects. This positive substantiation was even slightly stronger in the case of actual entrepreneurs already engaged in the execution of their projects. Nonetheless, more than 90% of the respondents also mentioned vagueness in the information that they shared, especially in relation to marketing (87) and long-term visions (45). Interestingly enough, 21 students with a low commitment to their business ideas recognised their perception of low or very low value of such ideas as they were not paired with internal or entrepreneur’s resources such as networking and motivational resources – even when 19 out of 21 of them regard the idea a good or a very good one -. As regards as strategies to attract interest (and votes) 102 respondents alluded to aspects related to specificity of data about market knowledge and 78 to elements pointing to clear competitive identity. Good prospects (both in the short and in the long term) were also expressed in this regard (51 cases), together with style of redaction (33 cases). In conclusion, the data collected in the present survey suggest that disclosure of business ideas is not considered a matter of importance by entrepreneurs that shared online their business venturing executive summary. The data collected may appear to suggest that business ideas are becoming worthless per se according to the above-mentioned lack of apprehension to open disclosure, but actually they do suggest that a new model of business
idea propriety is to be defined, where certain elements of the ideas paired with internal resources constitute the set that provides value. Responses converge on a certain pattern of elements of a business model and on certain internal resources. A more specific identification and validation of this finding was intended to be explored in the second part of the research.

The second stage of the research was a qualitative analysis aimed at deepening in the expectations about interaction with external agents and, also, in the attitude on protection of their business ideas. This research adopted a qualitative approach in order to obtain a rich and in-depth understanding of the elusive and subjective elements that frame the perception constructs on such topics. An in-depth personal interview was used for data collection with 25 of them, specifically with some of the respondents with a more receptive view on open innovation. In addition, fifteen interviews were conducted with actual entrepreneurs belonging to social innovation groups in the Balearic Islands which, aware of the contest, opted for not participating. No research has been found about whether individual socio-demographic characteristics predict disclosure proclivity, but, nevertheless, age, gender and academic background considerations were taken into account to select the entrepreneurs. This second group was not planned: it became a necessity after interviewing the first group. In this sense, the method may be regarded unplanned theoretical sampling. Theoretical sampling is the process of data collection whereby the researcher simultaneously collects, codes and analyses data in order to decide what data to collect next (Coyne, 1997). This sampling technique is intended to contribute to developing codes and emergent theory (Becker, 1993). As the data collection and analysis progressed, individuals from under-sampled groups were further recruited to yield a final sample reflecting perspectives of various clusters (in relation to adherence to open innovation principles). As a result, the final sample consisted of 40 individuals. Semi-structured interviews were conducted from January 2014 to March 2014. Interviewees were asked to explain their attitude towards the open innovation system used in the contest. In addition, they were probed to further explain in depth why they adhere or reject the model and which type of external agents interaction expected. Data analysis consisted of a thematic analysis (Braun & Clarke, 2006), in which the themes were identified within the explicit meanings of the data and, finally, some basic sensemaking techniques were used to extract results. No predefined categories were imposed on the data.

The analysis of the interviews brought about some general findings:

- Some key factors to participate in business ideas webmarkets (or contests in this particular case) relate to the belief that broadening one’s own business view has a price that is worthwhile to pay. Awareness of own limitations in terms of experience (15 comments), background (16) and, especially, perceptive focus (22 cites) are considered critical factors.

- Likewise, creating alignment across the innovation ecosystem is a concern in all cases (40 out of 40), but entrepreneurs opting for not participating in the open contest expressed high levels of general distrust in other agents’ intentions. Invariably all of them were not capable of proposing mechanisms to assuage expropriation risks, whereas the ones that participated did it. These suggestions connected with selective screening (21 comments), credentials for providing further details of the projects (20), pre-defined networking systems (10) and a gamification system regarding external agents (4). Although still vague and diverse in degree of definition, these elements provide a clear direction on the required interaction that may ensure perception match/tuning in open innovation systems.

- Opposite comments were collected among groups with respect to the necessary conditions for sharing ideas. The non-shareable aspects mentioned in the questionnaire results were largely expanded by interviewees from the second group.

- Personal values and professional principles are highlighted in all interviews as key variables to interact with external agents. Comments on connectivity appear in all 40 interviews –with remarkable emphasis on diversity of networks in the first group-. Collaboration is also a recurring topic and it is expressed in different, coherent ways in the two groups. “Innovation is a contact sport” (Analee Saxenian dixit) is embraced by almost all interviewees, but those who participated in the contest are more willing to adopt an open and uncertain approach. Negative apriorisms on external agents are abundant in the second group, in many cases based on previous experiences (basically as regards funding and partners). Challenge acceptance – being challenged from multiple angles in relation to their business ideas- is significantly stronger in the first group.
4. Conclusions and future research

The paper aimed at identifying relevant elements for the conceptualization of business ideas in the open innovation age. In such a realm, perceptive knowledge has been identified in this research as a central element to explain and justify business idea propriety. The results of the study indicate that perceptions among collaborating agents should match. Whether business ideas matter or not, thus, relates essentially to adding new perspectives: each person, regardless his or her background, has a unique perspective and that is the core, richness and justification of open innovation for business ideas, the essence of actual democracy in the process of business ideas creation. This perspective offers new elements and analysis variables for examining business ideas propriety. Business ideas do matter, provided that they incorporate new and matching perceptions. Accordingly, in co-creation contexts, particular bridges (channels, mechanisms) for perception tuning among agents are recommended. Business ideas and entrepreneurs’ resources might have different value in combination with bundles of complementary resources. Open innovation can have a dramatic impact on it and the specific variables to produce such an effect need to be conceptualized. Findings indicate that the distinction between internal resources and external resources is critical in identifying non-shareable elements of a business idea and business models. Further research is required to create a coherent construct, integrating Davidsson (2005) model.

This limited research signals new trails to explore: perception and assessment from companies and investors on ideas from webmarkets and operative suggestions on channels for perception tuning and effective co-creation. However, the most obvious research opportunity that this study prompted relate to the analysis of the absorptive capacity for business ideas in the open innovation context, with special attention on how to incorporate not only ideas and business models but singularity of perceptions.

Appendix: Semi-Structured protocol

1 Preparation.
2 Initiation and present the initial topic.
3 Verbal and non-verbal encouragement.
4 Questioning phase.
5 Concluding talk: continue the conversation as it comes, defining sensemaking elements.

References


Strategies Adopted by Male and Female Entrepreneurs in Italy to Face the Economic Crisis

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Abstract: The current economic and financial crisis has had a profound impact on the Italian economy, and has put Italian companies into great difficulty; however statistical data shows that businesses owned by women seem to have resisted the economic crisis more effectively than those owned by men. This paper seeks to describe the ways in which Italian businesses have responded to the economic crisis and adopted strategies to deal with it. The study also compares the attitudes and behaviours of male and female entrepreneurs, in order to gain insight into their respective ways of dealing with the recession. The literature review shows that firms have faced the economic crisis by adopting either an offensive or defensive approach, and by externally- or internally-directed action. Four main types of strategy were identified: restructuring, resizing, reorganization and innovation/development. Drawing from a questionnaire survey given to a sample of 300 (150 male and 150 female) owners of micro-enterprises located in the Marche region of Central Italy, the findings suggest that firms adopted mainly a defensive approach characterized by both restructuring and resizing strategies aimed to improve efficiency and refocus the core business. An offensive approach – involving innovation, development or reorganization strategies – was less common. A comparison between men and women shows that female entrepreneurs showed a lower propensity towards investment, innovation, development and growth. Consequently, they were significantly less oriented toward innovation/development strategies than men. Results suggest that under the same external conditions, gender may influence the strategies adopted by entrepreneurs in responding to the economic crisis. The defensive approach adopted by women entrepreneurs may be considered positive in the short-term, as it aims at guaranteeing the survival of the business. However, in the long-term it could undermine the ability of a business to seize new opportunities and to innovate, and consequently weaken competitiveness.

Keywords: economic crisis, entrepreneurship, strategies, gender

1. Introduction

The global economic and financial crisis that began in the USA between 2005 and 2006 spilled over to other economies and triggered a global recession, causing an economic downturn in Italy too. Between 2007 and 2013, two-thirds of the main sectors of national economy declined by more than 20% and in the period 2011-2013 national sales decreased by about 17% (Istat, 2014).

This recession has had a considerable impact on Italian businesses. Company mortality rate, the number of bankruptcies and non-bankruptcy insolvency proceedings has continued growing relentlessly (Cerved, 2014). However at a national level, company birth and mortality rates have consistently shown that female-owned enterprises fare better. For instance, in the period 2011-2012 the stock of Italian enterprises decreased by 0.49%, while the number of women-owned businesses showed only a very slight reduction (-0.04%) (Unioncamere, 2013). Women entrepreneurs seem to have resisted the economic crisis better.

Within this context, it is essential to further investigate strategies adopted by Italian firms to overcome the recession. Possible strategies include restructuring, resizing, reorganization and innovation/development (Kitching et al. 2009; Sternad, 2012). Several studies claim that significant differences exist between men and women entrepreneurs in terms of attitude, approach and strategic behaviours (e.g. Cliff, 1998). Could such differences have influenced the way in which male and female entrepreneurs faced the crisis? Empirical research often provides data on how businesses respond to economic crisis but ignores the issue of gender.

This paper aims first of all, to look at the ways in which Italian sole-proprietors have responded to the economic crisis and the strategies they have adopted to deal with it; secondly, it aims to compare the respective behaviours of male and female entrepreneurs, in an attempt to determine whether they have adopted different strategies in facing up to the recession.
The empirical research is based on a questionnaire survey given to a sample of 300 sole-proprietors, (150 men and 150 women), owners of micro-businesses located in the Marche region in central Italy. The data was collected during October-November 2013 and questions refer to the previous 5 years. The Marche region has one of the highest concentrations of micro and small enterprises in Italy. The impact of the economic crisis has been particularly harsh. For instance, in 2009 the regional GDP declined by 5.4% (Istat) and the mortality rate of joint-stock companies was the highest in Italy (7.5%) (Cerved, 2014). The regional feminization rate (24.3%) is slightly higher than the national average (23.6%) and even in this region women-owned companies have resisted the crisis more effectively (Unioncamere, 2013). For all these reasons, the Marche region is ideally suited to such a study.

The paper is structured in four parts. In the first part, the main literature is presented on the response of companies to the economic crisis. Next, the methodology employed in the empirical research is illustrated. Finally, the key results of the study are discussed and the main conclusions are drawn.

2. Literature review

There are few studies specifically addressing the strategies that companies adopted to face the recent economic crisis (Latham, 2009; Papaoikonomou et al., 2012). Therefore the literature review was extended to include research dealing with business crisis and business turnaround.

Generally, economic downturns present a “dilemma” for businesses: whether to cut costs to improve efficiency and protect revenues and profit margins or to make investments in new products and processes and pursue revenue growth in a key market segment (Deans et al., 2009). The first choice is a defensive one intended to guarantee the survival of the business in the short-term, whereas the second is an offensive choice aimed at creating opportunities for long-term value creation (Deans et al., 2009). From another perspective, firms may face an economic crisis by adopting externally-directed actions (actions directed towards the market and oriented to change marketing strategies, pricing strategies, international orientation, etc.) or internally-directed actions (actions directed towards the firm and oriented to changing structures, processes, systems or resources used) (Chattopadhyay et al. 2001; Sternad, 2012).

In this wide range of possibilities, four main strategies may be identified to explain how firms may respond to an economic crisis: restructuring strategies; resizing strategies; reorganization strategies; innovation strategies (Kitching et al., 2009; Papaoikonomou et al., 2012; Sternad, 2012).

Restructuring strategies are internally-directed actions that involve cutting costs in order to improve efficiency. Such strategies relate to traditional product/market combinations and do not involve significant dimensional variations. Firms try to improve efficiency by improving productivity and reducing expenditure on a wide range of activities. Resizing strategies are external-directed actions oriented to refocusing the core business and disinvesting non-core assets. The disinvestment of products/product lines, withdrawing from markets, selling parts of the business, closure of plants or production sites are examples of resizing actions (Latham, 2009; Sternad, 2012).

Both restructuring and resizing strategies are defensive in nature (Deans et al., 2009) and they are the most common approaches adopted by firms to deal with recession conditions, especially in the short-term (Sharma, 2000; Kitching et al., 2009), and this has been true in Italy (Istat, 2014). As regards restructuring and resizing strategies, or “retrenchment strategies” (Kitching et al., 2009), authors point out that recession provides a stimulus for firms to re-examine their portfolios, focus on their core activities and increase efficiency. On the other hand, cost- and asset- cutting can weaken the business’s competitiveness.

Reorganization strategies are external-directed actions concerned with the competitive position of businesses. Such strategies adopt an offensive approach (Deans et al., 2009) and examples include investment into new
markets, new product development, business diversification, increased marketing spending (Kitching et al., 2009; Papaioikonomou et al., 2012; Sternad, 2012). Some firms perceive economic crisis as “opportunities to invest, innovate and expand into new market in order to achieve or extend a competitive advantage during the recession and beyond” (Kitching et al., 2009). However, such strategies are risky and require resources in terms of finance, managerial competences and technical expertise (Kitching et al., 2009).

Finally, several authors argue the existence of “ambidextrous” strategies (Kitching et al., 2009), that combine both efficiency improvements and strategic investments (Sternad, 2012).

Factors that can influence the choice of a strategy for dealing with economic crisis are company size (Latham, 2009), the perception of crisis (Sharma, 2000) and cultural differences between countries (Sternad, 2012).

Empirical studies specifically addressing the responses of companies to the economic crisis often ignore the issue of gender. However, it is widely accepted that business decisions are influenced by an entrepreneur’s skills and competencies, as well as by his/her personal characteristics (e.g. preference for risk, innovativeness and propensity to invest) and several studies show the existence of significant differences between men and women entrepreneurs. Research on this subject shows that women have on average a lower risk propensity than men (Byrnes et al., 1999; Watson, Robinson, 2003; Croson, Gneezy, 2009), have lower self-confidence, especially in investment decisions (Pelger, 2012) and show a more cautious attitude toward business growth than men (Cliff, 1998; Carter, Shaw, 2006). According to Cliff (1998), “this more cautious approach toward business expansion may result in ventures that are able to out-survive those headed by entrepreneurs pursuing more risky, high-growth strategies”. Pelger (2012) says that women entrepreneurs are less inclined to invest and they are less likely than men to name sales increases, innovation, R&D and implementation of new products as their investment goals. For this reason, women entrepreneurs may have had a lower propensity towards innovation/development strategies, which would have required new investments and the willingness to accept risks associated with them.

To sum up, firms may implement a variety of strategies under recession conditions, and differences between men and women entrepreneurs may have influenced the way they have faced the crisis. In this paper, we have investigated these topics.

3. Data and methodology

The study presented in this paper is based on a questionnaire survey involving a sample of 300 men and women sole-proprietors (hereafter M and W), owners of micro enterprises located in the Marche Region, in Italy. The survey aims to compare M and W’s behavior during the economic crisis and to identify strategies they adopted to face the crisis.

A non-proportional stratified sample, with the same number of M and W, was selected using the list of members of one of the main regional business associations. Starting from a list of 1,627 sole-proprietors (429 W and 1198 M) a sample of 300 sole-proprietors (150 M e 150 W) was randomly extracted.

The decision to involve only sole-proprietors in the survey was motivated by several reasons: 1) in companies with members of both genders it is not easy to determine whether the strategic decisions are actually taken by a man or a woman; 2) in Italy sole proprietorships represent a very high percentage of the total number of female enterprises (61% in 2010); 3) in the case of companies or partnerships, information about the gender of shareholders, partners and directors is not always available.

Entrepreneurs selected this way took part in a telephone questionnaire between October and November 2013 and were asked questions regarding actions implemented to face the crisis.

Entrepreneurs included in the sample were given a list of 16 strategic actions devised from prevailing literature on this subject (Table 1) and were asked the following question: “In the last 5 years did you carry out any of the listed actions in order to deal with the crisis?”. They were also asked to give a point according to the Likert 5 point scale, in which 1=Definitely not; 5=Definitely. The survey enabled us to obtain 218 fully completed questionnaires. Women compiled 110 and men 108 questionnaires. The response rate was particularly high, standing at 73% and substantially similar for entrepreneurs of both genders (M: 72%; W: 73,3%).
The information gathered through the questionnaire has been used to:

- Identify the most frequently used actions undertaken by entrepreneurs to deal with the crisis;
- Identify several typical strategic profiles adopted by M and W: to this end the answers supplied by the entrepreneurs were submitted to factor and cluster analysis, and respondents grouped on the basis of strategic behaviour adopted during the crisis. Subsequently, the presence of men and women within the clusters was analysed.

4. Findings

4.1 Strategic actions undertaken by men and women entrepreneurs

The strategic actions most frequently adopted by men and women were identified on the basis of points given to each of the actions listed in the questionnaire (Table 1).

**Table 1: Strategic actions to face the crisis: Frequency distribution (%)**

<table>
<thead>
<tr>
<th>Action</th>
<th>M</th>
<th>W</th>
<th>M</th>
<th>W</th>
<th>M</th>
<th>W</th>
<th>M</th>
<th>W</th>
<th>Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction of waste and costs</td>
<td>1.4</td>
<td>1.4</td>
<td>2.8</td>
<td>0.9</td>
<td>4.1</td>
<td>4.6</td>
<td>13.8</td>
<td>14.7</td>
<td>27.5</td>
<td>28.9</td>
</tr>
<tr>
<td>Reduction of labour costs</td>
<td>1.8</td>
<td>2.8</td>
<td>6.0</td>
<td>2.3</td>
<td>10.1</td>
<td>7.3</td>
<td>21.6</td>
<td>11.9</td>
<td>10.1</td>
<td>26.2</td>
</tr>
<tr>
<td>Deferment of investments</td>
<td>5.1</td>
<td>11.0</td>
<td>9.2</td>
<td>6.4</td>
<td>13.3</td>
<td>12.8</td>
<td>13.3</td>
<td>3.2</td>
<td>8.7</td>
<td>17.0</td>
</tr>
<tr>
<td>Reduction of production volumes</td>
<td>14.7</td>
<td>24.3</td>
<td>13.3</td>
<td>2.3</td>
<td>10.1</td>
<td>12.3</td>
<td>6.9</td>
<td>6.0</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Lowering of prices</td>
<td>5.5</td>
<td>25.7</td>
<td>9.2</td>
<td>4.6</td>
<td>8.3</td>
<td>11.5</td>
<td>19.7</td>
<td>0.9</td>
<td>6.9</td>
<td>7.8</td>
</tr>
<tr>
<td>Improvement of production processes and products</td>
<td>24.3</td>
<td>45.9</td>
<td>14.7</td>
<td>4.6</td>
<td>6.0</td>
<td>0.0</td>
<td>3.2</td>
<td>0.0</td>
<td>1.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Organisat. or technological innovation</td>
<td>30.3</td>
<td>47.7</td>
<td>13.8</td>
<td>2.3</td>
<td>3.7</td>
<td>0.5</td>
<td>1.4</td>
<td>0.0</td>
<td>0.5</td>
<td>0.0</td>
</tr>
<tr>
<td>New products/services</td>
<td>33.5</td>
<td>38.5</td>
<td>10.6</td>
<td>3.7</td>
<td>3.2</td>
<td>5.5</td>
<td>1.8</td>
<td>0.9</td>
<td>0.5</td>
<td>1.8</td>
</tr>
<tr>
<td>Search for new clients</td>
<td>23.9</td>
<td>39.9</td>
<td>13.3</td>
<td>3.2</td>
<td>8.7</td>
<td>5.5</td>
<td>2.3</td>
<td>0.0</td>
<td>1.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Commun. and advertising</td>
<td>25.7</td>
<td>37.2</td>
<td>11.9</td>
<td>4.1</td>
<td>10.1</td>
<td>7.8</td>
<td>1.4</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Interfirms collaboration</td>
<td>37.2</td>
<td>50.5</td>
<td>9.2</td>
<td>0.0</td>
<td>1.8</td>
<td>0.0</td>
<td>0.5</td>
<td>0.0</td>
<td>0.9</td>
<td>0.0</td>
</tr>
<tr>
<td>More qualified personnel</td>
<td>41.7</td>
<td>50.5</td>
<td>6.4</td>
<td>0.0</td>
<td>1.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Training of staff</td>
<td>40.8</td>
<td>46.3</td>
<td>6.4</td>
<td>0.5</td>
<td>1.8</td>
<td>2.8</td>
<td>0.5</td>
<td>0.5</td>
<td>0.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Expansion of the activity</td>
<td>40.8</td>
<td>50.0</td>
<td>5.1</td>
<td>0.0</td>
<td>2.3</td>
<td>0.5</td>
<td>0.0</td>
<td>0.0</td>
<td>1.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Price increase</td>
<td>41.3</td>
<td>50.5</td>
<td>6.4</td>
<td>0.0</td>
<td>1.8</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Data show that entrepreneurs dealt with the crisis through a primarily defensive approach. Strategic actions most frequently undertaken by men and women were in fact related to restructuring and resizing strategies. The most frequent actions were: reduction of waste and costs, reduction of labour costs, deferment of investments. On the other hand, actions related to innovation, development or reorganization were less widely adopted. Only few entrepreneurs expanded the activity, invested in training projects, introduce innovations, made communication and advertising, improved production processes and/or products/services, introduced new products/services and sought for new clients. A significant percentage of entrepreneurs
(35.3% gave a 4 or 5 score) lowered prices to increase sales. But much less women adopted this measure. Indeed, although the prevalence of a defensive approach is what men and women had in common, the data in Table 1 suggests that men adopted an offensive approach more frequently than women.

The answers given by men and women were also analysed by applying the t-test to the means corresponding to each of the strategic actions listed in the questionnaire. The results of the t-test (Table 2) show the statistical significance of differences between men and women concerning the means of some actions. Women in fact scored higher on defensive actions (in particular reduction of labour costs), whereas men gave higher values to a series of offensive actions (improvement of processes/products, organisational and technological renewal, the search for new clients and markets).

Table 2: Differences between men and women’s means: T-test results

<table>
<thead>
<tr>
<th></th>
<th>Observations</th>
<th>Means</th>
<th>Means</th>
<th>Diff.</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>W</td>
<td>M</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>Reduction of waste and costs</td>
<td>108</td>
<td>110</td>
<td>4,28</td>
<td>4,36</td>
<td>-0,086</td>
</tr>
<tr>
<td>Reduction of labour costs</td>
<td>108</td>
<td>110</td>
<td>3,65</td>
<td>4,12</td>
<td>-0,470</td>
</tr>
<tr>
<td>Deferment of investments</td>
<td>108</td>
<td>110</td>
<td>3,23</td>
<td>3,17</td>
<td>0,059</td>
</tr>
<tr>
<td>Reduction of production volumes</td>
<td>108</td>
<td>110</td>
<td>2,37</td>
<td>2,15</td>
<td>0,225</td>
</tr>
<tr>
<td>Lowering of prices</td>
<td>108</td>
<td>110</td>
<td>3,27</td>
<td>2,22</td>
<td>1,050</td>
</tr>
<tr>
<td>Improvement of production processes and products</td>
<td>108</td>
<td>110</td>
<td>1,84</td>
<td>1,09</td>
<td>0,752</td>
</tr>
<tr>
<td>Organisational or technological innovation</td>
<td>108</td>
<td>110</td>
<td>1,55</td>
<td>1,06</td>
<td>0,483</td>
</tr>
<tr>
<td>New products/services</td>
<td>108</td>
<td>110</td>
<td>1,49</td>
<td>1,49</td>
<td>0,000</td>
</tr>
<tr>
<td>Search for new clients</td>
<td>108</td>
<td>110</td>
<td>1,87</td>
<td>1,43</td>
<td>0,443</td>
</tr>
<tr>
<td>Communication and advertising</td>
<td>108</td>
<td>110</td>
<td>1,77</td>
<td>1,49</td>
<td>0,278</td>
</tr>
<tr>
<td>Interfirms collaboration</td>
<td>108</td>
<td>110</td>
<td>1,36</td>
<td>1,00</td>
<td>0,361</td>
</tr>
<tr>
<td>More qualified personnel</td>
<td>108</td>
<td>110</td>
<td>1,19</td>
<td>1,00</td>
<td>0,185</td>
</tr>
<tr>
<td>Training of staff</td>
<td>108</td>
<td>110</td>
<td>1,23</td>
<td>1,18</td>
<td>0,050</td>
</tr>
<tr>
<td>Expansion of the activity</td>
<td>108</td>
<td>110</td>
<td>1,31</td>
<td>1,02</td>
<td>0,287</td>
</tr>
<tr>
<td>Price increase</td>
<td>108</td>
<td>110</td>
<td>1,22</td>
<td>1,00</td>
<td>0,222</td>
</tr>
<tr>
<td>New collaborators or partners</td>
<td>108</td>
<td>110</td>
<td>1,20</td>
<td>1,00</td>
<td>0,204</td>
</tr>
</tbody>
</table>

Before calculating the t-test, Leven’s Test F was calculated to verify the hypothesis of variance homogeneity among the groups and directly interpreted the correct version.

*** p-value < 0,05

4.2 Strategic profiles of men and women entrepreneurs

The following stage of analysis was carried out by submitting the 16 actions listed in the questionnaire to factor analysis. In this way we tried to more effectively outline the behaviour adopted by men and women during the crisis, and identified a more limited number of factors describing typical strategic profiles (Hair et al., 1998).

The strategic profiles extracted through the factor analysis were subsequently used to carry out a cluster analysis. This enabled us to extract several groups of entrepreneurs, different to each other yet characterised by a high degree of heterogeneity within the group, as they shared the same strategic behaviour when dealing with the crisis.

The aim of the factor analysis was not to confirm the validity of the pre-existing model, but to identify the variety of strategic behaviours manifested by the entrepreneurs during the crisis. Consequently a varimax orthogonal rotation analysis was carried out considering therefore a non-correlation among factors. The extraction of factors was carried out considering a method of parallel analysis (Zwick, Velicer, 1986). After having extracted 4 factors, the factor structure indicated in Table 3 was obtained. In this phase one of the strategic actions previously considered was eliminated (lowering of prices), as it had a factor coefficient lower than 0.5 (McCain, 1990).
The factors correspond to 4 different strategic profiles. To each of these profiles correspond the actions, which have resulted as the most significant to identify the strategic behaviour of each entrepreneur.

**Table 3:** Factor analysis results: Strategic profiles matrix

<table>
<thead>
<tr>
<th>Strategic actions</th>
<th>Strategic profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F1</td>
</tr>
<tr>
<td>More qualified personnel</td>
<td>0.816</td>
</tr>
<tr>
<td>New collaborators or partners</td>
<td>0.807</td>
</tr>
<tr>
<td>Price increase</td>
<td>0.791</td>
</tr>
<tr>
<td>Training of staff</td>
<td>0.560</td>
</tr>
<tr>
<td>Improvement of production processes and products</td>
<td>0.807</td>
</tr>
<tr>
<td>Organisational or technological innovation</td>
<td>0.779</td>
</tr>
<tr>
<td>Expansion of the activity</td>
<td>0.685</td>
</tr>
<tr>
<td>Interfirms collaboration</td>
<td>0.519</td>
</tr>
<tr>
<td>Deferment of investments</td>
<td>0.807</td>
</tr>
<tr>
<td>Reduction of waste and costs</td>
<td>0.788</td>
</tr>
<tr>
<td>Reduction of labour costs</td>
<td>0.783</td>
</tr>
<tr>
<td>Reduction of production volumes</td>
<td>0.686</td>
</tr>
<tr>
<td>Communication and advertising</td>
<td>0.849</td>
</tr>
<tr>
<td>search for new clients</td>
<td>0.754</td>
</tr>
<tr>
<td>New products/services</td>
<td>0.634</td>
</tr>
<tr>
<td><strong>PERCENT EXPLAINED VARIANCE</strong></td>
<td>17,457</td>
</tr>
</tbody>
</table>

Test Bartlett < 0.5 e KMO > 0.7.

Overall, the 4 factors explain 63.437% of the total percentage variance.

On the basis of the strategic profiles identified through the factor analysis, we grouped together entrepreneurs through the cluster analysis. The analysis was carried out through the K-Means method. Considering both the objectives of the research and the Pseudo-F, the 4 clusters solution was taken. In Table 4 the final centre values are listed.

**Table 4:** Cluster analysis: Results

<table>
<thead>
<tr>
<th>Factors</th>
<th>Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>F1</td>
<td>3,18200</td>
</tr>
<tr>
<td>F2</td>
<td>.66139</td>
</tr>
<tr>
<td>F3</td>
<td>-.47055</td>
</tr>
<tr>
<td>F4</td>
<td>.02814</td>
</tr>
</tbody>
</table>

The numbers in bold indicate the centres final, or the standardized mean of the segmentation variables.

The descriptive characteristics of each cluster are presented in Table 5. Each cluster has been labelled, in order to describe the strategic profile shared by entrepreneurs belonging to it.

The strategic profiles corresponding to each cluster are as follows.

**Cluster 1: Entrepreneurs oriented to the training of staff:** they interpreted the crisis as an opportunity to enrich their intangible assets and invested in particular in human resources. They employed more qualified personnel, looked for new collaborators and partners and participated in training courses in order to improve business’ s qualification and skills. This strategic behaviour is based on the desire for diversification as opposed to competitors. Business requalification was followed by an increase in the cost of products and services, as clients should be willing to pay a premium price for products and services.

**Cluster 2: Entrepreneurs market-oriented:** they tried countering the crisis by carrying out actions aimed at resisting the negative trend of demand. They redefined their supply and sought new opportunities for expanding demand. The strategy adopted was mainly geared to the renewal of supply, introducing new products and services, exploring new markets and looking for new clients. Such actions were accompanied by
initiatives of communication and advertising aimed at increasing the reputation of the business and improving its image.

**Cluster 3: Entrepreneurs oriented to development and growth:** they are similar to the previous group for having tried to counter the effects of the crisis by adopting offensive strategies aimed at turning around the negative trend of demand and increasing sales. In this case such an objective materialised in actions and investments aimed at reorganising the business and renewing its technology, in order to increase volume of production and sales and to improve processes and products. There are entrepreneurs in this group who started collaboration with other entrepreneurs to share the costs and realise joint projects.

**Cluster 4: Entrepreneurs oriented to downsizing:** they reacted to the crisis through a defensive approach. The initiatives adopted, in fact, included cost cutting measures, the elimination of waste, reduction of labour costs, deferment and/or cancellation of investments and reduction of production volumes. Ultimately these entrepreneurs placed the priority on the survival of their businesses. Consistent with this purpose, they gave up making new investments, redefined their core business activities and tried to increase the efficiency of remaining activities.

**Table 5:** Clusters description

<table>
<thead>
<tr>
<th>Label</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
<th>Cluster 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Training of staff</td>
<td>Market-orientation</td>
<td>Development and growth</td>
<td>Downsizing</td>
</tr>
<tr>
<td>Dimension</td>
<td>14</td>
<td>48</td>
<td>21</td>
<td>135</td>
</tr>
<tr>
<td>Percentage</td>
<td>6.4%</td>
<td>22%</td>
<td>9.6%</td>
<td>62%</td>
</tr>
</tbody>
</table>

Gender $\chi^2(3) = 44.143$

<table>
<thead>
<tr>
<th></th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>85</td>
</tr>
</tbody>
</table>

As can be seen in Table 5, the most numerous cluster concerns the adoption of defensive type strategy geared to downsizing. As a matter of fact 62% of entrepreneurs belongs to this group. Furthermore an analysis of the data in Table 5, reveals a marked contrast with regards to the presence of men and women. The latter in fact are completely absent from the group of entrepreneurs that adopted strategies of human resource training and strategies aimed at development and growth. By contrast, the presence of women is more marked in cluster 4, in which entrepreneurs who favoured downsizing come together. Therefore this data confirms what has already partially emerged from the analysis of values given by M and W to single strategic actions. W dealt with the crisis with a mainly defensive attitude and preferred downsizing their activities and increasing efficiency. To this end they reduced costs, cut unprofitable and marginal activities and focused on core business. Although such an attitude is rather widespread even among M, the latter dealt with the crisis in a more diversified way. As a matter of fact, the percentage of those adopting offensive strategies, aimed at requalifying human resources and at growth and development, has been markedly higher.

**5. Conclusions**

This paper provides insight into the strategies that micro-entrepreneurs adopt to survive the recent economic crisis. It analyses differences between men and women entrepreneurs in order to understand if they adopt different strategies to face the crisis. Findings suggest that entrepreneurs adopted mainly a defensive approach characterized by both restructuring and resizing strategies aimed to improve efficiency and refocus the core business. An offensive approach – realized by innovation, development or reorganization strategies – was less common. In this perspective, results are consistent with those of previous analyses (Sharma, 2000; Kitching et al., 2009; Istat, 2014). The defensive approach characterised both M and W, although the adoption of offensive strategies is more widespread among M. The cluster analysis has identified 4 groups of behaviour aimed, respectively, at the adoption of: strategies of human resource training (investment in intangible assets); strategies market-oriented (redefining supply and searching for new opportunities); strategies of development and growth (focus on the increase of sales and improving product and process); strategies of downsizing (reduction of costs, elimination of waste and redefining of core business). This last cluster proved to be the most numerous, and W are completely absent in the clusters of human resource retraining and growth and development. It would seem possible therefore to claim that, in front of the same external economic conditions, M and W made different choice to face the crisis. According to Cliff (1998), Carter, Shaw (2006) and
Pelger (2012) W showed a lower propensity towards investments, innovation, development and growth. Such a defensive strategic approach can be considered positive in the short-term as it aims at guaranteeing the survival of the business. In fact, as previously stated, women entrepreneurs showed better resistance towards the economic crisis (Unioncamere, 2013). However, in the long-term, such an approach should undermine the ability to seize new opportunities and to innovate the business, and consequently weaken business’s competitiveness. Policymakers who want to support female entrepreneurship should consider these aspects and identify tools and policies that can encourage women entrepreneurs to invest in innovation, training and the qualification of human resources and the business in general. In this way, women-owned businesses will not only resist the crisis more effectively, but also seize new market opportunities when they arise.

The study has important limitations related to the type of business analysed (only sole proprietors) and to the limited geographical context. Subsequent research could extend the study to other types of business and widen the geographical context of reference. It’s also important to check whether other variables, apart from gender, may have influenced businesses’ strategic choices. In this paper we only considered differences in strategic profiles between men and women entrepreneurs. Further analyses should therefore investigate the role of other variables related to entrepreneurs (age, education, family conditions, etc.) and to firms (sector, employees, turnover, performances, etc.).

Reference


Information Governance Modularity in Open Data

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pl.humphreys@ulster.ac.uk

Abstract: The growing global interest in enabling more accountable government through the use of the internet is reflected in international initiatives such as the Open Government Partnership (Noveck, 2009; Robinson et al., 2008; Yu and Robinson, 2012). The primary vehicle for the open government agenda has been the online publication of public sector information – or open data. It has been suggested that open data can improve government transparency, enhance citizen engagement in democratic processes and support increased efficiency and effective in public services. It is also proposed that open data can also enable the creation of value in the private sector by providing entrepreneurial opportunities, ensuring better investor information and accelerating product and service innovation (Guerin, 2013). In both industry and in government there is an on-going debate about how the principles of openness should be applied and how conflicting needs can be reconciled. In a survey of policy-makers and experts to identify drivers and barriers to implementing open data policy, six of the top seven issues were related to what might be termed “information governance”, including: privacy, quality, usability, standardisation, security and charging models (Huijboom and Van den Broek, 2011). One possible approach to addressing this problem is through the concept of IP Modularity (Henkel et al., 2012), which applies a modular systems perspective to show how intellectual property can be partitioned so that external innovation is supported while value appropriation is simultaneously protected. We examine how a similar approach can be applied to open data by generalising the model to include a wider range of rights and obligations. Information governance (IG) modularity is developed as a theoretical framework, drawing on concepts from configuration design and Fixson’s process perspective (Fixson, 2003).

Keywords: open data, modularity, governance, innovation

1. Introduction

The idea of making government more transparent and accountable through the use of technology has attracted much attention from policy-makers and commentators in recent years. (Noveck, 2009; Robinson et al., 2008). This global interest is reflected in international initiatives such as the Open Government Partnership (Yu and Robinson, 2012). The primary vehicle for the open government agenda has been the online publication of public sector information – or open data. Open data has been defined as “information that is available for anyone to use, for any purpose, at no cost”. (ODI, 2014). Open data is being promoted by national, regional and local authorities across the globe, with recent industry research showing that by 2011, twenty eight countries had created online portals for national open data initiatives (McKinsey, 2013). It has been suggested that open data can improve government transparency and accountability, enhance citizen engagement in democratic processes and support increased efficiency and effective in public services.

It is also proposed that open data can also enable the creation of value in the private sector by providing entrepreneurial opportunities, ensuring better investor information and accelerating product and service innovation (Guerin, 2013). The claim that government can generate value by sharing information with external innovators echoes research from open innovation (Chesbrough, 2003) and user innovation (Von Hippel, 1988). Similarly, the difficulties experienced by open data advocates in opening up government information assets to external innovators are similar in many ways to the challenges faced by business managers who adopt open innovation practices.

In both industry and in government there is an on-going debate about how the principles of openness should be applied and how conflicting needs (i.e., revealing vs. protecting information) can be reconciled. For example, Huijboom and Van den Broek (2011) conducted a survey of policy-makers and experts in five countries (the U.S., the U.K., Denmark, Austria and Spain) to identify the main drivers and barriers to implementing open data policy. While the biggest barrier identified by stakeholders was government culture, six of the top seven issues were related to what might be termed “information governance”, including: privacy, quality, usability, standardisation, security and charging models.
One possible approach to addressing this problem is through the concept of IP Modularity (Henkel et al., 2012). IP Modularity applies a modular systems perspective to show how intellectual property can be successfully partitioned, so that external innovation is supported while value appropriation is simultaneously protected. In this paper we will examine how a similar approach can be applied to the challenge of balancing demand for open data with the requirements of effective information governance.

2. Literature review

In our review of the literature we will focus on two main research streams: modular systems and information governance. The discussion of modular systems theory will begin with a broad overview of modularity in the context of technological systems, followed by an exploration of the impact of various methods, objectives and views on modularity, and concluding with an examination of the concept of IP Modularity (Henkel and Baldwin, 2009). We then look at the concept of information governance, how it emerged from policy initiatives around risk management and compliance, and how it has evolved in recent years into a broader and more complex paradigm.

2.1 Modularity in technological systems

According to Baldwin and Clark (1997), a modular system consists of “visible design rules” that apply across the system as a whole and “hidden design parameters” that apply with individual modules. Hidden design parameters exist to reduce cycles within the design process, and thus enhance the overall efficiency of the process. The visible design rules remain constant throughout the entire design process, and impose restrictions on the decisions of the designer. Visible design rules can be broken down into three separate components: a) architecture, b) interfaces and c) integration protocols.

Design parameters are considered to be “hidden” when their effect is restricted to the borders of the module to which they apply. These parameters related to information that is not visible to other modules, and for this reason they can be defined in the later stages of the design process. The concept of “information hiding” proposes that as much information as possible should be hidden by each module in order to allow for greater flexibility in the internal design. This principle emerged from the literature of software systems (Parnas, 1972; Yourdon and Constantine, 1979), and was designed to allow engineers to develop modules that could be integrated into larger systems without a detailed knowledge of each separate component. Importantly, the application of this approach also enables IP to be contained within modular boundaries.

Modularisation as described above is intended to create a number of advantages for designers, including the ability to modify individual modules without considering potential impacts on other parts of the system (Ulrich, 1995; Baldwin and Clark, 1997). This property of modular systems means that concurrent (asynchronous) development of complex systems can be adopted, enabling overall development times to be reduced (Eppinger et al., 1994; Ethiraj et al., 2008; LaMantia et al., 2008). In addition to this, modularisation makes it easier to redesign or makes changes to the system as a whole (Schilling, 2000; Langlois, 2002).

There are also disadvantages to modular systems that designers must take into account. Defining the design rules and testing integration between modules requires greater time and effort compared to non-modular systems (Langlois, 2002). There is also a risk that modules may not interact correctly if the system has not been properly designed. Despite such concerns, it has been proposed that, in situations where a system is subject to change, modularity is normally worthwhile due to the potential for increased flexibility for designers and users of the system (Baldwin and Clark, 1997; Langlois, 2002).

2.2 Disparate methods, objectives and views on modularity

Modularisation methods describe how business objectives can be converted into a set of specifications for modular product design (Baldwin and Clark, 2000; Ishii and Yang, 2003). In this way modularisation objectives determine how the product design is ultimately modularised. According to Campagnolo and Camuffo (2009), a strong causality exists between the aim of modularization, definition of modules, modularisation method and modularity measures.

Product design modularity varies across different life-cycle phases, and within each phase diverse objectives are possible (Newcomb et al., 1998; Kimura, 2001; Fixon, 2007). For example, increasing module reusability
within model range (i.e. design for time-to-market) implies looking for those (interdependent) components that can be kept similar across products in the same model range without negatively affecting customers’ perception of product variety and differentiation. Designing for material recycling is a design objective that supports grouping components that share similar (or at least compatible) recycling methods. Campagnolo and Camuffo (2009) give 13 examples of different design objectives across the product life-cycle.

Modularity can also be either market-driven or technology-driven depending on where design choices occur within the product creation process (Fixson, 2003). Fixson (2003) demonstrates that there are significant differences in focus between the management and engineering literature streams. He argues that these multiple stakeholder perspectives and variety of modularity context have made it difficult to development a shared terminology and language, and that this in turn has made operationalising modularity a significant challenge (Fixson, 2007).

2.3 Intellectual property (IP) modularity

It has been argued that modularisation can enable the effective sharing of information assets (e.g. intellectual property) with external innovators in order to enhance value generation. In particular the concept of IP modularity as conceived by Henkel and Baldwin (2009) attempts to address reconcile external value generation with the need for value appropriation. Teece (1986) demonstrated that businesses frequently fail to capture value from investments in innovation, while customers, competitors and imitators derive benefits.

This is due in part to the fact that product designers generally have to invest significant resources up-front, before there is an opportunity for value appropriation. Since modular design facilitates independent working by various contributors (either within a firm or across multiple firms), this means that innovation activities can take place across organizational boundaries and that the overall level of innovation activity is increased (Sanchez and Mahoney, 2002). At the same time, however modularity increases the risk of imitation (Baldwin and Clark, 1997; Ethiraj et al., 2008) and thus presents a potential threat to value appropriation.

The tension between value generation (enabled by modular product designs) and value appropriation is a recurring theme, particularly with regards to technology platforms (Cusumano, 2010). One possible means of managing this conflict is using the concept of IP modularity (Henkel and Baldwin, 2009). Henkel and Baldwin define an IP-modular architecture as “one in which the technical boundaries of modules are co-extensive with IP status. That is, if IP incompatibilities are present within the system, then they exist only between, but not within modules.” In this way, value capture provides an additional factor for decision-making in the modularization of a product. Using Henkel and Baldwin’s terminology, outgoing IP consists of elements that can be shared with external innovators; differentiating IP is IP that creates a distinct competitive advantage for the firm, and is typically a crucial part of the firm’s business model; and incoming IP is IP that is generated by external entities, licensed in for use by the company (Henkel and Baldwin, 2009). Modules that contain elements which exhibit different types of IP status are considered to be IP incompatible. IP incompatibility is an important issue because it can impact business strategies in a number of ways. Such risks can be mitigated or even prevented through the use of an IP modular design. IP modular design can be implemented to ensure that each module contains elements with similar IP status (Henkel and Baldwin, 2009).

According to Henkel and Baldwin (2009) there are a number of considerations which support the introduction of IP modularity into the design process. They present ten rationales, outlined in the table below.

**Table 1: IP modularity rationales (Henkel and Baldwin, 2009)**

<table>
<thead>
<tr>
<th>Own IP</th>
<th>External IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources in the surrounding ecosystem</td>
<td>Distributed ownership of external IP</td>
</tr>
<tr>
<td>- Potential for value co-creation in ecosystem</td>
<td>Hold-up risk</td>
</tr>
<tr>
<td>- Distributed co-creators</td>
<td>Extending control: When to avoid modularity with external IP</td>
</tr>
<tr>
<td>- Customisation</td>
<td>Uncertainty and external IP: Inadvertent infringements</td>
</tr>
<tr>
<td>Avoiding IP Leakage by IP Modularity</td>
<td></td>
</tr>
<tr>
<td>Extending control: When not to divide own IP</td>
<td></td>
</tr>
<tr>
<td>Uncertainty and own IP</td>
<td></td>
</tr>
</tbody>
</table>
2.4 Other rights and obligations

Henkel et al. (2012) state that the concept of IP Modularity might be generalised with regard to the rights and obligations under consideration. As examples they point to the attribution of liability, safety certification and information security. These various rights and obligations are often considered under the term information governance (Madison, 2007). Information governance may constitute another modularisation objective, as described above. In this section we will explore how the concept of information governance has been developed in the literature, to assess its suitability as an over-arching term for the full range of rights and obligations in a generalised version of the IP modularity model.

One of the earliest uses of the term information governance was by Donaldson and Walker (2004) in a discussion of UK National Health Service policy and practice supporting of information security, confidentiality, data protection, records management and data quality. Other authors have also considered the role of information governance in a medical informatics context (Becker, 2007; Williams, 2008; Powell and Buchan, 2005). The concept has been extended to other parts of the public sector (Shepherd et al., 2010) as well as industry (Zhao and Johnson, 2008; Economist Intelligence Unit, 2008; Brimsted and du Boulay, 2012). The focus for much of this research has remained on privacy and security issues.

On the other hand, some recent studies have attempted to address a perceived over-emphasis on risk and compliance by focusing on how information governance can generate value (Beijer and Kooper, 2010; Kooper et al., 2011). Kooper et al. (2011) propose that “Information governance may be viewed as a framework to optimize the value of information in some sense to the actors involved.” In this context, the goal of good governance is to achieve a balance of value for the various stakeholders.

As well as providing opportunities for value generation, information governance may include mechanisms for value appropriation. According to Williams (2008) information governance may be used to protect businesses from threats to intellectual property. Madison (2003) goes further and proposes that the licensing of digital information in general constitutes a form of information governance, with both public and private aspects. In his article “Information Governance” (Madison, 2007), he states that the production, distribution and exploitation of intellectual property should be thought of as “manifestations and species of governance”.

In summary, while some view information governance as a matter of managing risk and compliance, others argue that it should also encompass value generation and value capture, including the management of intellectual property. It therefore seems reasonable to propose that information governance as an inclusive term for the wider range of rights and obligations alluded to by Henkel et al. (2012).

3. Issues emerging from the literature

The primary issues that emerge from the preceding literature review are threefold:

1. A major gap identified by Fixson (2003) is that a wide variety of viewpoints (Smith and Duffy, 2001) and objectives (Michael et al., 2006; Campagnolo and Camuffo, 2009) mean that modularity descriptions are often incompatible, and that this is turn has meant that modularity has been difficult to operationalise. In particular there is a disparity between the management and engineering literature, especially with regard to whether modularity is primarily market-driven or technology-driven. The lack of a common language makes exploring the impact of trade-offs on various stakeholders particularly challenging.

2. Although the IP Modularity approach suggested by Henkel and Baldwin (2009) shows promise in terms of understanding how information assets can be either protected or revealed according to business requirements, the model does not explicitly address rights and obligations other than those specifically related to intellectual property. This shortcoming is specifically highlighted by the authors, who propose that there may be scope for generalising the model.

3. While information governance might be considered as a suitable term for the wider range of rights and obligations alluded to by Henkel and Baldwin (2009), the concept is itself in flux (e.g., Kooper et al., 2011; Khatri and Brown, 2010). This suggests that there is an opportunity to improve understanding of the governance implications of information systems and information assets.
4. Information governance modularity

Drawing on our analysis of the literature, we propose a theoretical framework that will help us to understand the various factors that might be expected to influence the design of open data systems. In particular we examine the interaction between competing stakeholder and organisational requirements, and how they might ultimately affect the decision to publish or not publish particular assets.

4.1 Generalising IP modularity

As noted above, various authors have explored the wide-ranging issues, rights and obligations associated with the term information governance. In order to generalise the IP modularity framework in the way that the original authors suggested (Henkel and Baldwin, 2009), we adopt the term information governance (IG) modularity to allow us to include the full range of governance issues that relate to information-based assets. IG Modularity is thus a generalisation of the IP Modularity framework.

In order to illustrate how information governance might be used to generalise the IP modularity model, Table 1 below demonstrates the close relationship between the definitions used by Henkel et al., (2012) and the corresponding definitions that underpin IG modularity.

<table>
<thead>
<tr>
<th>IP Modularity Definition</th>
<th>IG Modularity Definition</th>
</tr>
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<tbody>
<tr>
<td>IP Status describes the legal rights to and de facto accessibility of knowledge embodied in a module.</td>
<td>IG Status describes the legal rights to and de facto accessibility of information embodied in a module.</td>
</tr>
<tr>
<td>IP incompatibility exists between two elements of a system if their IP statuses lead to conflicting obligations or appropriability.</td>
<td>IG incompatibility exists between two elements of a system if their IG statuses lead to conflicting rights or obligations.</td>
</tr>
<tr>
<td>An IP-modular system architecture is one in which the technical boundaries of modules are co-extensive with IP status.</td>
<td>An IG-modular system architecture is one in which the technical boundaries of modules are co-extensive with IG status.</td>
</tr>
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</table>

4.2 IG modularity as configuration design

West (2003) proposes two major strategies for selective revealing: open parts, whereby some elements are fully revealed, while other elements remain protected; and partly open, whereby control is maintained by limiting the rights that are granted to external collaborators. A partly open system potentially exhibits greater modular complexity as it must map multiple elements, governance regimes and stakeholders. In an open parts system, decision-making is simplified as there are effectively only two modules to consider—the open module and the closed module. Modularisation can thus be reduced to deciding whether individual elements should be either open or closed. Such a simplification is appropriate in the context of open data, since the definition of open data requires that the relevant information assets are fully revealed (ODI, 2013).

If we assume an open parts strategy, then the major dilemma becomes “what is revealed” versus “what is protected”. This is essentially a question of configuration design; that is, we are defining how individual elements within the system are joined together to form open or closed modules (Fixson, 2003; Newcomb et al., 1998; Coulter et al., 1998; Jiao et al., 2007). The architecture of the system as a whole is determined by decisions about individual elements.

The decision to include a particular element within either the closed or open part of the system (thus partitioning the system along information governance lines) is subject to a range of factors which support either revealing or protecting that element. In a dynamic system there will also be “inertial” factors which resist any reconfiguration of the existing architecture. Figure 1 illustrates how these various demands influence the location of individual elements with respect to information governance boundaries.
4.3 A process perspective on IG modularity

A number of theoretical models were considered in order to develop a framework that would allow us to analyse the factors that influence IG modularity. Many authors have observed that modularity is subject to a variety of stakeholder views, needs and objectives, which often necessitate trade-offs. Fixson’s process perspective (Fixson, 2003; Campagnolo and Camuffo, 2009) was selected for the following reasons:

- its foundation in a comprehensive review of the literature
- its ability to combine managerial and engineering views on modularity
- its inclusion of both internal and external stakeholder needs
- its relevance to a wide range of modular design contexts

The main insight of the process perspective is that different considerations tend to guide design decisions at different stages in the product creation process. Specifically, it emphasises the distinction between market-driven and technology-driven approaches. These two approaches are described in more detail below.

Fixson (2003) suggests that most products follow a similar path of creation, whereby initial market research leads to the identification of user needs, which in turn are translated into technical specifications and a product design. The final part of this process is the manufacture and assembly of the completed product. Modularity tends to happen at either one of two distinct stages within this overall process; either at the end of the market research phase or during the product design phase.

According to Fixson (2003), studies in market-driven modularity generally begin with an examination of potential or existing markets, continue with the segmentation of those markets, and then the development of modular architectures that are capable of serving the identified segments. This process is influenced by two opposing aims; firstly the aim of providing the customer with the maximum desirable variety, and secondly that of minimising variety to control costs. The latter goal can be described as the search for “commonality”. The primary challenge in this case is mapping user needs to product architectures. Where modularity is driven by market factors, this mapping precedes the technical design phase.

While the marketer’s view of a product is “a bundle of attributes”, the engineer perceives “a complex assembly of interacting components” (Krishnan and Ulrich, 2001). Fixson (2003) suggests that the intellectual framework of the engineer is based on a sequence of analysis and synthesis, whereby complex challenges are repeatedly broken down in an iterative process into smaller and smaller problems until they become solvable. In general, technology-driven modularity begins with a review of the functional requirements, then maps these functions to system components, and finally combines the components into complete products. Modularity is therefore defined in technical terms during the design phase of product development.

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Figure 1: ID modularity as configuration design
Thus, from the process perspective, modularity can be either market-driven or technology-driven. This categorisation of design factors echoes the distinction between modularity-in-use and modularity-in-design as defined by Baldwin and Clark (2006).

![Figure 2: Product creation process (adapted from Fixson, 2003)](image)

An important gap in Fixson’s product creation process is the absence of the internal requirements of the firm as a distinct influence on design. As illustrated by Henkel et al. (2012), business considerations are often fundamental in determining the final architecture of products and systems. The importance of understanding business needs is also strongly supported by the literature on new product development (Cooper et al., 2008; Barczak et al., 2009; Harmancioglu et al., 2007; Cooper, 2011). In order to address this gap, we extend the process perspective model to include business demands as a third set of drivers alongside market and technical demands. In this way, business-orientated requirements such as value appropriation, risk management and regulatory compliance can be incorporated as criteria for modularisation. Figure 3 illustrates how Fixson’s product creation process can be modified to include business needs.

![Figure 3: Modified product creation process (adapted from Fixson, 2003)](image)

**4.4 The process/configuration matrix**

Finally, by combining the configuration model (Figure Y), which categorises design factors by preferred outcome (protect, reveal or do nothing), with the process perspective (Figure X), which categorises design factors by source (market, business or technology), we can generate a comprehensive matrix of IG modularity design factors.

![Figure 3: Matrix or map of IG modularity factors](image)

The question of how modularity can be operationalised has been largely avoided in the literature (Fixson, 2003). Fixson suggests that the primary reason is the lack of a consistent definition and terminology. He
proposes that future studies should attempt to integrate multiple perspectives or product development phases. In this way the issue of trade-offs - i.e., who benefits and who loses when design decisions are made - might be understood. The model described above will allow us compare market, technical and business perspectives to better understand the factors that affect architectural choices, and the impact of those choices on various stakeholders.

5. Conclusion

In the context of a global trend towards open government, driven by demands for increased transparency and accountability and by opportunities for public and private sector innovation, a major policy tool in the public sector has been the online publication of open government data. A range of challenges likely to be faced by managers has been highlighted by the literature on open innovation, and this has been echoed by recent empirical studies. One of the major problems is balancing the need to protect certain categories of information (for reasons of privacy, security, value capture, etc), with the need to promote openness and support external innovators.

In our literature review we analysed two major streams to develop a theoretical framework for future study. The first stream was the literature on modular systems, and in particular recent work by Henkel et al. (2012) which develops the concept of IP modularity to show how value capture can be managed in the context of distributed value creation. As demonstrated by Fixson (2003, 2007), a major challenge has been operationalising modularity across different sectors an industries. This has been made more difficult by the lack of a common language that might allow us to encompass the requirements of various different stakeholder groups. The second literature stream we examined was governance in the context of information systems, which has evolved from risk management and IT governance to include richer models which address the notion of “information as an asset” and recognise opportunities for value generation and appropriation (Kooper et al., 2011; Khatri and Brown, 2010).

A number of research gaps have been identified. On the modular systems side these include a generalisation of Henkel and Baldwin’s model of IP modularity, as well as an extension Fixson’s process perspective on modular systems. There is scope for building on recent developments in the theory of information governance. In addition to the contribution to theory, it is anticipated that future research could support practitioners by exploring how modularity can be operationalized in the context of open government data, thereby assisting public sector managers as well as external consumers and innovators in the wider open data community.

In order to assist this research a framework has been proposed, which generalises Henkel and Baldwin’s IP modularity model, combining concepts from configuration design with a process perspective on modularity. The aim of the framework is to enable the full range of factors that influence the design of IG modular systems to be mapped in a matrix, thus providing a clearer picture of how architectural designs are made.

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Innovation Risk Management – Banks’ Risky bet on Safe Innovating

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Abstract: This paper draws on the classical risk management framework, so fully employed in the current banking post-crisis landscape, by seeking its balance with the utterly needed innovation in the financial world. We are building the argument for a significant urge for a strong innovation culture while the whole banking system is extremely risk-averse, thus seeking to define the oxymoronic relationship between risk management and innovation. The purpose of this paper is to discuss the risks associated with innovation, while exploring the field of risk management in relation with the innovation process. The study introduces a conceptual framework, called innovation risk management that attempts to explain the leeway of boosting the innovation potential while applying a sound risk management practice in the same time. Even if the common knowledge is innovation being fostered by a risky behaviour, we seek to prove that an effective risk management is positively linked to enhancing innovation. Using risk management processes to improve the innovative capability creates a field of study yet unexplored in the specific literature. We have tested our proposed framework in the Romanian banking sector characterized by poor innovative strategies, deficient knowledge sharing and high barriers to technological advances. The purpose was to understand the various risks associated with innovation, identify existing risk management practices and their impact on creating an innovation culture, and derive recommendations that could help overcome this key barrier. This is done by a conceptualisation of risk and innovation by introducing this new framework, and insights gained from key risk and innovation managers from three large banks, invited at the expert group meetings. The research carried out was exploratory and the cases were chosen because of their relevance for the current innovation landscape in the banking sector in Romania. The results were indicative for three variables to be positively associated with the development of a viable innovation risk management framework: people, technology and resources. Our findings further show which factors are highly expected to influence the efficiency of the model: investment in new knowledge and intangible assets, a corporate culture focused on innovation spirit and risk knowledge sharing are found to be key drivers for an effective yet safe innovation. Our study is suggestive of the risk-averse culture of the banking system which could benefit from employing a business model focused on innovation risk management to heighten its performance and shift its goals from playing safe to safely innovating.

Keywords: innovation risk management, risk knowledge sharing, innovation strategies, risk adversity, financial innovation

1. Introduction

In today’s business world, the stakes are extremely high. We live in an ‘ever flattening’ global economy, embedded in high-speed connectivity and hyper commoditization of products, services, work force and clients (Johnson, 2012). Banks need to strategically cope and adapt to the innovation wave and the inherent risks involved.

The current face of the banking industry reflects a series of challenges that reshape the way banks approach their business processes: the formidable wave of technology redesigns priorities and applies great pressure on the services offered to the ever demanding customers, banks need to set new goals of performance and competitiveness in today’s difficult market of lower returns, high volatility and growing competitions, the clients’ expectations are rapidly transforming, demanding customized services and adopting digital modes of interaction. Developing innovating capabilities while effectively managing risks has become a key strategic objective in an industry highly risk averse and with low innovative capacity.

While exploring the field of risk management in relation with the innovation process, our study introduces a conceptual framework, called innovation risk management that attempts to explain the scope of boosting the innovation potential while applying a sound risk management practice. We place in the core of our model the process of risk knowledge sharing, as part of the people interactions in a financial institution (Rodriguez and Edwards, 2010). The diversity of business interactions and risk knowledge imply the potential benefit of enforcing risk management to innovation focused activities in order to foster a sound innovation culture.

This paper explains the identification of nine hypotheses based on the literatures on risk management and innovation management, and presents a preliminary analysis of the results of conducting an exploratory research based on input from risk management practitioners and innovation managers in Romanian banks.
2. Theoretical framing

2.1 Innovation pressure in the banking sector

This paper is related to the recent literature that emphasizes the importance of sound risk management practices upon the innovation process, applied on the banking sector.

The banking model today is more complex, hugely revolving around risk management processes, under the increasingly market pressure. Advances in technology such as digitization, as well as shifting consumer behaviours and expectations, are fundamentally disrupting the integrated banking value chain, creating numerous opportunities for innovation and new revenue streams (Moreno, Pichler and Starrs, 2014). Banks need to face these innovation challenges. The extensive use of smartphones all over the world forces banks to grow faster online through mobile banking, pre-paid account services, internet banking. While time spent on social media is growing fast, banks need to build a solid social presence and try to engage their clients as co-creators and stay competitive through social commitment. Data on the marketplace is huge, banks manage vast amounts of clients, payments, transactions, competitors’ information and the challenge is to efficiently manipulate it. Cloud technology is maturing and banks need to shape their offerings in order to move up their infrastructure to software, platforms and business processes. Consequently, banking is under increasing pressure.

However, the common perception is that banks are poor at innovation. Banks rarely feature in league tables of the most innovative companies; their traditional, prudence can easily be expressed as conservatism. Stringent regulation militates against risk-taking and imposes caution in the process of developing and implementing new ideas. Softer pressure from regulators, discourages the launch of radical new products and drives convergence to a norm (KPMG, 2014).

The real challenge of a company is to establish a competitive advantage, and the only way to accomplish that is continuous innovation and creation of new ideas (Drejer, Christensen and Ullhøi, 2004). By investing in the innovation talent of each employee, empowering and investing in them with resources to rapidly implement their innovations, banks can foster an intrapreneurial environment, blending an innovation culture with individual entrepreneurship. Intrapreneurship, also known as corporate entrepreneurship is the practice of developing a new venture within an existing organization, to exploit a new opportunity and create economic value (Pinchot, 1985). Intrapreneurship helps managers to renew and revitalize their businesses, to innovate, and to enhance their overall business performance (Kuratko et. al. 1990). In banks, by adapting intrapreneurship, a new and different corporate culture can be born, with employees channelling the company’s resources in the purpose of creating better products and services. In this framework, risk knowledge sharing can be considered as a prerequisite of intrapreneurship.

Up until now, the banks are often characterised as weak on innovation. But rapidly changing customers’ expectations, the development of technology in the digitalized era, the pressure of the competition and the binding regulatory constraints force banks look for new sources of competitive advantage, shifting their focus towards innovation.

2.2 Risk pressure in the banking sector

Banking is a business based on information and knowledge (Shaw, 2005), where once a new risk is identified it implies that new knowledge is required (Fourie & Shilawa 2005). Hence, while usually the innovation process generates risks and challenges that require efficient risk management practice, there is also the case of innovating and developing new knowledge in the purpose the resourcefully handle the newly occurred risks.

Financial innovation, the diversification of the clients’ needs, the digital era, the technology advances have pushed banks to innovate and trade complex products. Increased complexity also meant that only a few institutions were sophisticated enough to handle them, leading to a high concentration of highly risky and opaque activities in a few large institutions. It also meant that the regulators did not have the tools to evaluate the risks. This concentration led to an amplification of micro- and macro-financial risks resulting from an extremely high degree of interconnectedness (Pakravan, 2011).
During this period affected by the economic crisis, determining what types of risk hamper the banks’ efforts for innovation performance become increasingly important higher. On that purpose, there is a basis for risk knowledge transfer in the innovation culture of banks in order to develop a sound innovation process. Risk knowledge sharing has an important influence in risk management implementation because it provides connection between people and organization, producing dissemination, collaboration, innovation and acquisition of knowledge (Ipe 2003).

2.3 Blending innovation and risk management

While being innovative is a central characteristic of „superior” firms it also is a risky venture due to the uncertainties inherent to both the innovations themselves and their commercialization. The introduction of new products by a firm involves high and often sunk development and production costs that may fail to bring a sufficiently high payoff to recover those costs. Demand for these new products might not pick up or the products could be copied or replaced quickly by other new products developed by competitors. The model proposed by Ericson and Pakes (1995) illustrates the risks associated with innovation. In their model, firms engage in R&D investments which may improve their efficiency, profits, and survival but can also lead to firm exit if the outcome is not successful. Given that failed product launches are frequent, innovators might ultimately face a lower survival probability than other firms (Fernandes and Paunov, 2012).

Fernandes and Paunov (2012) studied the link between innovation and firm survival by focusing on the role of risk as a crucial determinant of that link, while testing that a positive innovation-survival link is valid only for cautious innovators who are less exposed to risk.

Innovation can be a company’s most powerful tool and a key driver of value. Yet many executives, fearful of the risks inherent in pursuing edgy new ideas that may not succeed, prefer to renovate rather than to innovate. They argue that responsible risk management necessitates a cautious approach to innovation (Moreno, Pichler and Starrs, 2014).

The recent Accenture research shows that highly innovative companies are essentially no more likely to embrace risk than their less innovative peers. But when they investigated further, it was found that they approach the management of innovation risk differently and that their business models are critical factors in their success (Alon, Koetzier and Culp, 2013). A corporate culture that only celebrates success can discourage innovation by making people nervous about taking risks—yet no rational organization would reward failure. However, some companies have recognized that they can allow innovation teams to make strategically intelligent mistakes within a clearly understood governance framework. This enables a culture that not only tolerates risk but also embraces failure as an integral part of the innovation process (Alon, Koetzier and Culp, 2013).

An integrated approach to risk management has thus become an important component of innovation in the face of the various risks throughout the innovation process.

3. Research model and hypothesis

Unlike traditional risk management where individual risks are managed separately, an integrated approach enables firms to manage a wide array of risks in a holistic way and exploit any natural hedges between different risk categories (Teller et al., 2012).

The paper simulates a model of an innovation risk management framework and derives testable predictions concerning the relation between risk adversity and productivity enhancement through innovation. It then tests these predictions on a data set of three banks, using the valuable input of 25 risk managers and key executives in the field. The surveys include detailed information concerning banks property structure, their investment in different types of innovation, their financial constraints, and other relevant information that can be used to investigate the extent of involvement in innovative activities and the efforts allocated to risk mitigation in developing new product, services or processes.
Our model (presented in Figure 1) applies to an institution with a strong innovation strategy, with firm objectives to develop, diversify and share innovation capabilities of all its employees. Along this process, it constantly raises awareness on the risks residing in the innovation challenges, while, in the same time making the most of the new opportunities, taking the positive side of risk. The ultimate goal is to build and foster an innovation culture on the pillars of risk management – nor innovating at any cost, neither playing safe and conservative.

On the basis of the literature review, we identified nine variables related to people, technology and resources that might be expected to influence the quality of risk knowledge sharing in a financial institution, respectively a bank, by defining an innovation risk management environment. Our research model thus sets up nine hypotheses for these variables, while the quality of risk knowledge sharing stands a core variable and integrator of our model (Figure 2). External forces as clients demands and market pressure apply additional tensions to the model.

The following sub-sections introduce the bases of the hypotheses.

### 3.1 Quality of risk knowledge sharing

We believe that risk knowledge sharing represents the one key variable that makes the innovation process less risky and helps to efficiently manage the wide arrays of risks encountered, while raising awareness on the threats.
Improvement in risk knowledge sharing develops capacities inside the organization. Equally, knowledge (Dickinson, 2001) is a factor to reduce risk and contributes to control, business strategy and underwriting processes because they depend on human actions (Rodriguez and Edwards, 2010).

Thus, the quality of risk knowledge sharing is constructed from the following five items:

- People are willing and motivated to share risk knowledge
- The company provides an appropriate environment to discuss innovation risks interdepartmentally
- The company’s MIS facilitates risk knowledge sharing
- There is no internal cost attached to risk knowledge sharing
- Intrapreneurs are the most effective exponents of risk knowledge sharing

3.2 People

There are more people involved in projects with different backgrounds and specialties, the skills and points of view of people are different and all these factors are part of the multidisciplinary and multi-group structures of projects (Rodriguez and Edwards, 2010). We suppose that the most reliable and rich investment that a modern bank could implement is the development of its employees’ ability to innovate.

Connecting the employee to the innovation process ensures a pool of intellectual capital that acts as an enhancer of the firm performance. This process is mainly done constantly investing in organizational learning and investment in acquiring new knowledge. These intangible definitely increase the pool of knowledge related to risk management.

\[ H1: \text{Investment in intangibles and new knowledge is positively associated with a higher quality of risk knowledge sharing} \]

Intrapreneurship refers to "a person within a large corporation who takes direct responsibility for turning an idea into a profitable finished product through assertive risk-taking and innovation" (Pinchot, 1979). For Pinchot, intrapreneuring means a set of business practices that liberates people with entrepreneurial personalities to innovate rapidly inside larger organizations for the benefit of that organization and its customers.

Intrapreneuring becomes a distinctive component of companies with a solid innovation strategy, since the innovation potential is brought about by the entrepreneurial skills of the employees. The investment in intangibles and new knowledge is also critical for the development of a climate of intrapreneurship, since knowledge creation leads directly to organizational innovation.

\[ H2: \text{Creating an intrapreneurial environment is positively correlated with an effective risk knowledge sharing} \]

In general, managers have to deal with the coordination of employees in many different ways and to improve organization capacity to transfer and use risk knowledge when employees are working in projects (Rodriguez and Edwards, 2010). The lack of risk knowledge sharing can create issues in the risk management processes and the controls may not be enough.

Moreover, managers should develop a competent management of innovation and define a strong innovation oriented corporate culture. Practices within the firm must work symbiotically with individual characteristics to build opportunities for individuals to innovate and firms to nurture the spark of innovation. A supportive environment also brings together like-minded individuals who create a community of innovation where ideas become innovations (Hausman and Johnston, 2014)

\[ H3: \text{A corporate culture focused on innovation is positively linked to a more effective risk knowledge sharing inside the organization} \]

Thus, the people variables are constructed from the following items:

- Poor investment in creating new knowledge contributes to poor innovation
- An innovation oriented corporate vision has a positive effect on employees’ performance
A corporate culture focused on innovation embraces risks as an integral part

An effective management board contributes to the innovation benefits associated with risk management in innovation

Investing in key people and cultivating their key knowledge promotes intrapreneurship

### 3.3 Technology

Banks have little instruments in measuring innovation. Even in a well induced strive for innovation, results can be uncertain due to constraints related to practical methods of measuring the innovation progress. We believe this is well correlated with the institutions’ risk management metrics, endangering its internal capabilities to perform according to its strategic goals.

H4: Lack of innovation metrics and risk management metrics is positively associated with a low capability of risk knowledge sharing

Given the shortening lifecycles of products, the increasingly demanding customers, the competitors endeavours, banks are forced to rapidly react on the market. While successful innovation heavily thus relies on speed, it also requires an efficient risk management process that can recognize failures early and make adjustments in time. This process integrates risk management in the innovation cycle.

H5: A speedy response to new developments is positively correlated to a more rapid reaction in risk knowledge sharing

The fast pace of technological change compresses product cycles, constraining the time horizons for business research. Over time, innovation adoption moves faster (Hausman and Johnston, 2014). For instance, the radio took 38 years to reach 50 million users, while television only took 13 years, the Internet only four years, only three years for the iPod, and one year for Facebook (van Opstal, 2009). Hence, successful innovation is positively correlated to a speedy response to challenges in the banking industry.

The functionality of information systems is an attribute that organizations as a whole and users look for in order to perform their activities. Support to the risk modelling process, development of experience in risk analysis, management support, improvement of work flow, capacity to work with multiple groups in a project are some of the new requirements for designing information systems (Dinner and Kolber 2005) according to the demands of regulatory frameworks in risk management in banks.

In general, the information systems design needs to deal with integration of information systems and how to achieve goals of compliance with new market conditions. Chrouhy et al (2001) pointed that “An effective risk management system needs to be able to generate the necessary RM information on all risks, perform specific analytical functions, and permit multitasking”.

H6: Risk management information systems functionality is positively correlated with risk knowledge sharing

Thus, the technology variables are constructed from the following items:

- Development of innovation metrics is a key to a firm’s innovative performance
- Technological advances reduces the lifecycle of products and leads to a commoditization wave
- Rapid response to market challenges is a key capability to a firm’s innovative performance
- Sharing risk knowledge requires adequate IT channels
- Poor adaptation to technological advances on the market increases performance risks

### 3.4 Resources

The major weakness in banks, that affects all processes with no exception, is low capitalization. This induces financial pressures and strong limitations on people performance development (internal knowledge development, investment in intangibles, training, continuous education, organizational learning, access to external sources of knowledge), technology (adaptation to new technologies on the market, acquisition of new IT systems that facilitate internal processes, development of risk management systems), resources (since financial constraints are massive, the pressure of available resources is increasing). Moreover, low
capitalization puts a sturdy barrier on the innovation capabilities of a bank, since a survival strategy replaces an innovation one.

H7: A high degree of bank capitalization is positively correlated with effective risk knowledge sharing

A solid innovation culture seeks to enlarge the sources of new knowledge and goes beyond the boundaries of the firm. Innovation collaboration allows organizations to gain needed skills, technologies, assets, and other resources from partners’ side. The sharing of resources enhances firm’s capability and flexibility of conducting its innovative projects. In the mean time, it implies that project costs and risks will be reduced by shared partnership. However, the more diverse the external knowledge sources the more risky the innovation.

External relationships may well be helpful for innovation because banks often suffer from a lack of resources to invest in R&D. Therefore, it can be argued that the ability to access external knowledge resources efficiently can become a competitive factor for banks.

H8: Diversification of external resources is positively associated with an effective risk knowledge sharing

Without innovations to entice consumers, firms increasingly depend on cost containment measures to provide short-term gains when consumer spending decline. Cost containment begins a downward spiral as workers are laid-off, which further decreases consumer spending, which creates a need for greater cost containment, causing more lay-offs (Hausman and Johnston, 2014).

Without innovation to boost the consumers attraction for financial services offered, their spending declines – such is the recent abrupt decline on the credit market, given the barriers raised by the banks (following a highly prudential recovery strategy after crisis) and the overgrowing needs of the customers. The highly customized market needs acts as a driver for the banks to reinvent their processes and refocus their resources in order to innovate.

H9: Efficient cost management is passively associated with effective risk knowledge sharing

Thus, the resources variables are constructed from the following items:

- A higher level of capital invested in intangibles reduce the probability of innovation risk
- The more diverse the external knowledge sources the more risky the innovation. Hence, open innovation may entail a higher degree of uncertainty than strategic internal innovation.
- Financial innovation is positively correlated to higher risks
- Innovation is negatively correlated to cost reduction
- Support from shareholders and top management for the innovation process, as well as a solid capital position, boosts the innovation potential

Additionally, in our research we put strong emphasis on two external forces that are currently reshaping the banking industry, putting a great deal of pressure on how innovation is performed: clients and market. Clients have become increasingly demanding, asking for customized products and personalized services, accordingly to rapid advances of technology. The competition is also fierce, targeting to set new standards of quality services for these demanding customers. An increase in competition leads to higher innovative activity and lowers the risk perception. Uncertainty on the market place can prevent banks from investing in risky and innovative projects. The extremely rigid market regulation in the banking sector acts as a barrier to innovation and levels the competition race.

4. Research methodology and analysis

Romania’s performance in innovation so far is unsatisfactory, with low R&D expenditures (0.5% of GDP in 2011), markedly lower than the EU-10 average (1% of GDP in 2011). According to the data presented by the European Commission in the Innovation Union Scoreboard, Romania is part of the lowest-ranked performance group, that of modest innovators, next to Bulgaria, Latvia and Poland (NBR, 2013). NBR recommends that in order to consolidate a stable economic environment, innovation should play a more prominent role in economic development (NBR, 2013).
The current research applied on the Romanian banking sector uses a structured, open-ended, focused interview approach to capture the information. This research is descriptive and exploratory. Since little is researched on the subject of innovation risk management, we consider an exploratory research methodology appropriate at this early stage of the research. We also draw upon the expertise and direct professional knowledge of one of the authors who has 10 years of experience in the risk management field in a bank. The research design is therefore informed and based on the case study methodology (Yin, 2003), but the research design is emergent and we cannot claim to have undertaken a fully developed systematic industry case study or in-depth organisational case studies for this research at this stage.

We have tested our nine hypotheses on a data set of three large banks in Romania (above 5% market share), using the valuable input of 25 risk managers and key executives in the field, using a structured interview approach. The questions included detailed information concerning banks property structure, their investment in different types of innovation, their financial constraints, and other relevant information that can be used to investigate the extent of involvement in innovative activities and the efforts allocated to risk mitigation in developing new product, services or processes.

Finally, all 9 predictions were rated on the same Likert scale, 1 strongly disagree, 2 disagree, 3 neutral, 4 agree and 5 strongly agree.

4.1 Findings

All 9 predictions were allocated nine variables (investment in intangibles, intrapreneurial environment, innovation culture, innovation metrics, speedy reaction, management information systems, degree of capitalization, diverse external resources, cost management) and values for these variables were derived from scores related to each variable. The items used to build each of the nine variables were tested with the Cronbach Alpha test. The Cronbach Alpha coefficients showed that items for each variables are reliable. We have also tested the correlation between the nine variables and the dependent variable risk knowledge sharing.

Table 1: Cronbach coefficients and correlations between independent and dependent variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach</th>
<th>Correlation with risk knowledge sharing</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1: Investment in intangibles and new knowledge</td>
<td>0.88</td>
<td>0.65982</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>H2: Creating an intrapreneurial environment</td>
<td>0.85</td>
<td>0.57256</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>H3: A corporate culture focused on innovation</td>
<td>0.90</td>
<td>0.66987</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H4: Lack of innovation metrics and risk management metrics</td>
<td>0.88</td>
<td>0.49512</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>H5: A speedy response to new developments</td>
<td>0.79</td>
<td>0.85669</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>H6: Risk management information systems functionality</td>
<td>0.81</td>
<td>0.68955</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H7: A high degree of bank capitalization</td>
<td>0.82</td>
<td>0.40252</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>H8: Diversification of external resources</td>
<td>0.81</td>
<td>0.65932</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>H9: Efficient cost management</td>
<td>0.80</td>
<td>0.39587</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

We have used the SAS 9.4. statistical software in order to manipulate the data, test the nine hypotheses and the correlations among the variables. Each hypothesis was first tested in the form of a null hypothesis that there was no association (correlation $\rho=0$). The Cronbach Alpha coefficients and the correlation results are shown in Table 1.

Table 2 presents the summary of the hypothesis test results, based on the correlations made by the experts:
<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>People</strong></td>
<td></td>
</tr>
<tr>
<td>H1: Investment in intangibles and new knowledge is positively associated</td>
<td>Supported</td>
</tr>
<tr>
<td>with a higher quality of risk knowledge sharing</td>
<td></td>
</tr>
<tr>
<td>H2: Creating an intrapreneurial environment is positively correlated with</td>
<td>Supported</td>
</tr>
<tr>
<td>an effective risk knowledge sharing</td>
<td></td>
</tr>
<tr>
<td>H3: A corporate culture focused on innovation is positively linked to a</td>
<td>Supported</td>
</tr>
<tr>
<td>more effective risk knowledge sharing inside the organization</td>
<td></td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
</tr>
<tr>
<td>H4: Lack of innovation metrics and risk management metrics is positively</td>
<td>Supported</td>
</tr>
<tr>
<td>associated with a low capability of risk knowledge sharing</td>
<td></td>
</tr>
<tr>
<td>H5: A speedy response to new developments is positively correlated to a</td>
<td>Supported</td>
</tr>
<tr>
<td>more rapid reaction in risk knowledge sharing</td>
<td></td>
</tr>
<tr>
<td>H6: Risk management information systems functionality is positively</td>
<td>Supported</td>
</tr>
<tr>
<td>correlated with risk knowledge sharing</td>
<td></td>
</tr>
<tr>
<td><strong>Resources</strong></td>
<td></td>
</tr>
<tr>
<td>H7: A high degree of bank capitalization is positively correlated with</td>
<td>Not supported</td>
</tr>
<tr>
<td>effective risk knowledge sharing</td>
<td></td>
</tr>
<tr>
<td>H8: Diversification of external resources is positively associated with</td>
<td>Supported</td>
</tr>
<tr>
<td>an effective risk knowledge sharing</td>
<td></td>
</tr>
<tr>
<td>H9: Efficient cost management is passively associated with effective</td>
<td>Not supported</td>
</tr>
<tr>
<td>risk knowledge sharing</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Summary of hypothesis test results

Risk knowledge sharing is significantly associated with the all the three people variables, investment in intangibles and new knowledge, intrapreneurship and a corporate culture focused on innovation, proving that the highest the investment in people resources, the highest the capacity of risk knowledge sharing in the organization, facilitating a proper climate for innovation risk management.

The results suggest that human factors – particularly those about new knowledge acquisition and innovation incentives -, as well as up to date technological support can be more important than the available financial resources or the cost management policies, in the innovation risk outline.

5. Conclusions, limitations and further research

This paper draws on theoretical literature and contemporary media accounts, building the argument for a significant impact of a solid risk management strategy on the innovation policy of banks, by correlating risks with innovation in the purpose of competitive advantage. Our theoretical model is loosely based on the study of Rodriguez and Edwards (2010) about the relationships between risk management and knowledge management, analyzing the factors affecting the perceived quality of risk knowledge sharing. The banking sector is characterized by a low innovation capacity and a highly risk adversity. Through our research we have tried to blend the classical risk management framework operated in banks with their strive to innovate, defining a new theoretical model of innovation risk management. Nine hypotheses were tested, in order to relate risk management concepts and innovation culture concepts with our proposed integrator risk knowledge sharing, critical for the functioning of the model. We have obtained key responses from 25 field risk and innovation managers. Seven of the nine hypotheses were supported by their feedback. In our model, risk knowledge sharing is influenced by people, technology and resources. During our interviews, we found that respondents regarded the new innovation risk management model as an issue of people and technology. The relatively low correlation between resources an risk knowledge sharing may be due to the our chosen sample
of risk and innovation experts — they operate in three large banks in Romania, with little capital or financial constraints, which may lead to a relatively biased result regarding the resources weight in our proposed framework. Furthermore, the limitations of this study also refer to the exploratory method used to reach consensus on the proposed hypothesis, and the lack of an extensive quantitative study, measuring the validity of the variables proposed. Other variables may be proposed and further quantitative analysis should be conducted in order to fundament the robustness of the innovation risk management model.

Acknowledgements

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References

Reaching Across the Pond: Extending a Regional Innovation Ecosystem Strategy

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Abstract: The Georgia Institute of Technology has been a catalyst for economic growth in the Southeast United States since its founding in 1885. Over the past 30 years, it has become known as one of the top technological universities in the world. As part of a strategic planning effort in mid-2009, it sought to strengthen its thought leadership and impact through the implementation of a global innovation ecosystem strategy. The Institute serves as the integrating focus within its region to promote disruptive thought, use-inspired research, experimentation, and accelerated implementation through novel educational, research, and industry partnership programmes. Since 2009, there has been a marked increase in economic development impact. This paper describes an implementation of a system-focused strategy for a regional innovation ecosystem in the Southeast United States, a research methodology for its continuous improvement and assessment with results and analysis over a multi-year period, and lessons learned. It postulates necessary ecologic, economic, and societal attributes for an innovation ecosystem, illustrates how these attributes are the basis for success within the region, and describes how this is a basis for extension to its affiliated programmes in France.

Keywords: innovation, ecosystem, leadership, collaboration, partnerships, strategy

1. Introduction

This paper describes ecologic, economic, and societal attributes of an emerging global innovation ecosystem centred on the work of the Georgia Institute of Technology in Atlanta, Georgia, USA and its affiliated programmes of education, research, and economic development at Georgia Tech Lorraine in Metz, France. Adner (2006) defines an innovation ecosystem as “...the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution.” Such requires the alignment and collaboration of various organizations with a vested interest in realizing the value of innovation in the marketplace as illustrated in Figure 1. As described in Youtie and Shapiro (2008) and Valdivia (2013), research universities serve a central role in guiding and facilitating alignment among members of the ecosystem.

Georgia Tech pursues a system-focused strategy that integrates research and economic development activities as described in Cross (2013a). It is grounded in a culture of innovation that stresses partnerships in specific market segments to facilitate collaborative work with industry, government, and nonprofit organizations. Georgia Tech provides commercialisation support to regional partners while leveraging its research base and educational programmes to provide venues for partners to explore disruptive concepts. Effective coupling and integration of industry into the university can provide a means to ignite, and even provoke, disruptive thinking which is embedded into academic programmes that provide experiential learning opportunities for students as well as support for research.

Success of the regional innovation ecosystem is predicated on key ecologic, economic, and societal attributes. Ecologic attributes refer to necessary functions that span research to commercialisation within the ecosystem and how they relate to and support various components of that ecosystem. Economic attributes refer to characteristics necessary to facilitate conduit of commerce throughout the ecosystem. Societal attributes refer to the characteristics of relationships within the ecosystem; elements necessary to promote positive outcomes. A model based on these ecologic, economic, and societal attributes will be discussed in the next section.
2. Research methodology and related literature

The approach taken to define and assess the regional innovation ecosystem, i.e., the research methodology, is based on benchmarking, surveys, and data analysis. Benchmarking is conducted through membership and active participation in forums sponsored by the U.S. National Academies through the Government University Industry Research Roundtable (GUIRR) and the University-Industry Demonstration Partnership (UIDP). In addition, benchmarking is supported by professional societies such as the Association of University Technology Managers (AUTM). Examples are provided in Fraser (2009) and Boccunfuso (2014). Independently conducted surveys, as in University Business Incubators (UBI) Index (2014) and AUTM (2013), along with economic development impact reports, such as Huron Group (2006), and periodic interviews with stakeholders provide insight into the effectiveness of best practice usage and insights into potential improvements. Representative data are presented and discussed later in the paper.

The work described herein is also influenced by the literature on innovation ecosystems. Wright (2014) observes "... that corporations turn to universities to investigate areas outside their core strengths, investing in speculative science in the hope of finding profit opportunities." In a similar vein, Fabrizio (2006) provides a comprehensive overview of open innovation practices increasingly employed by industry to engage research universities. Though much has been written about the importance of start-ups, and methods for start-up acceleration have been codified as described in Blank and Dorf (2012), Bresnitz (2014) has observed that the success of innovation ecosystems is not about start-ups alone, but about the platforms and differentiated value offered through different global locations. Carlson and Wilmot (2006) describe five rules for successful innovation focused on important needs, creation of value, innovation champions, multidisciplinary teams, and organizational alignment. UBI (2013) also provides a good summary of characteristics of successful regional innovation ecosystems. The following paragraphs briefly review the literature that captures these referenced characteristics in terms of ecologic, economic, and societal attributes.

Hage (2011) describes key ecologic functions that must exist within an “innovation network” (innovation ecosystem) to successfully translate research results into usable knowledge and valuable products. These functions span basic and applied research, design, manufacturing, quality control, and extension services as described in Table 1. Significantly, Hage stresses that technological innovation as enabled by research and design is by itself insufficient. Process innovations in manufacturing, quality control, and commercialisation research are also needed. In this context, what is commonly referred to as ‘extension services,’ in the American land grant university tradition, is synonymous with Hage’s use of commercialisation research. For example, the US Department of Commerce sponsors a manufacturing extension partnership programme in
each state to provide support for the manufacturing capabilities of small to medium-sized manufacturers located within that state. In the State of Georgia, these extension services are provided by Georgia Tech.

These works have prompted thinking and a focus for this paper in terms of the essential ecologic, societal, and economic attributes that must be present and integrated into an innovation ecosystem. As described in the next section, Georgia Tech has developed expertise in the key functions described by Hage and provides these routinely to its partners in its regional innovation ecosystem. For the purposes of this paper, these ecologic functions are summarized as research, development, production, and extension services.

Table 1: Necessary ecologic attributes for an innovation ecosystem

<table>
<thead>
<tr>
<th>Arena</th>
<th>Definition</th>
<th>For purposes of this paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic research</td>
<td>Experimental or theoretical work undertaken primarily to acquire new knowledge without any particular use in view</td>
<td>Research</td>
</tr>
<tr>
<td>Applied research</td>
<td>Original investigation undertaken to acquire new knowledge, but aimed toward a specific use objective</td>
<td>Development</td>
</tr>
<tr>
<td>Product development &amp; innovation</td>
<td>Systematic work based on existing knowledge gained from research and practical experience directed at producing new materials, products, and devices (including prototypes)</td>
<td></td>
</tr>
<tr>
<td>Manufacturing research &amp; process innovation</td>
<td>Research to design new manufacturing products or processes to increase productivity and improve quality</td>
<td>Production</td>
</tr>
<tr>
<td>Quality control research</td>
<td>Research aimed at improving the quality of products as well as research to reduce risks to the user and hidden costs for the environment</td>
<td></td>
</tr>
<tr>
<td>Commercialisation research</td>
<td>Research designed to understand needs of customers or to improve distribution paths and/or supply chains</td>
<td>Commercialisation</td>
</tr>
</tbody>
</table>

In a recently published book on successful innovation ecosystems, Tornatzky and Rideout (2014) describe societal and economic attributes that characterize successful innovation ecosystems based on case studies of twelve US universities. These attributes include boundary or interdisciplinary activities spanning entrepreneurship education, industry and community partnering, and technology transfer as well as the culture of the university and its leadership. The point is made that universities need to support and encourage student involvement in entrepreneurial activities and even view such activities as a focus for innovation in educational delivery. Such universities also commit to facilitating industry access to intellectual property and the development and enhancement of partnerships with members of the ecosystem (industry, government organization, and nonprofit entities). Lastly, the university culture must be accepting of entrepreneurial activity as a legitimate scholarly pursuit, and importantly university leadership must set the tone and direction for this to happen.

Figure 2 illustrates key ecologic, economic, and societal, attributes of an innovation ecosystem. Note that leadership is listed as a key societal attribute; leadership itself is fundamental throughout the ecosystem. The balance of the paper explores how these attributes relate to a successful regional innovation ecosystem centred on Georgia Tech and how this ecosystem is being extended globally through its European campus in Metz, France.

3. The Georgia Tech strategy

Georgia Tech was created in 1885 with the mission to educate a cadre of technical leaders in order to build a manufacturing and economic base in the State of Georgia. Georgia Tech’s strong engineering culture supports the co-existence of education, practical problem solving and discovery-focused research. Today, Georgia Tech
Stephen Cross, Bernard Kippelen and Yves Berthelot

consists of six colleges (engineering, architecture, computing, business, science, and liberal arts). The Georgia Tech Research Institute (GTRI), an outgrowth from the original shops and foundries, was created in 1934 to conduct applied, industry-focused research. In addition, the Enterprise Innovation Institute (EI²) supports economic development. EI² houses the first and largest incubator in the United States.

Figure 2: Innovation ecosystem attributes - ecologic, economic, and societal attributes

As part of a strategic planning effort in 2009, Georgia Tech defined an industry-facing research and innovation strategy focused both on leading-edge research and economic development. The strategy sought to bring a systems approach to the vast array of faculty-led research projects across Georgia Tech. This was done to create more synergy between the colleges, GTRI, and EI² and also to more efficiently and effectively fund research infrastructure and support processes. For example, Georgia Tech uses a shared services model to support the acquisition, use, and maintenance of research equipment. Such equipment is situated in administrative units, called interdisciplinary research institutes, reporting to the central administration outside the colleges and other units. This is done, in part, to promote interdisciplinary work. Another example is the simplification of contracting and intellectual property processes in order to become more “industry friendly.” In addition, 12 core research areas were selected to best represent the breadth and depth of research competencies and their mapping to strategic societal and market opportunities.

The core research areas are appropriate aggregations of core competencies represented in over 300 research centres, groups, and laboratories at Georgia Tech, their interdisciplinary nature, the alignment with strategic markets within the region, and the existence of industry and other partners interested in working with the Institute. The process to arrive at this aggregation involved a year-long discussion with faculty, administrators, and regional stakeholders in an effort to achieve shared understanding and agreement on how to best provide an effective “industry face” for research programmes and their economic development potential.

A concurrent approach to research and economic development through innovation means that teams of faculty, graduate students, application and economic development experts, and professional staff work together to define and pursue important problems, to foster earlier engagement with industry, and to accelerate the deployment of research results. It should be noted that to accomplish this, creative tension and a balance is required between high-risk discovery-focused research, use-inspired research, and development activities. The pursuit of discovery-focused research does not mean that every outcome will be successful in terms of usable outcomes for what is learned from creative pursuit and exploration must be a key focus. Research is an experimental pursuit where new insights and fundamental learning often come from failed attempts. The balance sought is to engender and support a culture that blends high risk, discovery-focused research with early identification of commercialisation potential.

Central to the successful implementation of such a strategy is a philosophy of maximizing collisions, reducing friction, and encouraging prudent risk taking. This requires a culture and a work environment where novel ideas can be explored and where faculty have the freedom and support to do that with minimal administrative burden. It also requires that work is done in ways that are meaningful to the pursuit of scholarship while
responding to the needs of industry and other important external stakeholders. As a result of these observations, Georgia Tech’s research and innovation strategy has three objectives: create transformative opportunities, strengthen collaborative partnerships, and maximize economic and societal impact.

Transformative opportunities occur when members of the faculty pursue high-risk, interdisciplinary research linked to important economic as well as societal impact. Members of the faculty are encouraged to provide thought leadership at the national and international levels. These and other initiatives are pursued in ways where the Georgia Tech campus and the surrounding region serve as a living laboratory to support scalable and relevant research on real-world problems. Professional support in licensing, industry contracting, commercialisation, business development, communications, and marketing are necessary to the strategy.

Partnerships with other universities and technical colleges, national and international universities, major corporations, local nonprofits, and State agencies are essential. Strategic partnerships exist with many major international companies headquartered in or with significant business operations in Atlanta. Along with improvements in industry contracting and intellectual property management, a customer service model was introduced to better serve to cultivate deep understanding of the partner company’s needs.

Maximizing economic and societal impact means that research success is not measured solely by standard metrics associated with scholarly productivity, as important as they are to academia. Success is ultimately based on research results being deployed beyond the laboratory and classroom into the real world. Success measures include companies formed, patents and licenses issued, outside industry investment achieved, and new jobs created.

Data collected over the past several fiscal years for Georgia Tech’s business incubator, VentureLab (VL), is shown in Table 2. The UBI Index (2014) ranks VL as the 2nd most productive such incubator in the U.S. and the 17th globally. Patent productivity remains high, ranking #3 in the State of Georgia behind AT&T and Kimberly-Clark, and #9 among worldwide universities with U.S. patent filings per NAI-IPO (2014). An influential trend the past three years has been the increase in multinational corporation (MNC) innovation centre formation on the campus. These companies invest directly into start-ups and support education and research activities, thus enhancing the ecosystem. Besides internal productivity, new education and mentoring programmes in the region have helped launch 150 new companies and produced over 25,000 new jobs per annum. Extension services support over 700 SMEs state-wide. An unpublished update of an earlier study by Huron Group (2006) estimates a regional economic impact of over $3B.

4. Expansion towards a global innovation ecosystem

In 1988, Georgia Tech sought the opportunity to provide its students with an international experience while pursuing the same rigorous education provided at the Atlanta campus. A partnership with the region of Lorraine, the city of Metz, and a top engineering school (Supelec) resulted in the establishment of Georgia Tech Lorraine. A unique feature of GTL is that the faculty is comprised of tenure-track academic faculty with home units in Atlanta and supplemented faculty from the Atlanta campus on one-semester rotations. Today there are 6 permanent faculty members affiliated with the schools of mechanical engineering, electrical and computer engineering, as well as in computer sciences, and about 20 faculty on annual rotation. Over 600 students attend GTL annually, including 140 graduate students. All academic matters are governed by the Atlanta campus. Most of the undergraduates are from the Atlanta campus, while most of the Master students are from top French engineering schools, spending a semester or two in Metz before finishing their degree on the Atlanta campus. Georgia Tech faculty members at GTL have established focused research programmes in advanced materials, optoelectronics, and robotics. In 2006, Georgia Tech established with the French Centre National de la Recherche Scientifique (CNRS) the first Unité Mixte Internationale (UMI) in France. Being a CNRS laboratory has been crucial to growing a successful ecosystem of R&D with key partners, locally, in France, and in Europe. Today, GTL is cited as a success upon which to base regional economic development as described in Consulate (2011).

Given a national desire to achieve greater economic development impact in the region Lorraine, focused in the areas of energy and materials, there has been significant recent investment and a strategic focus to derive greater economic impact from educational and research programmes. A striking example is the newly created
**Institut Lafayette**, which is an open innovation platform, governed by a partnership between Georgia Tech and key local government entities (Conseil)

**Table 2**: Georgia Tech business incubator data

<table>
<thead>
<tr>
<th></th>
<th>FY ’09</th>
<th>FY ’10</th>
<th>FY ’11</th>
<th>FY ’12</th>
<th>FY ’13</th>
<th>FY ’14 (estimate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Technologies Evaluated</td>
<td>149</td>
<td>125</td>
<td>219</td>
<td>199</td>
<td>200</td>
<td>219</td>
</tr>
<tr>
<td>Number of Deals Created</td>
<td>21</td>
<td>16</td>
<td>13</td>
<td>16</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>New Investment into Incubated Companies</td>
<td>$96M</td>
<td>$77M</td>
<td>$95M</td>
<td>$111M</td>
<td>$53M</td>
<td>$76M</td>
</tr>
<tr>
<td>Number of MNC Innovation Centres</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Number of Jobs Created by Incubated Companies</td>
<td>457</td>
<td>433</td>
<td>519</td>
<td>599</td>
<td>677</td>
<td>720</td>
</tr>
</tbody>
</table>

Régional de Lorraine, Conseil Général de Moselle, Communauté d’Agglomération Metz-Metropole, Ville de Metz, and with support from the French government and the European Union. The Institut Lafayette is managed by Georgia Tech and located on the European campus of Georgia Tech (Georgia Tech Lorraine or GTL). The newly created institute, which opened in May 2014, is housed in a brand new 2,350 m$^2$ building comprised of offices, laboratories and a 465 m$^2$ cleanroom fully equipped with state-of-the-art characterization, fabrication, and pilot manufacturing equipment to enable innovations and training in optoelectronics. The new partnership further grows and supports the local innovation ecosystem in collaboration with other local higher-education institutions (e.g. Supelec, the University de Lorraine). Following the successful Atlanta model, a faculty member skilled in research management and economic development with extensive European industry experience works closely with GTL and the Institut Lafayette to collaborate with European MNCs and the regional innovation ecosystem led by Georgia Tech in the Southeast US. Lastly, new revenue generating partnerships have been initiated. For example, GTL, and its campus in Atlanta, participates with PSA Peugeot Citroën as a member of their OpenLab initiative as stated in PSA (2012). Research collaborations have been initiated with major international corporations with operations in France and in Georgia. While the innovation ecosystem in optoelectronics in the Lorraine region is emerging, initial signs are very positive. The next section describes the progress to date and the lessons learned.

5. Discussion and key lessons

In this section, the progress and plans for the international innovation ecosystem will be reviewed using the ecologic, economic, and societal attributes previously discussed.

5.1 Ecologic

There are strong collaborative research programmes between the Atlanta and Metz campuses in materials, optoelectronics, and robotics. Federal funding for basic and applied research are provided for specific projects by both the US and French governments. Careful attention has been paid to national policies and regulation, such as the US export control laws, to ensure such work meets the common definition of fundamental research. While development and production capabilities have been quite strong in the programme in Georgia, the new Institut Lafayette, described at Jager (2014), provides the opportunity to enhance these functions in France through partnering and alignment with extension services within the Provence, such as those offered by ISEETECH, a nonprofit organisation in Metz, France that assists SMEs. The constant flow of ideas and people between the Atlanta campus and the Lorraine campus makes for a truly global ecosystem.
5.2 Economic

As described earlier, the State of Georgia has defined strategic markets spanning information/telecommunications technology, biomedicine, energy, materials and other areas. There has been a rapid expansion of start-ups coupled with recruitment of large companies thus enhancing the regional innovation ecosystem. The curriculum for undergraduates in Atlanta has been revised to support more entrepreneurial education and experiential learning via innovation competitions. A faculty member on leave during the spring 2014 semester initiated the first innovation competition with students at GTL and it was a huge success. The plan going forward is to offer the same entrepreneurial education in the courses offered in Metz and to engage students from across the region in competitions with students from Atlanta. While the economic impact in France is still to be determined, applications to Georgia Tech overall increased by 46% in the past year. Given the critical role of tuition for university budget support in the United States, demand for admittance was a stronger factor in the decisions to raise tuition and to admit approximately 5% more students over the past several years. Technology transfer programmes are being harmonized based on new "industry friendly" intellectual property and contracting agreements to allow any international company conducting business in Europe or the United States to provide the full array of services.

5.3 Societal

Despite recently cited cultural inhibitors, e.g., as cited in Floc'h (2014), the authors have found that France has taken a proactive approach to embracing and applying best practices in innovation. The Georgia Tech experience in Metz has been very positive with respect to local receptiveness and support. Critical to this is the long-standing commitment of the city of Metz and region of Lorraine to the Atlanta area and the State of Georgia, and vice versa. Historically, the role of the Marquis de Lafayette during the American Revolution, and more recently the continued honoured role of the US military in the region during WWII provides the backdrop for a friendly and trusted relationship. That is not to say there have not been challenges or issues between Georgia Tech and its partners in the region during the past 24 years. But there has been willingness, based on shared cultural heritage and the dedication of leaders involved, to work through those issues and to find ‘win-win’ solutions. An annual Atlanta–France event, see Clavé (2014), which brings government officials, technologies, business leaders, researchers, and artists together both in Atlanta and in Metz, further enhances the key attribute of communication and trust. This has, in turn, enhanced the willingness to share resources and to align programs. For example, the clean room in the new Institut Lafayette is supported by IP-based functions similar to those implemented in the clean rooms on the Atlanta campus. A last key attribute is the role of leadership. Randles et al (2012) discuss how responsible innovation is more than risk mitigation or harm avoidance, but the pursuit of doing good. Such social responsibility is encouraged as part of Georgia Tech’s experiential education through a variety of innovation competitions supported by its business and policy programmes. These are being extended to its French campus as evidenced by a first student innovation competition held in April 2014. Georgia Tech has developed a leadership model based on the attributes of servant and adaptive leadership Cross (2013b) and provides mentorship in its use by all those in research and economic development leadership positions.

5.4 Key Lessons

There are six key lessons.

A systems approach has proven to be effective: Transforming the Georgia Tech enterprise by viewing it as a system has led to an effective approach for promoting more synergy between discovery, application, and deployment activities.

Alignment is necessary throughout the system: Alignment of vision, strategy, process, culture, and outcomes is very important. Moving dedicated teams of support professionals into faculty research areas to focus on offloading administrative burden and to support the functions related to curiosity, experimentation, maturation, and value have enabled faculty to spend more time on their research while others focus on transition to use. Further, alignment of core research areas with strategic markets important within its regions of operations and with its industry strategic partners has both produced support for research and for deployment activities.
Excellence in scholarly output is a necessary condition: The excellence of faculty, students, educational programmes, and research are all linked inextricably to high-quality scholarly output. Equally important is the translation of scholarly output into usable technologies and knowledge that have social and/or economic value. Directors of new MNC-based innovation centres have noted the importance of access to technical expertise and motivated students engaged in experiential educational programmes.

Effective communication and trust are fundamental: A team-based approach, common in large engineering projects, is more challenging in a research university environment. Frequent communication (including active listening) is crucial in order to gain support and trust with external stakeholders.

Innovation happens in such an interdisciplinary environment: It has long been recognized that “breakthrough ideas” often occur at the boundaries of different points of view. The approach implemented at Georgia Tech supports interdisciplinary research (across academic disciplines) and across the life cycle of discovery, application, and deployment.

Leadership and the willingness to change: Leadership within the university and in key nodes within the innovation ecosystem is fundamental to ensure collaboration and alignment of strategies in order to maximize the opportunities for market and societal impact. One key improvement opportunity learned in the past year from the data shown in Table 2 was the importance of early technology scouting by economic development personnel trusted by faculty. Staff previously focused on those activities was diverted to support new start-up acceleration courses and related mentoring activities in the regional innovation ecosystem resulting in an “input decrease” in investment into and formation of new university-based start-ups. A recent change was made to increase the effort in technology scouting. This is an example of a “lesson learned” that will be shared with the benchmarking groups and professional societies discussed earlier in the paper.

6. Summary

Georgia Tech in Atlanta, Georgia (USA) is the centrepiece of a very successful regional innovation ecosystem. The success of this system is predicated on key ecologic, economic, and societal attributes embedded in a systems-focused strategy that strives for concurrent execution of education, research, and economic development activities. The impact of the system is measured in the overall societal and/or economic value that is generated (e.g. jobs created, research volume, and the increased trend of companies locating operations adjacent to the central campus). Educational programs have evolved to further support workforce development needs and to provide venues for companies to explore disruptive concepts in a university setting. Through its long-standing relationship with its affiliated campus in Metz, France, Georgia Tech is extending its innovation ecosystem in the region of Lorraine and the city of Metz. The approach is based on the lessons learned through leading a regional innovation ecosystem in Atlanta, Georgia, and the transposition of the model to Lorraine melding the rich differences in two cultures with a long tradition of cooperation.

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Measuring Business Benefits and Performance in Smart Cities

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Abstract. Smart City is an urban strategy aiming at improving the quality of life in urban space. It is a comprehensive strategy, addressing all the aspects of wellbeing, that is, economic, social and environmental aspects. The distinctive component of smart city is the large use of technology: indeed, a smart city strategy is largely based on innovative technological solutions to improve the quality of life and to solve the more frequent urban problems. The smart city implementation requires a joint effort from several different actors: local governments, businesses, universities and research centres, citizens by themselves or by not-for-profit organizations. Companies have a pivotal role in the smart city implementation. This paper aims to verify if company members of a smart city body can really realize value from this business; it suggests a comprehensive framework to individuate and measure direct and indirect benefits for companies deriving from the smart city implementation. To empirically observe these benefits and performance, the Genova Smart City Association (GSCA) has been studied.

Keywords: Smart cities; business performance; information technology; smart city benefits; smart city stakeholders

1. Introduction

Smart City is an urban strategy concept aiming at improving the quality of life in urban space. It is a comprehensive strategy, addressing all the aspects of wellbeing, that is, economic, social and environmental aspects. It distinguishes itself from other urban strategies because it aims to harmonise all these aspects that often conflict each other. Therefore, in a smart trend, economic development should be pursued both safeguarding the environmental quality of urban areas and granting a better equilibrium in wellbeing where people live, with reduction of poverty and inequality.

The distinctive component of smart city is the extensive use of technology: indeed, a smart city strategy is largely based on innovative technological solutions to improve the quality of life and to solve the more frequent urban problems. A smart city implementation plan is based on both soft or physical and soft Information Technology. Physical technology regards all the facilities and devices used to reduce pollution and energy demand, improve efficiency in urban transport and logistics and produce energy from renewable sources. It especially aims at reducing the environmental impact of large cities on the quality of water, air and land. Information and Communication Technology is consequently used to connecting people, delivering e-services to them and improving their participation in political and social life.

Implementation of the smart city requires a joint effort from several different actors: local governments, businesses, universities and research centres, citizens themselves and or not-for-profit organizations. One can observe such a smart city quadruple helix, that enhances social, environmental and economic development in city by the joint contribute of all of these partners. To organize their activity, complex organizations are settled, with the specific goal to create and deliver public and business value to all the city stakeholders.

Companies have a pivotal role in the smart city implementation. Indeed, they are the subjects able to offer devices, solutions, organization and processes to realize the planned smart city defined by local government, universities and not-for-profit bodies. However, they should find their own economic returns by realizing business in the smart city context.

This paper aims to verify if company members of a smart city body can really realize value from this business; it suggests a comprehensive framework to individuate and measure direct and indirect benefits for companies deriving from the smart city implementation. To empirically observe these benefits and performance, the Genova Smart City Association (GSCA) has been studied. Genova is one of the smarter cities in Europe, having won EU projects about smart city pioneer implementations. GSCA is a complex organization joining both companies and public administration, not-for-profit organizations and the university. Our paper selects business stakeholders in Genova Smart City and defines a set of areas and indicators to measure direct benefits in Smart City projects.
2. Smart city definition and components

Smart city is a recent phenomenon, but it has a great success in large cities all over the world (Dameri and Cocchia 2013). The main idea connected with smart city is that technology and knowledge – and especially ICT – could help in facing and solving most of the problems related with larger and larger metropolis, that is: pollution, energy consumption, traffic, inequality, poverty, and so on. In the meantime, a smart city is also seen like a weapon to better exploit the economic, social and cultural potential offered by a large city (Giffinger 2007).

However, the smart city concept is heterogeneous and a sound and shared definition of smart city still doesn’t exist. It is normal for new topics, but it could negatively impact on the smart city implementation; lacking a unique definition, cities starting to realize smart initiatives lack a well-defined plan to apply (Dameri 2013a).

A very large literature survey has been conducted to extract and compare the most cited smart city definitions and to find common aspects and recurrent components, to support the design of a smart city perimeter. This survey covers more than 700 scientific papers, collected by Google Scholar in February 2013. Interesting conclusions emerge, making it able to depict a vision of a smart city, not totally clear but very promising.

For the first, it is necessary to clarify that the terminology about smart city is still confused. The literature survey suggests several different ways to name a smart city, substantially similar to each other. Several definitions are based on the role of ICT in realising smarter cities, nearest to the citizens and able to share and spread data, information and e-services. Wired city, virtual city, ubiquitous city are different ways to underline the importance of the Internet and connectivity in realizing a virtual community parallel to the concrete city (Hollands 2008, Anthopoulos et. al. 2010). The most recurrent definition in this area is digital city: “an open, complex and adaptive system based on computer network and urban information resources, which forms a virtual digital space for a city” (Bowerman 2000). According to this definition, a digital city indeed includes virtual, wired and ubiquitous communities.

An historical literature survey shows that the digital city concept was born before the smart city one and was more common and widespread from 2000 to 2010 (Dameri 2013b). The Internet diffusion has been the main driver of the digital city idea, and the use of mobile devices has further enforced this urban strategy. Several European countries have their own digital agenda and the EU has drawn up a European Digital Agenda, aiming at helping Europe’s citizens and businesses to get the most out of digital technologies (EU 2013).

But a smart city is not only made by ICT. There is another core aspect of smart city, that is, knowledge. Information city, knowledge city, learning city are concepts aiming at underlining the crucial importance of data, information and knowledge for the quality of life in urban space (Anthopoulos et. al. 2010, OECD 2010). Also on the knowledge side of a smart city ICT plays a qualifying role, realizing an arena where people can interact and share knowledge, experiences and mutual interests (Ishida 2002). But a smart city especially uses knowledge – both individual and common knowledge – to become intelligent, that is, to develop a high capability for learning and innovation, delivering a better quality of life for its citizens (Komninos 2006).

The smart city is moreover a city able to use well the natural resources and to respect the environment. Indeed, the environmental impact of large metropolis is very negative and it gets worse exponentially when the city dimension increases. A smart city aims therefore to become a green city, respecting the environment, and a sustainable city, granting both a green profile and economic development (OECD 2010).

From this literature survey, it emerges therefore that a smart city is a polyhedral strategy, putting together ICT, knowledge and environmental safeguard to improve the quality of life in the urban space and to promote innovation and community building (Caragliu et. al. 2009). Deepening the analysis, the smart city emerges like an urban strategy, with its own goals, processes and key initiatives. High technologies, and not only ICT, are at the basis of this strategic view, especially aiming at three interconnected goals: environmental safeguard, economic development, quality of life for everyone.

To reach these goals, several initiatives are implemented. Even if each city could develop a different strategic map to realize a smart program, there are some common projects that characterise the smart city strategy. They could be classified as follows (Dameri 2014a):
ICT projects, aiming at creating a strong and shared connectivity for all the citizens;
- E-services projects, aiming at using the broadband connection to deliver online information and public and private services to citizens, improving their access to these services at a lower cost, in shorter time;
- Energy projects, aiming at reducing the energy consumption and at replacing traditional energy sources with renewable ones;
- Environmental projects, aiming at reducing pollution, CO2 emissions and the environmental footprint of the city;
- E-democracy projects, aiming at using the Internet to better involve citizens in the political debate;
- E-community projects, aiming at creating a smart community among citizens to enforce their social identity and belonging to the city and the opportunity to share competences and information.

3. Smart city stakeholders and benefits

All the definitions of smart, digital, intelligent city – and so on – share a common, large goal: to improve the quality of life in the urban area (Dameri 2014b). However, a so large goal risks to become worthless to drive a smart strategy, because it is too vague. Indeed, the smart city is a complex strategy, as it has both several goals and several stakeholders. Each goal could be reached pursuing different projects, each project could concurrently impact on several goals and different stakeholders could gain benefits from different projects (Fontana 2014).

Examining all the Italian province seats (117 medium cities), it emerges that nowadays cities are starting to implement some smart actions, but they lack a comprehensive strategy and also a governance framework. This means that it would be difficult to address initiatives towards the more important goals to be reached, and that benefits would be difficult to realize and measure (D’Auria e Dameri 2014).

For these reasons, it is important to support smart city programs with a strong governance framework (Kourtit 2013), able to:
- individuate the program stakeholders;
- associate expected benefits to all the different stakeholder segments;
- address projects and initiatives to maximise the stakeholder satisfaction, optimising the goals to be reached with respect to the expected benefits.

Depending on the most cited smart city definitions mentioned/discussed in the previous paragraph, the citizens’ quality of life is the main goal to be reached. However, this aim is indeed a smart city vision and it needs to be detailed in specific objectives, regarding several actors involved both in the smart city implementation and in benefits enjoyment. In Figure 1 below the role of different smart city stakeholders is described (Dameri 2012).

![Figure 1: Benefits in Smart City](image-url)
We can consider a smart city like a complex system composed of not only an infrastructure, including ICT and other high technologies, but also organizational infrastructures involving a set of projects, initiatives and e-services; the public and private organizations acting both to create or to use the smart city deliverables; and all the people living, working, studying or visiting the city, that are the final addressers of the smart city benefits.

In figure 1 above, we can see how the different actors play to realize the smart city ecosystem. We can distinguish between enablers and enjoyers. Enablers are the actors acting for realizing a part of the smart city complex system. They are:

- governments, establishing the policies, guidelines and rules to drive the smart city implementation;
- solution vendors, offering technological supports and professional skills for the smart city implementation;
- the educational system, delivering education and training, both to educate all the citizens to use the new technologies offered by the smart city, and to produce skilled professionals able to participate to the smart city realization.

Enjoyers are the actors receiving the smart city services and gaining their benefits. They are:

- citizens and the civil society, enjoying a better quality especially of public services;
- the public administration, especially local administrative public bodies, gaining in efficiency and effectiveness and obtaining a higher political consensus thanks to the citizens’ satisfaction about the smart city services;
- all the businesses, that benefit of a higher innovation and productivity of the economic environment.

To better understand the set of benefits delivered by a smart city program, it is important to distinguish between direct and indirect benefits (Caragliu and Del Bo 2012).

Direct benefits are the ones enjoyed by citizens, public administration and the economic system. They receive the direct results of the smart city implementation, thanks to better public services, better public processes and therefore a better impact of public policies, a higher quality of the economic context in which companies work and finally also a better city reputation.

Indirect benefits are the ones enjoyed by the enablers. They act to realize the smart city and to improve the benefits offered to the enjoyers, but in the meantime receive themselves benefits for their activity:

- vendors enlarge their business in more innovative sectors, with an opportunity to realize better financial performance;
- governments improve the quality of their policies, the quality of democracy, the citizens participation to the political debate and finally their consensus;
- the education system spreads knowledge and skills and realizes a higher performance in its core activity.

4. **An investigation about smart city benefits in businesses: Genova Smart City**

A case study of particular interest, related to the design and implementation of the process of transformation into a smart city, is that of the city of Genova (one of the most important city in northern Italy). In this context, the AGSM (Association of Genova Smart City) was created by the council of Genova together with Enel Distribuzione and the University of Genova. In consistence with what has been outlined above the AGSM proposes to:

- elaborate a systematic transformation process which results in rendering Genova an intelligent or “smart” city, according to the European Commission’s definition; the declared intention is to realize a concrete involvement of different partners involved in such a way as to make possible the perpetuation of the well-known “virtuous circle” that permeates through research, businesses, institutions and citizens;
- identify explicit actions, initiatives or specific projects which permit the objectives outlined in the following contexts to be achieved: improvement of the quality of life; protecting the environment and respect and overcoming the energy and environmental objectives of the Kyoto protocol; economic development and growth in employment with particular reference to youth employment; support for research and mutual collaboration between research, innovation, business; participation in European tenders in areas involving improvement of the quality of life, also in collaboration with associates and with
the use of their proposals; to share the objectives and their implementation both within the associations and businesses that make up the economic fabric and other economic and institutional subjects.

It has emerged, from stated polizie, that “Genova Smart City is a city which improves the quality of life through a sustainable economic development, based on research, innovation, technology and directed by local leadership with an integrated planning logic” (www.genovasmartcity.it). It should be noted that the concept exposed is expanded with regard to that normally used in the European context, as it concerns the so-called “overall management of the city” and not simply the rational use of energy (in the context of the Strategic Plan for Energy Technologies or SET Plan). In other words, Genova Smart City allows us to discuss the renewal of old values and relationships thanks to the contribution of an innovation (also) technological suited to the specific space-time concept. Here, the improvement of the quality of life is identified as an achievable objective through actions, initiatives and projects where infrastructural, cultural, health and social networks play a fundamental role which has to be carefully managed and monitored. Therefore, technology assumes an important, but not exclusive, function, in particular: ICT, Smart Grids and electrical networks allow, in the present context, to properly support the entire macro-process maintaining the economic and environmental costs at an acceptable level. The slogan which summarizes the expanded concept of Smart City sees therefore “the city as a living organism that needs a brain to guide towards healthy growth”.

From an organizational point of view, the AGSM, chaired by the Mayor, is based on a “dual governance” which involves a Governing Council and an Operating Committee. Nonetheless, it is the Technical Scientific Committee that analyses proposals from members and allows a close link between the applied research and the reference context.

The activity of the AGSM demonstrates itself to be particularly dynamic also in relation to the Memoranda of Understanding which focuses on specific projects where businesses carry out, free of charge, a particular study or feasibility project. In the signed or soon to be signed Protocols by way of example we mention: ABB a study for an intelligent health building, transparent technological laboratory and green port; Elkrom a study on mini wind turbines and intelligent sport facilities; Enel the development of smart grids, intelligent meters; Poste Italiane analysis of integrated digital communication and friendly counter; Selex-ES a study of energy consumption for specific buildings, a safety study with the participation of volunteers in the port area, experimentation on the system of hydrogeological monitoring of landslides; Siemens: a project on intelligent historical buildings, green airport, green harbour and urban mobility; TOSHIBA Transmission & Distribution EU analysis for energetic optimization of waterways, museums and intelligent sports facilities. Based on the latest statistics available (February 2014) AGSM has eighty-eight paying members and six honorary members.

A specific analysis of GSCA members focuses on the heterogeneous composition of the association. However, we can observe several companies, but also a lot of not-for-profit bodies and public agencies; such as the Port Authority, Trade Unions and so on. We can also find trade associations like Industrial Trade, Commercial Trade, Building Trade and cooperative companies, Association of Citizens working in culture and welfare and education sectors. The dimension of company members is very heterogeneous, too: we can find several global, large companies like Toshiba, Siemens, Selex, Ericsson, Erg, Ansaldo; besides a large number of SMEs, mainly working in energy or ICT industry. Also research bodies are represented by several members like University of Genova, CNR (National Research Centre) and IIT (Italian Institute for Technology, based in Genova) (Dameri, 2014).

Statistically, it is possible to underline that GSCA is currently made up of 12.6% Public bodies, 4.5% Research bodies, 21.6% Large companies, 47.6% SME’s, while Trade associations and Not-for-profit organizations represent respectively 7.9% and 5.8%. These subjects can be considered to all effects, along with the institutions that operate within the Smart City, as the enablers who, in addition to being active in the realization of the macro-project, avail of the indirect benefits as described above (Caragliu and Del Bo, 2012).

The creation of a framework aimed at identifying and monitoring the performance obtained from the Smart City model must, therefore, be based on two distinct levels which allow the evaluation of both the direct and the indirect benefits (see fig. 2). The heterogeneity of the interested parties along with the difficulty in identifying appropriate indicators of performance imposes the use of composite logics for evaluation.

- With regard to indirect benefits each participating party will see its performance increased (or decreased) according to the induced effect of the functioning of the Smart City system; in particular the businesses,
regardless of their size, will have a specific focus on the economic-financial aspects and on the indicators considered significant in the creation of value, the not-for-profit organizations and public bodies could enjoy the benefits in terms of image and simplification in procedures, research bodies could measure the increased performance in terms of funds received rather than in relation to the percentage of research projects implemented, for all parties there will be returns with regard to the improvement in both professionality and core activity results;

- The evaluation of the direct benefits is more complex. These are, in fact, absorbed by the citizens, society, public administration and all the businesses, in relation to the different actions put in place through the implementation of the Smart City macro-project. According to several authors (Dameri and Cocchia, 2013) the concept of benefit is related to three different smart city ideas. First: the “close” idea, strictly focused on a smart city definition regarding only the environmental footprint of cities, and consequently it includes mainly the projects and initiative aiming at reducing pollution and CO2 emissions and the energy consumption: this is EU the smart city idea; second: the “medium” idea, including both smart city as conceived above and digital city, joining both the use of hard technologies and ICT softwares, the first to reduce the infrastructure impact on the environment and the latter to connect people through open data, information sharing, broadband connections and digital e-service: this reflects the more accepted smart city idea, both in the academic world and by companies; third: the “large” idea, including the smart city definition all the initiatives aiming at improving the quality of life in the urban area, both technology based or not; this broad definition is quite fuzzy and it makes it difficult to really understand what a smart city is.

![Figure 2: Direct and indirect benefits in Smart City](image)

It goes without saying that the current challenge is connected to the possibility to measure the direct benefits through a combination of indicators carefully chosen that allow the comparison of results between the different Smart City projects. Among the many tentatives to rationalize the problem of measuring such a complex combination of performance, it is worth mentioning the Smart City Index which was devised by a well-known Milanese consultancy company (Between, www.between.com) with the support of Poste Italiane, Selex-ES and Telecom Italia. In this case, a procedure was created that allows the documentation of rankings between the different Smart cities, taking into account 9 thematic areas, 18 sub-areas and 153 indicators. In short, the nine thematic areas concern:

- Broad band, with reference to fixed and mobile broad band (6 indicators);
- Smart health, which essentially regards electronic health (9 indicators);
- Smart education, for the diffusion of the digital school (6 indicators);
- Smart mobility which monitors both private and public transport (35 indicators),
Smart government, for online payment services, electronic payments and open data (54 indicators),
Sustainable Mobility, for the diffusione of electric cars and mobility sharing (14 indicators),
Energy efficiency, in both versions smart building and smart lighting (14 indicators),
Natural resources, for waste management, water leakage and air quality (8 indicators),
Renewable energy, with focus on photovoltaic, wind power and hydroelectric (7 indicators).

In Figure 2, Smart City indicators have been connected to different smart city stakeholders in order to understand how direct benefits are realized. Using Between Smart City Index, however, indirect benefits are not considered.

With 100 being the maximum on the result indicator (resulting from the processing of the values for all 153 indicators), Genova, for 2013, was placed in sixteenth place (on 116 Italian municipalities – provincial capital-sampled) with a value of 78.2. In more detail, it can be noticed that every municipality was inserted, for each thematic area, in a first, second and third level according to whether the results obtained were good, sufficient or negative. With this in mind, Genova was the third for renewable energy and smart education, second for smart health and natural resources, and highest-ranking for all other thematic areas.

With specific reference to the research in question and limited to only metropolitan cities, Genova was placed in sixth place of the fourteen cases examined, preceded in order by Bologna, Milan, Rome, Turin and Florence. It should be noted that the metropolitan cities in the North of Italy are all placed in an optimum position, thanks to both anticipating the start of the experimentation with respect to other cities and European projects that allow, at the same time, a more rational path of development and access to financial funds through dedicated channels. However, it can be said that those cities are subjected to considerable pressure from public opinion for the expected results and are often characterized by increased territorial and socio-environmental complexity which make the development of certain projects particularly difficult. It should be noted, for example, that for all metropolitan cities (with few exceptions) the thematic areas relative to smart education, renewable energy and natural resources make up the three main weak points. For a more complete examination of the Italian results relative to the application of SCI see Figure 3.

Figure 3: Smart City Index in Italy (Report Smart city index, Beetween)
Cities are classified adapting the Boston Consulting Group categories to this situation, by using the Between Smart City Index. Therefore, we individuate four categories of cities:
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- Smart Cities with a high quality of life;
- Smart Cities with high quality of life, but smart projects not yet implemented till now;
- Question Marke Cities at early stage implementation of smart projects, with benefits and a better quality of life not yet realised;
- Dog Cities having not implemented any ore few smart projects and have a low quality of life too.

5. Conclusions and further works

In this paper, the topic of measuring smart city benefits is addressed. The authors especially study the relationship between smart city projects and business performance and benefits. To analyze this relationship, a comprehensive framework is designed including all the smart city stakeholders and both direct and indirect benefits. To measure smart city benefits, the Between Smart City Index has been adapted to the framework. However, this Index considers only direct benefits, therefore indirect benefits are not included. In conclusion it can be said that the framework presented here, even though it means a considerable effort for the identification of specific measurement indicators of the performance of the smart city, is anyway limited to representing a “slice” of the so called direct benefits. It neglects both some other direct benefits and indirect benefits. The next evolutionary step should look at the possibility of integrating in the aforementioned model further direct benefits that are not currently represented in the defined thematic areas and above all consider the indirect benefits that, particularly in the large metropolitan areas, can create virtuous circles which are self-sustaining.

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The Association Between Personality Traits, Entrepreneurial Intentions and the Promotion of Cultural Heritage in Late Adolescence

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Abstract: The first goal of the present study was to examine the determinants of the entrepreneurial intentions toward the promotion of cultural heritage in a sample of Italian late adolescents. The second goal was to examine the relationships between personality traits (measured with Big Five Questionnaire, Caprara Barbaranelli and Borgogni 1993), entrepreneurial intention toward the promotion of cultural heritage and its determinants (i.e., attitude, subjective norm and perceived behavioral control; Ajzen 1991). The third goal was to examine the indirect effect of personality traits on entrepreneurial intention toward the promotion of cultural heritage, through its determinants. Participants were 381 students (57% were females; 18 year-old on average, SD=1.9) attending the last two years of four high schools from Lepini mountains, an area in the center of Italy that aims to develop an integrated tourism system, promoting initiatives of general interest to create the necessary conditions to enhance and safeguard tangible and intangible local cultural heritage (UNESCO 2003). It emerged that the five personality traits were positively associated with each other. Attitudes, Subjective norms and perceived behavioral control were all moderately and positively related with entrepreneurial intention toward the promotion of cultural heritage. In addition, conscientiousness emerged as the most important trait involved in the explanation of entrepreneurial intention toward the promotion of cultural heritage. In particular, conscientiousness was significantly and positively related to subjective norms and perceived behavioral control. In addition, via path analysis, significant indirect effect emerged for conscientiousness on entrepreneurial intention toward the promotion of cultural heritage, through both subjective norms and perceived behavioral control. Such paths emerged controlling for the inter-relations between personality traits, on the one side and the determinants of entrepreneurial intention toward the promotion of cultural heritage, on the other side.

Keywords: personality traits, entrepreneurial intentions, cultural heritage, late adolescence

1. Introduction

According the UNESCO Conference in Paris on 17 October 2003, cultural heritage can be defined as everything is associated with the history, culture and tradition of a specific context that can be both tangible (e.g., monuments, paintings, books, artifacts) or intangible (e.g., dialects, music, performances, events). In particular, intangible cultural heritage can be defined as “a list, as oral traditions and expressions—such as epics, tales and stories, performing arts—including music, song, dance, puppetry and theatre, social practices, rituals and festive events, knowledge and practices concerning nature and the universe—for example, folk medicine and folk astronomy and traditional craftsmanship, as well as the sites and spaces in which culturally significant activities and events occur” (Kurin 2004: 67).

Safeguarding intangible heritage needs an effort focused to its maintenance, conservation and transmission over time (e.g., the organization of festivals that allow people to remember and live intangible cultural heritage). Toward such aim, young people are considered the ones that have the greatest potential to actively improve the economic and cultural power solicited by the promotion of cultural heritage.

Recently, the need to understand how many youths have the intention to invest in safeguarding local cultural heritage (e.g., through an entrepreneurial activity aimed at the promotion of cultural heritage such as a Bed and Breakfast in towns well-known for folklore festivals, or a restaurants that cook special local food, which is also part of the local cultural heritage that needs to be safeguarded) is emerging within local communities, on the one hand and among researchers, on the other hand. Individuals may be predisposed to promote cultural heritage. Such predispositions are traditionally studied as personality traits.

Personality is conceived as a set of dynamic, self-regulatory systems that emerge and operate over the life course (Caprara and Cervone 2000). People are directed toward achieving personal or collective goals through these internal systems that also guide affective, cognitive and motivational processes and provide coherence and continuity in individual behavior across different situations and contexts (e.g., Caprara and Cervone 2000).
Personality traits are defined as relatively unconditional behavioral tendencies that attest to individual potentials in a broad domain of functioning (McCrae and Costa 1999). Personality researchers have increasingly converged on the Big Five model of personality (e.g., McCrae and Costa 1999). The Five Factors Model (e.g., McCrae and John 1992) is the one of the most comprehensive personality taxonomies that encompasses five general dimensions of personality: extraversion that refers to the level of activity, positive affect, energies and sociability; agreeableness that concerns the level of empathy, warmth, trustiness in interpersonal relations; conscientiousness that concerns persistence, organization of goal directed behaviors; neuroticism (or low emotional stability) that concerns chronic level of poor emotional adjustment and control; and openness (or intellect) that concerns openness to new experiences, values and behaviors.

Kuratho and Hodgetts (2004) define entrepreneurship, accounting the role of different factors such as cognitive factors, willingness and ability, as: entrepreneurship is a dynamic process of ideas, change and creativity, it needs energy and a capacity to deal with risk.

Starting a new business is a process that assumes a willingness and intention toward starting a new business (Krueger, Reilly and Carsrud 2000). Krueger et al. (2000) underlines the importance of examining entrepreneurial intentions to better comprehend and predict such processes.

Among those models that examine intention, the theory of planned behaviors is among the models that have encountered the best empirical support to examine and predict intention toward a specific behavior. A central factor in the theory of planned behavior is the individual’s intention to perform a given behavior. “ Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior” (Ajzen 1991: 181).

Within the theory of planned behavior, three independent determinants of intention are conceptualized: attitude, subjective norm and perceived behavioral control. Attitude toward a specific behavior “refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question. The second predictor is a social factor termed subjective norm; it refers to the perceived social pressure to perform or not to perform the behavior. The third antecedent of intention is the degree of perceived behavioral control which refers to the perceived ease or difficulty of performing the behavior and it is assumed to reflect past experience as well as anticipated impediments and obstacles” (Ajzen 1991: 188).

Those individuals who have a more favorable attitude toward a specific behavior, a more favorable subjective norm with respect to that behavior and that perceive a greater behavioral control to perform that behavior will have a stronger intention to perform that behavior (Ajzen 1991).

Shepard and Krueger (2002) underline that acting entrepreneurially is an intentional choice made by people especially if they perceive an opportunity of succeeding; for example, there must be the perception that financial resources are feasible before a person chose entrepreneurship. In the last decade, researchers have focused their attention on achieving a deeper understanding of the roots of entrepreneurial thinking. In some studies, researchers underlined that it is the entrepreneurial behavior of both the individual entrepreneur inside the organization and the organization, as well as the importance of both individual and team perceptions of desirability and feasibility that promote entrepreneurial intentions and actions (Sheperd and Krueger 2002). Moreover, in other studies, researchers focused their attention on explaining entrepreneurial intentions of students (mostly college students attending Economics and Business courses). With a sample of Greek college students, Fafaliou (2012) found that almost half of these students reported a propensity to entrepreneurship in the face of any difficulties that they could encounter over their potential business venture, however they reported that they perceived themselves as not sufficiently prepared to start their own business. In addition, only one third of those students reported that they knew the type of business they wished to pursue. Furthermore, Pruett, Shinnar, Toney and Llopis (2009) examined entrepreneurial intentions of college students in US, China and Spain. In agreement with previous studies (e.g., Krueger et al. 2000), they found a positive association between entrepreneurial exposure and social norms and students’ entrepreneurial intentions. In addition, it emerged that cultural values were only moderately associated to entrepreneurial intentions. This result has been interpreted by these authors as an indicator that personal characteristics might be more important in reaching a better understanding of entrepreneurial intentions. In line with this interpretation, Krueger (2009) stated that there is a strong need in the entrepreneurial literature
to better understand how potential entrepreneurs perceive obstacles and facilitators of entrepreneurial intentions and actions. A possible answer to such call might come from studies that examined the role of personality in predicting entrepreneurial status. Zhao and Seibert (2006, 2010) have implemented a meta-analysis to examine the association between personality and entrepreneurial status and intention. In such meta-analyses, it emerged that conscientiousness, openness, emotional stability and extraversion are positively associated to both entrepreneurial status and intention. In addition, it emerged that agreeableness was negatively related to both entrepreneurial status and intention.

A better understanding of the personality of those who intend to promote cultural heritage through entrepreneurial activities may be increasing for several reasons. External factors associated with the possibility to start a new business might facilitate more those that have specific personality characteristics. Funding agencies might be interested in understanding the personality profiles that are most associated with youth entrepreneurial intention toward the promotion of cultural heritage.

We are not aware of previous studies aimed in such a direction. Thus, our study is exploratory.

2. The present study

The present study is part of an ongoing multi-disciplinary project entitled Cultural Heritage: Developmental and youth entrepreneurial models in two integrated area of the region of Lazio. This enlarged project has been cofunded by the Regional Government of Lazio and Sapienza University of Rome. The general aim of the project is to identify and promote innovative ways to produce, value and deal with cultural heritage in two specific mountain area of the region of Lazio (e.g., the Lepini Montains 2014). Such areas suffer from the proximity of the city of Rome, due its great cultural and historical value in comparison to the aforementioned area. These are areas characterized by a complex heritage system that merge historical and artistic landscapes, local products and original museums which are highly distinct from those belonging to the city of Rome. This multi-disciplinary project has the main aim to produce innovative methods of production and use of cultural goods, taking into account the characteristics of the specific context and the perspective of the social actors who live in such context. In addition, a great deal has been assigned to the young generation and to the opportunity that they will be protagonists of the appreciation and promotion of local cultural heritage. A second aim of the multi-disciplinary project is to identify efficacious and innovative ways to create educational tracks that promote youth entrepreneurship focused on promoting local cultural heritage. The aims of the present study are: (1) to examine the association between personality traits and the entrepreneurial intention (and its determinants) toward the promotion of local cultural heritage; (2) to examine the impact of personality traits on the entrepreneurial intention toward the promotion of local cultural heritage through the determinants of such entrepreneurial intention (see Figure 1 for the conceptual model). We are not aware of previous studies that have pursued such aims, thus our study is exploratory.

Figure 1: Conceptual model
3. Method

3.1 Participants
Participants were 381 students (57% were females; mean age=18, SD=1.9) attending the last two years of four high schools from the Lepini Mountains (Lepini Mountains 2014), an area in the center of Italy that aims to develop an integrated tourism system, promoting initiatives of general interest to create the necessary conditions to enhance and safeguard tangible and intangible local cultural heritage (UNESCO 2003). Thirty percent of the participants reported previous work experience. Participants declared that their fathers’ average age was 51 years old (SD=4.9) and that their mothers’ average age was 47 years old (SD=4.3). Eighty-nine percent of participants reported that their parents were married, 4.4% that were separated, 3.1% divorced, 0.8% cohabitants and 2.5% reported that one of their parents had died. Participants reported that 46.4% of their fathers were non-skilled workers, 31.2% were skilled workers, 11.2% were in professionals, 7.3% were local merchants, 1.2% were service staff, 2.4% were unemployed and 0.3% were retired. In addition, 59.9% of participants reported that their mothers were non-skilled workers, 29.2% were skilled workers, 3% were in professionals, 0.6% were local merchants and 4.8% were unemployed. Furthermore, parental work has been coded in order to determine the rate of those parents who were involved in a type of work and if that somehow related to the promotion of cultural heritage. It emerged that only 14.2% of fathers and 1.8% of mothers were involved in a type of work somehow related to the promotion of cultural heritage.

For the parental level of education, 27% of fathers had finished junior high school, 52% completed high school, 16% completed a bachelor’s degree and 4% completed a master’s or a Ph.D program. In addition, 24% of mothers finished junior high school, 55% completed high school, 13% completed a bachelor’s degree and 4% completed a master’s or a Ph.D program. Ninety-six percent of participants reported living with their parents.

3.2 Procedure
Participants were selected among those students attending the last two years of high schools in the mountain regional area called the Lepini Mountains (2014). We focused on this sample because they might choose (or have already chosen) to promote local cultural heritage in the Lepini Mountains and, in particular, to engage in an entrepreneurial activity to promote cultural heritage.

Participants were administered the measures by one female researcher and one male researcher during specially scheduled sessions in four high schools. Participants did not receive any payment for their participation in the research. During the entire research project, consents/assents were obtained, experimenters offered explanations as needed and confidentiality was guaranteed for all participants. The entire study was approved by Sapienza University of Rome’s Human Subjects Institutional Review Board.

3.3 Measures

3.3.1 Personality traits
We measured the trait component of personality with a short version of the Big Five Questionnaire (BFQ) (Caprara, Barbaranelli, Borgogni and Perugini 1993; Caprara, Barbaranelli and Borgogni 1994). The short form of the BFQ used here contains 60 items that form five domain scales and 10 “facet” scales, with six items on each scale. Respondents indicate agreement with the extent to which each item describes them on a five-point scale ranging from complete disagreement (1 = very false for me) to complete agreement (5 = very true for me). The original extended form of the BFQ (132 items) was validated on large samples of Italian respondents (Barbaranelli and Caprara 2002; Caprara et al. 1993, 1994) and in cross-cultural comparisons (Caprara, Barbaranelli, Bermudez, Maslach and Ruch 2000). Cronbach alpha reliability coefficients of the five domain scales were .71 for energy, .73 for agreeableness, .83 for emotional stability, .81 for conscientiousness and .81 for openness.

3.3.2 Entrepreneurial intentions (and its determinant) toward the promotion of local cultural heritage
The attitude toward becoming an entrepreneur that promote the local cultural heritage was assessed with three seven-point semantic differential scales (unpleasant/pleasant, bad/good, unfavorable/favorable; Cronbach alpha reliability coefficient =.81).
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Subjective norms were measured with two items “Most people who are important to me think I definitely should/definitely should not become an entrepreneur that promotes local cultural heritage” and “Most people who are important to me probably consider my intention to become an entrepreneur that promote local cultural heritage to be wise/foolish.” Both items were rated on seven-point scales (1=absolutely no, 7=absolutely yes; Cronbach alpha reliability coefficient =.80).

Perceived behavioral control was measured with one item (1=strongly disagree, 5=strongly agree): “It would be very feasible for me to start my own business.”

The three aforementioned determinants were computed by averaging the corresponding items.

Intentions were assessed with one item in which participants expressed their intentions and plan to become an entrepreneur that promotes local cultural heritage (1=unlikely, 7=likely).

3.4 Analytical approach

First, correlations were computed among all constructs examined in the present study. Correlations were interpreted following Cohen (1988) where \( r = .10 \) is interpreted as a small effect, \( r = .25 \) as a medium effect and \( r = .40 \) as a large effect.

We used the path analysis framework using Mplus 5.1 (Muthén and Muthén 2006) to explore the hypothesized relations among the variables. Given that obtaining a non-significant \( \chi^2 \) becomes increasingly unlikely with large sample sizes (Kline 1998), the following criteria were employed to evaluate the goodness of fit: We accepted Comparative Fit Index (CFI) values greater than .95 (Hu and Bentler 1999) and Root-Mean-Square Error of Approximation (RMSEA) values lower than .07 (Brown and Cudeck 1993). Full-information maximum likelihood (FIML) estimation in Mplus 5.1 was used to handle missing data in our analyses (Muthén and Shedden 1999). This method uses unbiased estimates under ignorable missing data pattern like missing completely at random (MCAR) or missing at random (MAR). Mediated effects were calculated using the procedures outlined by MacKinnon, Lockwood, Hoffman, West and Sheets (2002).

4. Results

Descriptive statistics (range, means, standard deviations, asymmetry and kurtosis) and Pearson’s correlations across all the constructs examined in the present study are reported in Tables 1 and 2, respectively.

Table 1: Descriptive statistics of the constructs examined in the present study

<table>
<thead>
<tr>
<th>Personality traits</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
<th>Asymmetry</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>1.67</td>
<td>4.92</td>
<td>3.08</td>
<td>0.54</td>
<td>0.21</td>
<td>0.51</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>1.09</td>
<td>4.91</td>
<td>3.17</td>
<td>0.66</td>
<td>0.02</td>
<td>0.07</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>1.17</td>
<td>5.00</td>
<td>2.91</td>
<td>0.67</td>
<td>0.05</td>
<td>0.04</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>1.25</td>
<td>4.75</td>
<td>3.09</td>
<td>0.53</td>
<td>0.12</td>
<td>0.81</td>
</tr>
<tr>
<td>Openness</td>
<td>1.33</td>
<td>4.83</td>
<td>3.12</td>
<td>0.66</td>
<td>-0.26</td>
<td>-0.05</td>
</tr>
</tbody>
</table>

Determinants of entrepreneurial intention toward the promotion of cultural heritage

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>SD</th>
<th>Asymmetry</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective norm</td>
<td>1.00</td>
<td>7.00</td>
<td>4.70</td>
<td>1.36</td>
<td>-0.13</td>
<td>-0.35</td>
</tr>
<tr>
<td>Perceived behavioural control</td>
<td>1.00</td>
<td>5.00</td>
<td>2.91</td>
<td>1.16</td>
<td>-0.05</td>
<td>-0.72</td>
</tr>
<tr>
<td>Entrepreneurial intention</td>
<td>1.00</td>
<td>7.00</td>
<td>2.36</td>
<td>1.41</td>
<td>1.12</td>
<td>0.86</td>
</tr>
</tbody>
</table>

As reported in Table 1, all the examined variables were normally distributed.

Table 2: Pearson’s correlations between the constructs examined in the present study

<table>
<thead>
<tr>
<th>Energy (1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conscientiousness (2)</td>
<td>263</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Stability (3)</td>
<td>253</td>
<td>302</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreeableness (4)</td>
<td>309</td>
<td>378</td>
<td>293</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Openness (5)</td>
<td>517</td>
<td>473</td>
<td>363</td>
<td>472</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude [6]</td>
<td>0.02</td>
<td>0.075</td>
<td>0.035</td>
<td>0.073</td>
<td>0.069</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective norm [7]</td>
<td>0.066</td>
<td>0.125</td>
<td>0.061</td>
<td>0.039</td>
<td>0.030</td>
<td>0.402</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Perceived behavioral control [8]</td>
<td>0.008</td>
<td>0.132</td>
<td>0.014</td>
<td>0.045</td>
<td>0.024</td>
<td>0.057</td>
<td>0.248</td>
<td>1</td>
</tr>
<tr>
<td>Intention</td>
<td>0.066</td>
<td>0.047</td>
<td>0.102</td>
<td>0.039</td>
<td>0.057</td>
<td>0.263</td>
<td>0.308</td>
<td>0.225</td>
</tr>
</tbody>
</table>

Note. * These variables refer to the entrepreneurial intention toward the promotion of cultural heritage.

In addition, as reported in Table 2, it emerged that the five personality traits were positively associated among each other. Attitudes, subjective norms and perceived behavioral control were all moderately (Cohen, 1988) and positively related with entrepreneurial intention toward the promotion of cultural heritage (Table 2).

### 4.1 Path analysis

The posited model fitted the data well: \( \chi^2 (5) = 5.216, p = .39, \) CFI = 1.00, RMSEA = .01 (0.00 – 0.08), p=.78, SRMR = .01. Conscientiousness was significantly and positively related to subjective norms and perceived behavioral control. In addition, attitude, subjective norm and perceived behavioral control were significantly and positively related to entrepreneurial intention toward the promotion of cultural heritage. Such paths emerged controlling for the inter-relations among personality traits, on the one side and the determinants of entrepreneurial intention toward the promotion of cultural heritage, on the other side.

Moreover, two significant indirect effects of personality traits on entrepreneurial intention toward the promotion of cultural heritage emerged. In particular, it emerged that subjective norms mediated the impact of conscientiousness on entrepreneurial intention; such indirect effect was .07 (\( p < .05 \)) (95% confidence interval: .01–.07). Furthermore, a significant indirect effect of conscientiousness on entrepreneurial intention through perceived behavioral control also emerged, the indirect effect was .07 (\( p < .05 \)) (95% confidence interval: .01–.06).

The posited model accounted for 14% of the variance of the examined intention.

The standardized coefficients are reported. \( p < .01^{**}, p < .05^{*} \). The inter-relations between personality traits were all positive and significant and were omitted for sake of simplicity.

### 5. Discussions

The present study examined the relationships between personality traits, entrepreneurial intention toward the promotion of cultural heritage and its determinants (namely, attitude, subjective norm and perceived
behavioural control, Ajzen 1991). In agreement with Preutt et al. (2009), attitudes, subjective norms and perceived behavioral control were all moderately (Cohen 1988) and positively related with entrepreneurial intention toward the promotion of cultural heritage. In agreement with Zhao and Seibert (2006), conscientiousness (i.e., that assesses dependability, orderliness, precision and the fulfilling of commitments) emerged as the most important trait involved in the explanation of entrepreneurial intention toward the promotion of cultural heritage. In particular, indirect effect (MacKinnon et al. 2002) emerged for conscientiousness on entrepreneurial intention toward the promotion of cultural heritage, through both subjective norm and perceived behavioral control. There are some limitations in the present study. First, basic traits, attitude, subjective norm, perceived behavioral control and intention were assessed concurrently, more rigorous longitudinal designs are needed to establish the validity of the relationships between basic traits and entrepreneurial intention toward the promotion of cultural heritage. Second, it is important to note that the use of self-reports in the assessment of the examined indicators may have introduced response biases (such as social desirability) and inflated the pattern of correlations. Third, caution should be used in generalizing results from the present study to other populations because participants in this study were Italians, predominantly middle-class, educated and from two-parent families.

Future research should further clarify how personality traits and entrepreneurial intention toward the promotion of cultural heritage predispose individuals to develop new enterprises aimed to the promotion of cultural heritage.

Finally, in the present study we did not focus on innovative entrepreneurship but on youth entrepreneurial intentions in promoting cultural heritage. This type of business might be considered as an innovative way of being an entrepreneur considering, for example, the recent European Union (EU)'s statement about the need to develop a cultural heritage strategy with a stronger coordination of policy and action between stakeholders and business sector (Europa Nostra 2009). In support of such an effort, a European Union Prize for Cultural Heritage / Europa Nostra Awards has been established; it is Europe's most prestigious prize in the heritage field. Every year, it honors the most outstanding heritage achievements from all over Europe. It recognizes the excellence and dedication by architects, craftsmen, cultural heritage experts, volunteers, schools, local communities, heritage owners and the media. Such achievements are honoured in four areas: conservation; research; dedicated service; education, training and awareness-raising (Europa Nostra 2014). Thus, youths who intend to pursue this career path might consider it as an internationally valuable and innovative business choice.

6. In conclusion

The main contribution of the present study is that individual characteristics such as responsibility, the ability to plan, organize and persist in the service of achievement (i.e., conscientiousness) influence both the perceived social pressure to start an enterprise that promotes cultural heritage (i.e., subjective norm), as well as the perceived ease or difficulty of starting such enterprise (i.e., perceived behavioral control).

In addition, considering the well-known association between high achiever orientation and being predisposed to seeking out an entrepreneurial position (e.g., McClelland 1965; Judge and Ilies 2002; Komarrajua, Karaub and Schmeck 2009; Richardson and Abraham 2009), it might also be worth having future studies to explore the possible meditational effect of conscientiousness trait on entrepreneurial intention (and action) through achievement motivational orientation. In other words, conscientious individuals (who are likely to be orderly and decisive), might have a strong need to achieve, might want to solve problems themselves, set targets and strive for these targets through their own efforts (high in achievement orientation) and more strongly find their way to entrepreneurship and succeed better than others as entrepreneurs (Littunen 2000).

Moreover, both subjective norms and perceived behavioral control influence youth entrepreneurial intention toward the promotion of cultural heritage. Local governments and educators should be aware of their young citizens/students’ personality antecedents in order to better attune their efforts to improve their young citizens/students’ entrepreneurial intention toward the promotion of cultural heritage.

Acknowledgements

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References


Differentiating "Real" Entrepreneurs From “Entrepreneurs Inside”

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Abstract: The two authors have developed and tested the MEL-Index, an assessment tool that measures both individual executive and collective organizational capabilities within a commercial setting. The MEL-Index is predicated on the premise that there are three main archetypes of executives: the manager, the entrepreneur and the leader. In recent studies (e.g., Dover& Dierk, 2010) we have examined the impact and influence of these archetypes on innovation and sustainability within established corporations. This current paper presents research that was conducted with seven "real" German entrepreneurs, owners who remain active in running their own company. All of these companies would fit into the SME (revenues of – in some cases, considerably – less than €150m) classification and operate in industries as diverse as IT and laundry services. The principle question driving this research was “Is there a difference in capabilities and characteristics of “real” entrepreneurs compared to those personnel tasked with entrepreneurial functions in the larger, often public corporations?” The a priori assumption was that differences found across these organizational types would mainly be in the entrepreneur archetype. We interviewed this small group of entrepreneurs in an in-depth, one-hour face-to-face session. The findings were both interesting and – at first blush – surprising. First, we found very different motivations as to why these subjects became entrepreneurs. No one claimed as their driving goal to have an idea they wished to pursue with persistence, creativity and passion. That is – to use the present entrepreneurial vernacular – they were not “opportunity obsessed.” Some had become an entrepreneur to demonstrate to family, friends, business associates, etc. that they were capable of being successful even though others may not believe this possible. A linked but rather more positive motivation was “what this entrepreneur can do, I can do better.” Both approaches stemmed from a strong case of self-belief in their entrepreneurial talents, one stimulated reactively by doubt from associates, the other coming more from a proactive sense of challenge. A second key finding was that each entrepreneur felt a very strong personal responsibility for their employees and was willing to sacrifice parts of the company profit for their well-being and long-term employment. A third finding relating to the MEL-Index measures was that these entrepreneurs were very balanced in the strength of their entrepreneur and leader capabilities. That is, they tended to have plenty of both! Previous work suggests a major difference with the profiles of executives in larger corporations where a balance of competencies between leaders and entrepreneurs is far less frequent. This is partially explained by the ability in a corporate setting to compensate for weaknesses in one of the archetypes (e.g., a strong leader with limited entrepreneurial abilities) by selecting other personnel who have the strength that is missing. Our tentative conclusion from this small sample of German entrepreneurs is that the need to balance entrepreneur strength and leader strength within the company founder is a prerequisite for a successful and sustainable company.

Keywords: managers, leaders, entrepreneurs, innovation, ambidexterity, archetypes

1. Introduction: The differences between "real" entrepreneurs and corporate executives

The continued sustainability of companies depends on effective management of the present combined with imaginative ideas for the future. On the one hand, firms need to optimize processes, organizational structure, staffing procedures and the like, to be faster, more cost efficient and responsive to current markets. Such focus allows success in the present and near future. But this does not at all ensure continuity in the longer run. In order to achieve this, companies must also regularly assess their vision, encourage innovation, be willing to adjust or change strategies, products and markets and more. In order then to sustain both short and long term futures companies must work simultaneously on doing the same things better while stimulating and responding to change (doing things differently). A term increasingly used for these phenomena is the ambidextrous organization (O’Reilly and Tushman, 2004). It may well be that the emphasis shifts from current optimization to future change management and backwards like a pendulum, depending on such factors as the situation at the individual company, market forces, and the socio-economic environment.

Many organizations struggle to attain this delicate balance with the result that otherwise adept companies often fail in rapidly changing markets. Following many years of observing and working with both SME’s and large international corporations, the authors became fascinated by the concept of the ambidextrous organization and by the formal and informal roles played by various personnel in longitudinally guiding the firm. The decision to create the MEL Institute started with the a priori view that strategic and operational success depends, in large part, on the combination of skills evident in the leadership team of a firm. In
particular, we became interested in the integrative impact of three types of personnel — managers, entrepreneurs and leaders (MEL) – in the sustainable fortunes of the organization.

This basic conceptual building block for our research – that three major decision making archetypes exist – receives some support from the business literature (e.g., Kotter, 2001; Thornberry, 2006). Initial evaluation of this secondary research suggests that managers, entrepreneurs and leaders bring different skills and capabilities to their company roles. We have tentatively summarized them as focusing on current complexity (Manager), focusing on change (Leader), and focusing on opportunities (Entrepreneur). Figure 1 summarizes the archetypes and suggests that they exhibit areas of interaction. The extent of this interaction is explored by the MEL methodology.

Figure 1: Three archetypes: Managers, entrepreneurs and leaders

While the management literature is quite well represented by work on the similarities and differences between leaders and managers (e.g., Zaleznik, 1992) – and has started to address, if somewhat less completely, the associated role of corporate entrepreneurs (e.g., Ireland et al., 2006) – it is largely silent on the combination of skills required of executives to guide the short and long term development of the organization. This led us to muse on a number of intriguing questions:

- what is the weighting of these managerial, entrepreneurial and leadership practices that result in optimal short and long term corporate performance? How are these weights impacted by contextual variables such as industry maturity, technological intensity and cultural norms?
- if different kind of capabilities are required to simultaneously work on both short and long term initiatives, how can they be balanced to ensure smooth operations and minimize conflict? How does attaining (or failing to attain) this skill balance impact the innovation profile of the organization?

These broad questions were then translated into the following specific applied research program:

- To develop and validate a measurement instrument (the MEL-Index) that will allow an organization to assess the managerial, entrepreneurial and leadership capabilities of its key personnel as well as for the company as a whole.
- To correlate MEL-Index profiles with company performance metrics (profitability, market share, customer loyalty, etc.) and perceived level of innovation activity.
- To offer prescriptive guidance to corporations on achieving an appropriate balance between managerial, entrepreneurial and leadership capabilities.

Over the past few years, considerable work has been carried out to better understand the perceptions of European and American executives on the role and required skills of the manager, entrepreneur and leader. During this time much work has been undertaken on how these archetypes can best be measured and interpreted, both individually and organizationally.
2. Building a conceptual framework

How can the collective activities of managers, entrepreneurs and leaders best sustain innovation within corporations? To help classify innovation, we adopted a typology of commercial development projects devised by Wheelwright and Clark (1992). Each of their three project types requires a unique combination of development resources and management styles.

*Derivative projects* (often referred to as *incremental innovation*) range from cost-reduced versions of existing products to add-ons or enhancements for an existing production process. In both cases, minimal changes are required in ongoing management procedures. *Breakthrough projects* (or *radical innovation*) are at the other end of the development spectrum because they involve significant changes to existing products and processes. Here executives need to give development teams considerable latitude in designing new processes, rather than forcing them to work with existing plant and equipment, operating techniques, or supplier networks. *Platform projects* are in the middle of the development spectrum and entail more product and/or process changes than derivatives, but don’t introduce the untried new technologies or materials that breakthrough products do. Because of the extent of changes involved, successful platforms require considerable upfront planning and the involvement of not only engineering but the interaction of marketing, manufacturing, senior management and others.

Platforms, in particular, offer considerable competitive leverage and the potential to increase market penetration, yet many companies systematically under-invest in them. The reasons vary, but we believe that managers over-emphasize the importance of derivatives as they strive to optimize the efficiency of current practices. Although the desired mix of projects will vary by industry type and market condition, an allocation of development resources of around 50% to new platform growth is advocated (Laurie et al., 2006) This is not the current allocation in most organizations where most investment is regularly earmarked for derivative improvements.

It is helpful to diagrammatically show our thinking so far. If we represent “innovation type” and “time” on the axes, we can picture the differential roles of managers, leaders and entrepreneurs in pursuing innovation strategies over varying time horizons. It is thought that leaders play more of a catalyst role in the identification of platform and breakthrough projects, facilitating the climate for the entrepreneur to flourish as an activist.

![Figure 2: Archetype roles in innovation](image)

An additional dimension in the operation of the *ambidextrous organization* is that of *perceived risk*. Managers, driven by short term objectives and clear metrics, tend to be risk averse. Entrepreneurs, in their obsessive search for opportunities, strongly reflect risk takers. Leaders, it would seem, need to take a middle course.
They must show, through vision and future orientation, a propensity for risk. At the same time, they must carefully search for a balanced portfolio of innovation opportunities. This requires substantial due diligence with the aim of risk minimization. These traits can be represented as follows:

<table>
<thead>
<tr>
<th>Improve Efficiency</th>
<th>Engender/Facilitate Change</th>
<th>Create Opportunities; Activate Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managers</td>
<td>Leaders</td>
<td>Entrepreneurs</td>
</tr>
<tr>
<td>Risk Averse</td>
<td>Risk Taker + Risk Minimizer</td>
<td>Risk Taker</td>
</tr>
</tbody>
</table>

Figure 3: Archetype risk perspective

The significance of these variables is impacted by the moderating influence of business conditions (or “zeitgeist”) facing a decision maker at any point in time. It appears that context matters. Mayo and Nohria (2005) noted that “entrepreneurs were uniquely skilled at sensing emerging opportunities or the potential of nascent technologies and through perseverance and determination build successful new enterprises.” Adding to these macro-factors, we are particularly interested in measuring such considerations as the impact of corporate (e.g., privately vs. publicly owned) status, national (e.g., European vs. US) cultures and stage of the industry life cycle, as contextual variables that can influence the focus of innovation activity. Indeed, in this present study we will compare the role of the MEL archetypes on the activities of “real” entrepreneurs (people who start and run their own companies) versus those of corporate entrepreneurs (personnel embedded in larger organizations).

3. Measuring MEL

All research to date has been conducted with a) senior management, including Board members, and b) “high potential” personnel who are seen as the “future of the company.” These are thought to be essential players in the *ambidextrous organization*. Out of this emerged a measurement instrument (the MEL-Index) that allows an organization to assess the managerial, leadership and entrepreneurial capabilities of its key personnel. We have used a triangle (see Figure 4) to visually represent executive perceptions of individual and organizational competencies on the three archetypes. Respondents are asked “Please take a look at the triangle. We would like you to rank yourself/company on the manager, entrepreneur and leader dimensions. On each of the dimensions allocate yourself/your company a score between 0 and 10, with 0 equaling no capabilities and 10 indicating truly outstanding skills.” In addition, we collect considerable open-ended information from the participants. This includes a description of their current job, perceptions of the generic roles and responsibilities of managers, entrepreneurs and leaders as well as verbatim comments on their own and their company’s capabilities on these archetypes.

![MEL Triangle](image)

**Figure 4: The MEL - triangle**

Because the research remains exploratory in nature we employ both a case study methodology and a convenience based approach to sample selection. We find that all participants are highly involved in the study, are very willing to openly discuss the issues, and are keen to be informed of results on completion of any project. Indeed, we have trouble at times closing the interview, so intrigued are participants in analyzing their own and their companies MEL capabilities!
4. "Real" entrepreneurs

Our research to-date has revolved around corporate executives within companies mainly located in Germany and the US (e.g., a midcap German SME with about €100m in revenue and 400 employees or a larger US company with €1,6b in income and 12,000 employees). Drawing some broad conclusions from the dozen or so companies we have examined in depth, we found that overall just a small percentage (roughly 5%) of the assessed corporate executives (our samples so far have comprised almost exclusively very senior executives – C-suite or just below) claim to possess strong entrepreneurial capabilities. Rather more from these samples, although still not a majority, perceived themselves as strong leaders, who – according to our conceptual model – act as facilitators for corporate entrepreneurs. A key question that has resonated throughout our research is “how can these companies sustain innovation or maintain an entrepreneurial mindset, especially if they are short on both entrepreneurial and leadership skills?” However, the research results do contain some individual differences. There is evidence that the smaller, and often family-owned, companies (for example, the German "Mittelstand") can be very entrepreneurial. This raised an interesting question for us: Are "real" entrepreneurs different from senior corporate executives in terms of archetype capabilities and, if so, what were the implications for the running and performance of their respective companies? We define a "real" entrepreneur as someone who runs and owns his/her company. They may have founded this company or may have taken it over from a previous owner or from a family member. Overall, he or she makes all major decisions and is financially liable for the company.

5. Sample of "real" entrepreneurs

So far we have conducted in-depth interviews with 7 German entrepreneurs who are known personally to one of the authors. They operate in a wide range of industries that include machine building, laundry service, internet activities, food products and agriculture. Their size varies in revenue from €2.2m to €137m and from 20 to 700 employees. Four of them operate regionally/domestically, while the other three do business globally.

We conducted a one hour face-to-face interview with each of these entrepreneurs and asked them to evaluate themselves and their company according to our three archetype model – as managers, leaders and entrepreneurs. In addition to this – immediately following the above interview – we asked them to fill in a 36-question-based inventory on their archetype traits which allowed us to create a second MEL-index for each respondent. We are currently in the process of replicating this interview process with "real" entrepreneurs in the US in order to examine such issues as the cultural and economic phenomena that drive the entrepreneurial process. We hope to publish these comparative findings in the near future.

6. MEL findings from the “real” entrepreneurs

All of the interviewed entrepreneurs found our three-archetype-model used as the building block for the MEL-Index both very intuitive and easy to understand. One of them even indicated after the interview that (after ten years in business) he much better understands now what he and his company needs to do in order to achieve sustainable growth. All but one of the respondents (the gentleman above!) indicated in their self-evaluation that they perceived themselves as strong entrepreneurs.

![Figure 5: Self-evaluation of entrepreneurs](image_url)
The average self-rating on the Entrepreneur dimension was 8.6, a particularly strong evaluation\(^1\). This finding certainly has some *a priori* support as each respondent ran and owned their own company and qualified for our definition of a “real” entrepreneur. But if you compare these MEL results with earlier work (Dover & Dierk, 2010) on a sample of executive board members from a midcap company in the automotive supplier industry, substantial differences are evident. Here the average Entrepreneur ratings are at 4.8, well below those for the “real” entrepreneurs.

![Figure 6: Self-evaluation of members of executive board](image)

Most of these executives saw themselves as strong managers (average score: 7.4), some of them as strong leaders (7.1), but none of them as a strong entrepreneur. Although this represents just one sample company, we found similar –if not quite so acute -- patterns of findings in nearly all of the other medium to large companies in which we undertook the MEL process and calculated a MEL-Index.

A very interesting set of results emerge for the "real" entrepreneurs from the inventory of 36 questions that followed the face-to-face interview. Although scores for the Entrepreneur rating were below those for the self-evaluation (6.7 vs. 8.6\(^2\)), all of the respondents were assessed as strong leaders (average score = 8.1).

![Figure 7: Questionnaire evaluation of entrepreneurs](image)

These results suggest that “real” entrepreneurs have not only strong entrepreneurial characteristics but also often have strong leadership skills. This finding has considerable intuitive merit as the successful entrepreneur needs to excite people with their original idea and their associated vision for the future. This requires a sound feel for market dynamics, continuous assessment of potential customer needs as well as the ability to stimulate and reassure employees and other stakeholders.

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\(^1\) Although we use the term “strong manager/entrepreneur/leader,” we do not – as yet – have a scientific way of determining strength. As our goal is to build a world-wide data base across industries and cultures, we are hopeful that confidence in measuring concepts such as “strong” will grow with experience.

\(^2\) In devising our inventory we had access to considerable literature on the traits that make strong leaders and prior inventories that have been developed to measure leadership. We did not have the same experiential guidance for building the entrepreneur inventory. In short, we have considerable confidence in the veracity of the leadership scores but rather less in those for entrepreneurs. One of the items at the top of our to-do list is to build and test a variety of improved entrepreneur inventories.
Six of the seven entrepreneurs evaluated themselves as a weaker manager than entrepreneur or leader. This is very much in line with our emerging MEL-model, in which we have found it very rare that a strong entrepreneur also possesses the skills of a strong manager. This fits well with the concept of the ambidextrous organization where managers work hard to efficiently optimize current performance while entrepreneurs are the agents of change, consistently searching for new and better opportunities. Indeed, this presents the all-too-prevalent setting for internecine conflict, where the often contradictory goals of exploitation (e.g., further penetrating existing markets) and exploration (e.g., opening up new markets, experimenting with new technologies) butt heads.

A further interesting finding is that 5 out of 7 of our entrepreneurs see their company as a whole just as entrepreneurial as themselves but much more managerial oriented. It would seem that these entrepreneurs surround themselves with employees that have effective manager skills to balance their own entrepreneurial proclivities.

![Figure 8: Comparison of company evaluation and self evaluation](image)

### 7. MEL index and innovation

In each of the entrepreneurs’ companies, continuous innovation was seen as the main driver for long term success. But – as we noted earlier – not all innovation is the same, ranging across incremental (small changes to existing products and processes), platform (significant improvements in existing technologies or processes) and radical (often involving new-to-the-world technologies and processes) changes. A strong leader is required to move the company beyond incremental work, facilitating entrepreneurs and their technical support staff to invest risk capital in the search for platform and radical innovations. As Figure 5 above shows, the “real” entrepreneur – to be successful – must assume both of these tasks. If we compare this observation with the automotive supplier company mentioned previously and explore the peer and subordinate evaluations of the executive board members, we can see a dramatic difference in the archetype ratings.

![Figure 9: Peer and subordinate evaluation of executive board](image)

None of the executive board members were seen by their peers or by their subordinates (direct report middle managers) as strong entrepreneurs. The group evaluated included the CEO and his CTO, the head of product development. The latter, along with most of his colleagues, turned out to be a strong manager, a trait unlikely to be a significant driver of innovation. Loss of market share and steady slippage in technology currency raised a critical question: Who in this company was the catalyst or at least facilitator for innovation? Sadly a damaging lack of innovative new products and services continued, economic prospects darkened and, in order to survive, they had to sell off parts of the company to concerns outside of Germany. The CEO and the CTO, both family members, were asked to leave the company and were replaced by “outsiders.”

In conclusion, the maintenance of a healthy company with a long term growth and profit perspective requires people within the company that will either facilitate or act as entrepreneurs. In the case of the 7 German
entrepreneurs used in this study, it was the company founder that provided both leadership and entrepreneurial skills. In larger companies, the duties of leader and entrepreneur are often split, but the end goal remains the same -- the search for continuous innovation. The MEL-Index provides a powerful tool to determine the balance of capabilities held in any company so that adjustments in process and structure can be made to reach well-articulated strategic objectives.

8. Additional observations

Much of the literature (e.g., Smilor et al, 1996) around the intrinsic motivation of entrepreneurs centres on the “passionate search for new opportunities” (McGrath and MacMillan, 2000). In order to achieve their goals to start or run a company an entrepreneur needs individualism, persistence, passion, self esteem and much more. In our interviews with the 7 entrepreneurs we found evidence of all of the above traits although – somewhat surprisingly – the driving force of “first-to-market innovation” was much more nuanced. For example, one of our sample of entrepreneurs is now well established in the Internet Business. However, when he started his company in 1996 he wanted to do “something with math and computers” without having a precise idea about the future of the internet and possible products or services at that time. His enthusiasm, his desire for independence, his flexibility, his fortune at being at the outset of a technology revolution plus a lot of hard work has ensured the evolution of a small yet prosperous niche enterprise.

Another entrepreneur, an engineer by education and passion, worked for years as a senior executive in a midsize family run company where he was the head of a business unit in the agriculture machine industry. He left the company to start his own business by acquiring an existing company that produces power generators for sailing boats, trains and military applications. In this case, the traditional “better mousetrap” model of entrepreneurship was followed. He invested into this new company because he wanted to drive an enterprise based on superior technical products that met his demands for engineering excellence and had concomitant potential for growth. He took over in 2004 with income of €11m and has grown his company to €24m and 110 employees. Besides his professional motivation for a technically outstanding company he wanted the personal satisfaction of working "without a suit and a tie" and being "... at the top and not in a sandwich position".

The other 5 entrepreneurs took over their businesses from their families, either their father or brothers. One of them runs a very successful laundry service company, serving restaurants, hospitals, hotels and private individuals as customers. Currently it is the largest competitive company within the geographic region in which he does business. The company has existed for 55 years and he was groomed by his parents to take over when the appropriate time came. However, at the age of 10 he was told by one of his teachers that he would never make much in life. This slight remained an abiding motivation to "....show his teacher and all the others that I can succeed". This turned out to be a major driver when he took over from his father in 1978. The other main stimulus for success turned out to be the bad reputation of the laundry service at the time of his succession to CEO. By introducing new and imaginative products and services into the business, along with substantial process improvements, he was able to run the business successfully, vastly improve its image as a community participant and provide an attractive local growth engine. He now feels able to consider himself on the same level as his fellow-entrepreneurs in the more “attractive” areas such as industrial machinery, internet services and food products. In this case, the entrepreneurial tendencies came from two serendipitous external events rather than from an initial burning desire to change the world through innovation.

In generalizing our findings from the interviews we can conclude that all of these entrepreneurs share a desire for freedom and independence. They were also very passionate about their company and its business and felt a strong responsibility for their employees. All of them were willing to sacrifice parts of their profit for the well being and long term employment of their staff and workers. All of them run healthy companies and most of them are financially independent from banks (another function of their desire for independence). All of them are prepared to take risks and are constantly looking to be innovative with their products, services or processes. But none of them started or grew their business based on a “single great idea” – this may, in part, be because many of the respondents were continuing on-going businesses. It may also be partially explained by the study being conducted in Germany where entrepreneurship is often pursued for “life style” (a desire to exit the corporate rat race and follow a long-held personal initiative) rather than “growth” (a much more US phenomena – build quickly and divest!) perspectives.
9. Summary and outlook

This research was conducted with German entrepreneurs who ran small companies in various industries. The sample size is very small (7) so great caution must be taken in interpreting the findings. However, the research has the substantial benefit of collecting very “deep” data on respondents and using a tried and tested tool in the form of the MEL-Index. It materialized that the companies were headed by “real” entrepreneurs who not only founded or took over their firms but also exhibited strong levels of entrepreneurial capability through the measure of the entrepreneur archetype. This strength in their entrepreneurial skills was accompanied by a similar strength in their leader capacity. The marrying of these two attributes led to innovative, forward-looking and socially concerned enterprises.

We will continue this research in 2014 by interviewing a similar sample of entrepreneurs in the US and possibly a number of other countries (UK, China, etc.). We will also continue to draw contrasts and similarities with entrepreneurs inside the larger corporation. This latter topic – often referred to as intrapreneurship or “entrepreneurship inside” – has re-emerged as a “hot” topic which can also lend itself to detailed insight from the MEL process (see references below).

References


“How to Solve the Jobs Dilemma: Attract and Retain More Entrepreneurs,” (April 14, 2014), Knowledge @ Wharton (http://knowledge.wharton.upenn.edu/article/solve-jobs-dilemma-attract-retain-entrepreneurs/)


Exploring Students Learning Outcome in a Business and Entrepreneurial Flavoured University

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Abstract: The purpose of this study is to examine the mushrooming universities in Malaysia with business and entrepreneurial flavours which are getting more attention from parents and students. These universities aim to reach out to students with the intention of establishing a business and entrepreneurial mind-set and to allow for educational transformation through an experiential education. It also enables a new view on the affect in entrepreneurial education as a landscape that has indirectly surfaces and enables an entrepreneurial mind-set among students in a desiring ontology. Within the field of experiential education research, there has been insufficient attention given to understanding learners and learning. This research is intended to provide an initial understanding of group socialization theory on whether the education system of these universities to cultivate creative entrepreneurial students through the use of business and entrepreneurial experiential pedagogy are operative or not. Field note, observations and in-depth interviews were conducted to explore students’ socialization behaviour. The paper concludes with a challenge to provide greater scrutiny in experiential education in cultivating desired behaviour.

Keywords: business, education, entrepreneur, experiential learning, group socialization, learning

1. Introduction

For more than 20 years, business educators have lamented that pedagogy in higher learning institutions are not abreast with the needs of the industry (Blaylock et al., 2009). Within the scope of higher learning pedagogy, the dearth of synergy between theory and practice has raised great outcry among educators and graduates. Instead of reengineering on the curriculum per say, Campbell, Heriot, and Finney (2006) insists on a more viable approach in transforming the current pedagogy to relate to the desired integrative nature of business and to expose students to real-world scenarios, and to have a more effective business education learning experience.

In line with the urge to a pedagogical transformation, the awakening call by the Malaysian government in the Tenth Malaysia Plan 2011 – 2015 to provide programmes to strengthen graduates competitiveness and resilience has reached the ears of many higher learning institutions in Malaysia. Coupled with the Budget 2014 announcement, the Malaysian government will allocate RM50 million¹ under the Graduate Entrepreneurship Fund to encourage graduates to venture into entrepreneurship upon graduation. This allocation is expected to reduce unemployment rate among graduates. The fund is managed by the SME Bank and it will provide soft loans of up to RM500,000 at four per cent interest rate.

Stemming from the government’s call to provide improved skills and entrepreneurial development, this study examines the mushrooming universities in Malaysia with business and entrepreneurial flavours which are getting more attention from parents and students. These universities aim to reach out to students with the intention of establishing a business and entrepreneurial mind-set and to allow for educational transformation through an experiential education. It also enables a new view on affect in entrepreneurial education as a landscape that has indirectly surfaces and enables an entrepreneurial mind-set among students in a desiring ontology. Within the field of experiential education research, there has been insufficient attention given to understanding learners and learning. Although many researches were conducted to further understand the effectiveness of appropriate teaching methods that could provide good positive learning outcome, little attention is directed to understand the impact of pedagogy, socialization and environment on transforming beliefs and cultivating mind-sets as according to the educational philosophy. With an increasingly competitive job market (Hopkins, Raymond, and Carlson, 2011) and the overly supply of graduates, this study focuses on how business educators can play a role to help students develop an entrepreneurial mind and skills. In other words, research on the meanings of pedagogy, socialization and environment to students, including the ways

¹ As of 17th April, US$1.00 = RM3.2428
in which these supports the students’ learning and learning outcome remains scarce. This study seeks to assess the feasibility of socialization that embraces a blend of curriculum, framing of actual world scenarios and activities and the creation of learning practices that enable and facilitate the exploration of becoming successful and knowledgeable entrepreneurs. To realize the argument, the authors draw upon conceptual notions of socialization and learning, practice and reflexivity as a method to develop entrepreneurial pedagogy.

This research is intended to provide an initial understanding of group socialization theory on whether education system of these universities to cultivate creative entrepreneurial students through the use of socialization and business and entrepreneur experiential pedagogy could be an initial stage to embrace more entrepreneurial mind-sets among students. In this study, socialization context involves only the socialization in the school and the experiential learning. Thus, the purpose of this study is to examine the plausibility of integrating theory and practice in higher learning pedagogy and to recognize the use of socialization and business environment pedagogy in nurturing entrepreneurs through group socialization and experiential learning.

2. Research context

Business flavoured universities in Malaysia involve teaching students the fundamentals, theories, applications and processes of business. It provides students with the ecosystem that constantly affects and is affected by competitors in which each business must be flexible and adaptable in order to survive. Undergraduate students are exposed to doing real work, interacting with business people, in a live and real-time situation. Drawing on experiences from undergraduates and graduates in a private university in Malaysia focusing highly on entrepreneurial and business education, we aim to find the role of socialization and experiential learning in realizing the call and to address challenges to produce entrepreneurs from higher learning institutions.

The main emphasis is on students’ socialization and exposure to real business environment and activities. Students are encouraged to run their own businesses on campus where facilities are provided by the universities. Students are required to do their own inventory keeping, stocking, ordering, business strategies etc. Students are also encouraged to run entrepreneurial clubs and activities with the aim of reaping profits and market shares. On top of that, the university also invites companies that require “consulting” services and these companies will provide students with real hands-on business scenarios. They will send representatives to the campus and brief students on their expansion and development plans and students are required to study the companies, products, strategies etc and to provide proper planning and strategies to the management teams. Students are required to present the plans to the top management people at the end of the semester to be assessed. Case studies and problem based learning are also taught in these universities.

3. Literature review

Weisner (2002) studies on the impact and influence of ecological theories and proposes that individuals’ development is shaped by adapting to the intersecting environments. Accordingly, the primary focal of intersecting environment will carry the most direct influence on individuals developmental competencies (Suizzo et al., 2008). Through socialization, the process of beliefs, goals, and behaviours are shaped to conform to those of their social group (Parke & Buriel, 1998) and thus, instilling the value of long-term educational achievement (Hill, 2001). It cultivates the desire or necessary attitudes, behaviours, and knowledge (Cable & Parsons, 2001). Socialization represents a broad constellation of forces that influence behaviour (Allen, 2006) that increases competencies (Raz and Fadlon, 2005). In other words, socialization is seen as facilitating flow of knowledge (Tsoukas, 2002). In general, successful socialization transforms an individual according to the embraced guiding philosophy (Feldman, 1976). Social relationships that students develop in university contexts are of pivotal importance to their learning (Chambers and Armour, 2012) and further enhanced through legitimate peripheral participation (Lave and Wenger, 1991). As a result, universities are challenged to deliver innovative approach to enrich entrepreneurial programmes and to equip students with appropriate skill sets and abilities to deal with uncertain business environments (Bumpus & Burton, 2008; Matlay, 2011).

There is great debate on the use of traditional pedagogical methods of learning to understand and adequately develop entrepreneurs through experiential learning (Higgins et al., 2013); are they sufficient to deal with the complexities of running and creating innovative business opportunities and to recognise or consider the actual circumstances that entrepreneurs have to deal with in the real world? According to Dehler (2009) and Li
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(2005), learning is not innate but developed through the process of socialization. There is an increased influential impact to professional socialization and learning (Tsoukas 2002; Boud and Middleton 2003). Capel et al. (2011) assert that all knowledge is socially constructed, be it formally and deliberately or informally and casually, and social structure in many situations are more powerful than formal context. This is because it develops a deeper understanding of information sharing with differential peer influences in the learning process (Miller and Morris, 2014). It is interesting to know that during the socialization process, learning and gradual adjustment begins to emerge and it later stabilizes (Bengtson, Zepeda and Parylo, 2013). A very important insinuation of socialization is that it allows students to understand the dynamics of the society while taking all stakeholders into consideration (Litzky et al., 2010).

4. Method

With the aim to understand socialization and the impact of the environment on achieving learning outcome, this study takes a qualitative inquiry approach to data gathering. To facilitate an in-depth understanding of study context, 12 participants were recruited. Participation was voluntary. Privacy concerns were assured through the use of assigned pseudonyms. The informants ranged in age from 19 to 22 years old. Table 1 provides the demographic background of informants.

Table 1: Background of respondents

<table>
<thead>
<tr>
<th>Respondent ID</th>
<th>Age</th>
<th>Area</th>
</tr>
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<tbody>
<tr>
<td>ID01</td>
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<td>ID02</td>
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5. Findings

The results of the data analysis produced 10 themes that were subsequently grouped into the following six stages of the hierarchy-of-effects model; awareness, knowledge, liking, preference, conviction and adoption. Hierarchy-of-effects models (Ladvige and Steiner 1961; Scholten 1996) intend to provide an explanation on how attitude impacts behaviour. Though the original model focused on the marketing communication model, this model has also been used to for other areas, for example, to gauge goodwill impact (Murray and Vogel, 1997) and information search (Gauzente, 2009). Figure 1 depicts the six stages informants go through to embark into entrepreneurship as their career path. All the informants experienced a sequential flow of these stages.

![Figure 1: Hierarchy-of-effect](image)

In this study, it should be made clear that the author does not deny the possibilities that there are students who defected. The informants interviewed in this study have shown positive inclinations towards socialization and entrepreneur career and has move steadily in the hierarchy-of-effect model path.
5.1 Awareness

*Information search.* Most informants are not aware of a business flavoured university and its aim, till they Googled online for universities and make comparisons. 40% of the informants were attracted to the learning philosophy of the university and hence, enrolled in the university.

> I do not know what I intend to do after I have completed my school examination. My parents asked me to make my own university choice, hence, I Googled all the local universities in Malaysia and I was attracted to this university’s learning philosophy. I read through few testimonies online. During that time, I did not know what entrepreneurs were all about (ID02).

Awareness. Individuals build awareness stage through socialization. Though individuals are aware of the education outcome, they do not know what entrepreneurs are all about, in such that entrepreneurs are just another type of career. Hence, their knowledge in entrepreneurs is very general and superficial.

> We spend most of our time with friends. Friends also can give great influence towards someone. Socialization among peers is needed to enhance skills and knowledge. Without conscious, some of our friends had taught us to be an entrepreneur (ID05).

Group socialization is different from lectures which restrict the freedom of students. Group socialization allows students to be more active and give their own opinions. Good discussion can give students opportunities to formulate principles in their own ways and also suggests application of the principles. As a first year student, I tend to build my practice through the foundations that I learn in class (ID02).

5.2 Knowledge

*Exploration.* When informants socialize with their peers, the pressure about setting-up their own business arises. One of the reasons might also be the association to these students’ family background, where their parents are successful businessmen. These participants get to know their peers’ family and background, and the idea of becoming own boss tangles in their mind. At this stage, informants still have minimal knowledge about careers in entrepreneurship.

> I was awed by my friends’ living-style. They are able to purchase many things that I cannot even afford. When I get to know their family background, it came to my realization that their parents own a business, whereas, my parents are working for other people. I believe there are great differences between owning a business and working for people (ID11).

Socialization is tightly linked to enculturation, where people learn from their surroundings, the value system and behaviours, where this will shape one’s competitiveness, skills and knowledge (ID12).

Knowledge. Through the act of socialization, the impartation of knowledge were done and instilled. Socialization, university and teachers play important roles in this regard.

> The tertiary education differs from primary and secondary education by the learning environment in tertiary education, independent learning is central to education. The good environment of tertiary education produces a well-rounded student where students have a very independent study method, discipline, being respectful toward others including the environment and has leadership skills. How does the tertiary education develop an entrepreneur? The environment of the tertiary education provides highly competitive environment develop better thinking skills and create a creative way of presenting themselves to be able to compete with other. Tertiary education also provides a surrounding of where the students are able to become the entrepreneur (ID03).

5.3 Liking

*Liking.* Students started to like entrepreneurs thinking and challenges, but at this stage, they have yet to step out into the field and to be involved in business and entrepreneurial activities. Through socialization and learning activities, students started to build a better insight into the entrepreneurs’ challenges.

> Universities can inspire and motivate individuals by providing the right environments for student enterprise and graduate entrepreneurship to help them live their lives in aspirations. For
example, institutional capacity building is a strong imperative approach to develop a holistic education approach, reaching students in subjects and at all levels of learning and experience. Next, institutional reach activity is relevant and applicable to both students and academics, to research and teaching. The relationships universities have with the local and regional economy [companies/businesses/enterprises] are needed to enhance the experience of entrepreneurship in any subject discipline and place it at the centre of activities (ID11).

5.4 Preference

**Evaluation.** Many of the participants enrolled to the university into non-entrepreneurial degrees. Through socialization, university environment and activities, these participants are having second thought on the importance of entrepreneur education, and are evaluating the feasibility of embarking on an entrepreneur career.

> I registered as a Marketing student. Exposure through teaching and activities, such as presenting real case scenarios to actual companies makes me think further about my education and career. Coupled with my knowledge in marketing, I enjoy all the challenges when the top managers come and tell us about their plans, strategies and expansion programs. Through the “consultancy” projects, it excites me to think of all the market dynamics and strategies, I think I really enjoy and would see myself as an entrepreneurs when I graduate (ID06).

**Preference.** The benefits of entrepreneurs become more vivid at this stage. Students talked and discussed about the potentials and the different business ventures. At this stage, students are still partial and unstable about their choice to set-up their own business.

> Socialization and university environment also help students to always ready to accept any challenges and adapt with the critical situation in doing projects. A business case often is used to secure a level of commitment and funding for the project or task. When we carry out projects that relate to real business cases, we will have new experience that we can practice when we become entrepreneurs and train us to be good entrepreneurs towards the society and country (ID04).

5.5 Conviction

**Conviction.** Throughout the entire study program and socialization, individuals have increased their conviction in the area of entrepreneurship. They begin to get involved in activities, business-related functions and etc.

> In order to learn entrepreneurship, one must get involved in entrepreneurship. This means that one should require a set of practices and not only study about the theory. Of course this practice should be grounded by theory. The effectiveness of practical can be seen through Montessori Method. In this method, a particular child is given a toy and begins to play. This particular child can eventually develop a new way to play the toys. As we can see, teacher is only a guide who offers possibilities to students, instil interest in students, and also encourages students to reflect on what they had learned (ID09).

5.6 Adoption

**Immersion.** All participants are involved in setting up own campus business and they iterated that business has become part of their life, it is very challenging and inspiring, though their main customers are still university students.

> My mind-set is still fresh and young. Before I joined the university, I am still unsure what I plan to do... my direction in life is still blurred. This university has given me great opportunity to understand what entrepreneurial mind is, and I am deeply indebted to the university, for I know what I plan to do upon graduation (ID12).

**Adoption.** Few participants have already registered or set-up their own business with the aim to run the business upon graduation. They are certain that they want to embark as an entrepreneur as their career path upon graduation.

> During the previous semester break, I have already made enquiries to the relevant agencies and bodies on starting up my own business. I have also obtained information from banks on the loan
6. Discussions and managerial implications

This study intends to examine the plausibility of socialization and the cultivation of entrepreneurial mind-sets among students in a business flavoured university. The findings of this study are important to shed light on future strategy and planning for government, practitioners and educationists in crafting appropriate programs or curricular. This study provides evidences that socialization does shape behaviour and has the ability to achieve the learning outcome to cultivate entrepreneurial mind-sets. This is in line with Astin (1993), who asserts that the most powerful source of influence on student’s academic and behavioural development is the peer group.

The nomological validity of this study and behaviour, an important feature, is demonstrated within the framework of hierarchy-of-effects models. The traditional hierarchy-of-effects model depicts typical consumers’ evaluation processes, from the initial exposure of product/service beliefs leading to attitude formation and behavioural intention (Woo, Fock and Hui, 2006). Barry and Howard (1990) assert that understanding the hierarchical processes allows researchers to predict behaviour and to provide information on strategies. It enables simple, intuitive, and logical sequences and how consumer’s attitude is formed and the final decision to purchase is reached (Barry, 2002). Behaviour can be cultivated from a non-affirmative behaviour to an affirmative behaviour through the use of proper approach. According to Brim (1966), socialization is a process where individuals interact to acquire essential knowledge, skills and behaviours for effective participation in society.

Extant research demonstrates that higher learning institutions play important role in shaping student attitudes and values (Dey, 1996). Few informants were unsure of their career path, but through a conducive socialization interaction and university environment, they feel secured and confident of their choices. According to Gibson (2004), socialization enables information to flow to the learner that allows current and desired behaviour to be compared, resulting in some change or adaptation. It is a process of which groups maintain and reproduce themselves the social norms and skills that involves the transfer of know-how (Harney 2007). It then brings a clear emancipatory perspective to the construction of meaning rather than relying on the theoretical textbook alone (Jones 2009). According to Astin (1993), each student influences each other mutually and reciprocally through the process of socializing which has far-reaching effects on almost all areas of student learning and development.

When students are exposed to experience and run their own business, it provides them with a hands-on experiences and knowledge on what a real business is all about. Lave and Wenger (1991) emphasis that learning through engagement and co-participation in actual activities increased knowledge and confidence. Providing pro bono business consulting services also enhances their efficiency and effectiveness and valuable learning experience (Steiner and Watson, 2006) which further increased their motivation (Thomas & Landau, 2002) and self-efficacy (Tucker and McCarthy, 2001). It is important that students be given the opportunity to learn from experience and to engage in activities that address human and community needs which further stimulate student learning and development (Litzky et al., 2010). According to Schon (1983), it is the process of reflection-on-action, where young entrepreneurs construct understanding by drawing upon experiences with that situated experience.

Constraining students to classroom learning is often too theoretical in nature, which can lead to widespread inertia (Drie and Dekker, 2013). This is further supported by Higgins et al. (2013), who state that academic pedagogies that focus on theories disentangled itself from what is actual and true, students need to make sense of what they have learnt as they interact with the society and environment. Hence, the idea of experiential learning is a forceful approach when universities plan to bridge between theory and practice. There is certainly a need to experiential learning that enables young mind-sets to move from passive ideas of learning to a proactive learning method that needs them to take control and ownership of their own learning. This situation is in line with the progressive conformity theory that state that peer group values, beliefs and aspirations tend to change in the direction of the dominant values, beliefs and aspirations of the peer groups (Astin, 1993). On top of that, it further develops students’ ability to bridge theory and practice by applying
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their theoretical learning into a relevant and meaningful business context (Papamarcos, 2005). When students are given the opportunity to present their ideas and to contribute in a meaningful way to the society, this will increase their passion to implement ideas, propose innovative and problem-solving approaches to businesses (Litzky et al., 2010).

7. Conclusion

This study, grounded in a hierarchy-of-effects model and despite a number of limitations, it outlines three main contributions. Firstly, a conceptual background to the use of socialization and its positive influence of socialization outcome to cultivate entrepreneurial mind-sets is clearly illustrated. Secondly, the effects of a behavioural model that further exemplify the hierarchy-of-effect model in a student-behaviour model further strengthen the generalizability of the model. Thirdly qualitative inquiry data suggests that socialization and experiential learning is indeed enhancing and cultivating an encouraging behaviour. As from an academic point of view, this research is still exploratory in nature, and more researches are needed to further strengthen the hierarchy effect.

References


The Impact of Innovative Practices on the Performance of Small and Medium Enterprises

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Abstract: The ability of companies to identify customer requirements, appropriately organize and develop products that satisfy these requirements in the most efficient way, is the key to obtaining competitive advantage. This is highly associated with the ability of the company to monitor the environment and adjust with the environmental changes by developing innovative practices. The Food and Beverage industry in Cyprus is a leading manufacturing sector and is under investigation in our study. Results presented in this study are based on a large project carried out aiming at the investigation of the innovative behaviour of the sector and the development of a model illustrating possible relationship of innovative behaviour and practices with the achievement of a competitive advantage. A nation wide survey has been carried out with an aim to identify and further develop the managerial practices that foster the innovative ability of the companies. The study examines the success or failure of those innovative initiatives in the sense of the achievement or not of a competitive advantage and investigates its relationship with the application of innovative practices. All five prefectures (Nicosia, Famagusta, Limassol, Larnaca and Paphos) were covered and a sample of 5% of the whole sector is surveyed. A closed questionnaire, made of five sections has been used in order to collect relevant information. The results of the factor analysis and the subsequent regression models developed highlight the relationship between strategic planning competencies and the ability of companies to innovate. It is shown that the successful implementation of innovative practices depends highly on the adoption of a successful Human Resource mainframe. Staff development approaches and the degree of customer involvement in the decision making process is found to be a factor that generated also a high impact on both the growth of innovative activities as well as on the organizational performance.

Keywords: innovation practices, innovation growth, organizational performance

1. Introduction

In today’s Business competitive environment, innovation is not an option but a requirement. Generic company competitive priorities include among others price, quality, delivery times and flexibility. Delivery time competitive priority is closely related with development speed in the sense of adoption and development of innovation practices. Innovation itself is a very broad concept and, as a result, various classifications of innovation have been developed and applied in literature. Most researchers have focused on technology-related innovations, such as the introduction of products that require radical changes in the production process. The concept of innovation however can be seen extending far beyond radical and technology-based product innovation. The European Union’s Green Paper on Innovation, suggests that there are three forms of innovation (product, process and organization). On the other hand technology is characterized as the key for developing core competency in industry. Technological innovation is regarded as a tool for strengthening the competitiveness of a nation (because it secures continued economic growth by reinforcing employment and income generation) (Siika 1999 Vandevrande et al, 2009). Technological change is essential to the survival and growth of individual firms and to the development of national competitiveness (Bessant and Francis, 1999).

Organizational innovation deals with changes in marketing, purchases and sales, administration, management and staff policy. Organizational innovation has gained importance in all manufacturing sectors and especially in the Food and beverage sector through the implementation of ISO 9000 and other health and safety and quality standards (Boudourooulos and Arvanitoyiannis, 2000)

Innovative organizations embrace innovation by constantly introducing change. Innovations include new work structures (teams, networks, outsourcing, creating value webs new work procedures,) advanced technology, new manufacturing methods, information technology, quality management and process cycle time, human resource management strategies to ensure strategic fit with the business goals and inject flexibility (constant training, recruiting the best talent and rewarding employees, creating a work environment to spur innovation). The last decade has witnessed an upsurge in research seeking to incorporate different strategic management perspectives in the field of operations management and strategy (Gagnon, 1999; Miller and Ross, 2003; Smart,
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Bessant and Gupta, (2007), Further on innovations encourage risk taking behaviours and valuing experimentation (Terziowski, 2002).

Bigliardi and Dormio, (2009) states that that in order to innovate a firm must have the right organisational conditions, such as sufficient qualified personnel, sufficient knowledge, and a flexible organisation structure, but it must also have the right financial conditions.

Researchers and managers have tried various approaches to clarifying the relationship between organizational characteristics and the adoption of innovation in the face of multiple dimensions of innovation. Hitt et al, (1996) combined the acquisition of process innovations with the adoption of product innovations and market innovations into a single variable termed external innovation. When using his approach they did not find significant relationship between firm size and the adoption of external innovation. Others (Rothwell, 1983) have found a significant relationship between firm size and product innovation, and others (Cohn and Turyn, 1980) between firm size and process innovation. Infrastructural decisions refer to organizational policies and practices pertaining to workforce, production and service (Boyer, 1998).

Integrative communication capabilities contribute to synergy of functional capabilities with the requirements and needs of the innovation project (Tepic M et al, 2013).

Terziowski, (2002) presenting the results of a major study commissioned by the Australian manufacturing Council (1995) mentions on the basis of a 1,300 response data base, that continuous improvement and innovation management have a positive impact on the business performance of individual firms.

Francisco et al (2003) in their study regarding the possible relationship between perceptions of quality and innovation environments at Bank branches (80 bank offices) presents the relationship between TQM approaches and Innovation. Customer orientation is found to be a stimulus for innovation in the organization, and provides a clear orientation to innovation, as it links innovation to customer needs. Continues improvement promotes change, innovation and creativity, as it reflects on how the work is organized and managed. On the other hand customer orientation may prevent organizations from undertaking radical innovations while overemphasis on efficiency of continues improvement may ultimately minimize and even remove availability of the resources required for innovation.

A client relationship will facilitate better understanding that will reflect needs for service and process innovations more accurately. It must be emphasized that relationship orientation contributes not only to innovations but also to improvement in the capability to innovate (Panayides, 2006).

Empowerment makes people feel that they have a certain degree of autonomy, which make their work more innovating. Teamwork is one of the most effective communication channels, and communication is one of the main determinants for innovation within organizations. On the other hand the cultural trend to teamwork is detrimental to radical innovation and inventions. Firms with high performance in innovation usually have a formal process for developing new products and services (Shaw et al., 2001; Oke, 2007).

Innovation has always been at the centre of competitiveness. Competitive priorities are defined as the planned or intended goals that guide strategic actions and resource allocation decisions. Competitiveness comes from innovative minds. The lesson is clear. To remain on top you have to produce the consumer products people want. You have to find and convert new innovations into producible goods. You have to continually try to develop useful applications from what many would consider useless by-products (Nair and Boulton, 2008).

A company embarks on innovation projects in order to improve its position in the competitive arena. The competitive success can be measured in terms of improvements in different business performance, such as R.O.I, market share and so on (Porter, 1985)

There are cases in which innovation does not lead to positive effects on business performance. It is not sufficient to introduce the innovation, but in order to gain better business performance, the innovation has to produce effective out comes (Gunn, 1987 ;Womack, Jones and Ross, 1990)
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These can be obtained by leveraging technological innovation, information and communication technology, and organizational changes. (Schomberger, 1986; Flynn, Sakakibara and Schroeder, 1996). According to Efstathiades et al (2002) stated that technology can only contribute to a competitive success if it is integrated into organizations’ business strategies and practices. In order to maintain a strategic fit throughout the evolution of industry and technology contexts, the “innovation” competitive priority is essential (Nair and Boulton, 2008).

A model proposed by Neely et al, (2001) uses five constructs relating innovation performance and innovation practices as follows: business performance, outcomes of innovation, innovation, capacity to innovate and external contextual environment.

The dimensions of company performance that can be influenced by the outcomes of innovation are:

- Return on Investment
- Market share
- Competitive position versus direct competitors
- Value to customers (the extend to which product and services are seen by customers as value for money)

Becheikh, Landry and Amara (2006) carried out a detailed survey of 108 papers relevant to innovation management. It has become apparent that multiple regression analysis represented the most widely used analytical approach to investigate innovation. The driving forces of technological innovations can be described by two factors: (1) results concerning the internal determinants of innovation, and (2) those specific to the contextual determinants. For managers, encouraging innovation begins, among other things, with a clear and precise definition of their firm’s strategies. They should encourage, as much as possible, a specialization built on the firm’s distinctive competencies, with a differentiation business strategy. The structure should remain flexible and encourage the employees’ empowerment and the interaction between the various company units. Managers should also establish a control system using primarily strategic indicators rather than purely financial ones.

There is a joint influence of cohesion and strategic vision on innovation Strategy, structure and behavior have been confirmed to be less supportive of creativity and innovation in local organizations compared to organizations influenced by foreign ownership. (Carmen, De la Louz and Salustiano, 2006; Zdunczyk and Blenkinsopp, 2007)

2. Methodology

The aim of this study is examine the innovation implementation process in Small and Medium Enterprises. The method that has been used to collect information is that of a closed questionnaire applied on a carefully selected sample of manufacturing companies in Cyprus. The size of the sample includes 50 Cypriot manufacturing enterprises (~5% of the total size of manufacturing enterprises, in the Food and Beverage sector in Cyprus). The survey is a part of larger project investigating the innovation process in the Cyprus Food and Beverage Industry and it is funded by the Cyprus Research Promotion Foundation.

3. Research aim and objectives

In detail the objectives of this paper are:

- To examine the innovation implementation process and to identify specific organisational factors (through factor analysis) that fosters the innovation process.
- To model the innovation implementation process through linear regression models.

4. Results and analysis

4.1 The innovation implementation process

The data collected from the survey was subjected to statistical analysis, aiming to the modelling of the innovation process by the identification of specific organizational factors that foster the innovation process by empirical means.
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The first step of this modelling process entailed the analysis of the survey data by the means of factor analysis aiming to the development of a dimensional structure. The rationale of this methodological decision is twofold. First, a dimensional structure of innovation indicators is developed, and secondly, the extracted dimensions were treated as independent variables at the subsequent stages of the modelling process.

By examining the factor analysis results the following factors were extracted

- **Factor 1** Strategic Management Capabilities.
- **Factor 2** Human Resources, Leadership, Learning and Relationship marketing practices
- **Factor 3** Organizational flexibility to adapt to environmental changes.
- **Factor 4** Market oriented policies and practices
- **Factor 5** Staff development approaches and degree of customer involvement in the decision making process.

Similar work is done by Avlonitis, Kouremenos and Tzorkas (1994) indicating the fundamental dimensions of organizational innovativeness being:

- The technological innovation challenges
- The manifested strategic innovation intentions
- The product innovativeness
- The innovativeness of core machinery and
- Innovative leadership

The above five-factor solution, account for **72.69%** of the total variance, with 49.50%, 9.30%, 5.10%, 4.72% and 3.67% of the variance accounted by each factor respectively. The percentage of variance is shown in Table 1.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Eigenvalue</th>
<th>Percentage of Variance (%)</th>
<th>Cumulative percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>27.441</td>
<td>49.502</td>
<td>49.894</td>
</tr>
<tr>
<td>2</td>
<td>5.118</td>
<td>9.306</td>
<td>59.200</td>
</tr>
<tr>
<td>3</td>
<td>2.806</td>
<td>5.101</td>
<td>64.301</td>
</tr>
<tr>
<td>4</td>
<td>2.596</td>
<td>4.720</td>
<td>69.021</td>
</tr>
<tr>
<td>5</td>
<td>2.020</td>
<td>3.673</td>
<td>72.694</td>
</tr>
</tbody>
</table>

The extracted factor solution can be considered as satisfactory. As Hair et al, (1998) suggested, percentages around 60% of the total variance are considered as satisfactory.

As has been previously discussed the existence of “Strategic Management capabilities” is considered as a major factor to the innovative effort of the companies and account for 49.5% of the variance.

This Strategic Management effort is focused on planning out and implementing the companies’ innovation strategy. This is achieved by: (a) emphasizing on the provision of systems for effective management of the innovative activity, (b) an effective utilisation of all personnel’s skills (c) using the most modern tools and techniques guided always by a detailed knowledge of customer’s needs and finally (d) with the contribution of all the companies departments.

Moreover importance is given on the contribution of personnel, the provision of the required training, so as to develop new skills and competencies and having in place a system that recognize and remunerate the achieved goals.

This study revealed also that Strategic Management issues have given high importance lately in the Cyprus Industry. Strategic thinking is in the fore front of the attention of Business managers in their effort to maintain/increase the market share in the highly competitive environment they operate.

The second factor that emerged from the variables that strengthen innovative capacity is the “Human Resources, Leadership, Learning and Relationship Marketing Practices” that accounts for 9.3% of the variance.
The Human Resources, Leadership, Learning and Relationship marketing practices are determined by (a) the quality control practices, (b) the continuous request for quality work, (c) the proper company management (Dynamic and open minded company management) and finally (d) the provision of good after – sales customer support.

Important managerial competences that foster the HR, leadership and learning organization capabilities include: (a) the building of right links and relations with the customers, (b) the degree of attendance of employees in the daily processes and their degree of involvement in the innovation process, (c) the degree of staff involvement in the everyday processes to the extent needed and the recruitment of the right associates. The level of operating as a “learning organization” is found as an important parameter in developing and applying proper innovation strategies.

The third factor identified that is connected to innovation ability is: “The Organizational flexibility to adapt to environmental changes” accounting for 5.1% of the variance. Thus, (a) the willingness for acceptance and adoption of new ideas, (b) the connection with external know-how providers, (c) prober internal and external communication with the adoption of new communication channels and (d) the involvement of all departments in the process of introduction of innovation practices from the very first stages, are closely connected with the achievement of organizational flexibility in order to respond to the environmental changes.

An important factor identified that determines the innovation ability of the companies is the “Market oriented policies and practices”. Such capabilities are focused on the development of market oriented policies, the exterior orientation and the sensitivity to the customers’ needs, the provision of customer training and the effective utilisation of advanced technologies.

The degree to which interaction between departments and processes is encouraged and facilitated (staff movement between different departments, team work, effective management of interaction, flexibility to work) as well as the ability in the attracting of talent managers and researchers is an important parameter that explains this factor.

Factor 5: “Staff recruitment / development approaches and the degree of customer involvement in the decision making process” accounts for 3.7% of the variance. This factor reflects the high importance given to the ability of the company to implement human resources practices in terms of recruitment and staff development practices. Further more gives emphasis to the application of participative style of management in the decision making process in an effort to satisfy customer requirements better than the competitors (relationship marketing).

4.2 The relationship between the management factors, the innovation process and results: development of linear regression models

A linear regression modelling approach has been used in order to examine the relationship between the management factors identified by factor analysis and the innovation process and results. The dependent variable is modeled as a random variable because of its uncertainty or inherent variability.

Degree of Innovation Growth

The discussion that follows gives the linear regression analysis between the five factors that were extracted from the Factor Analysis (independent variables) and the “Degree of Innovation Growth” (dependent variable). The Degree of Innovation Growth, has been determined by averaging the degree of (a) product innovation, (b) process innovation and (c) organizational structures innovation.

The linear regression results as shown in table 2 below are summarized in the following regression equation:

\[ K_1 = 0.556 \times (P1) + 0.394 \times (P2) + 0.249 \times (P3) + 0.274 \times (P4) + 0.431 \times (P5) \]

Where:
- \(K_1\) = degree of innovation growth
- \(P1\) = factor 1
- \(P2\) = factor 2
- \(P3\) = factor 3
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P4 = factor 4
P5 = factor 5

- **Factor 1** Strategic Management Capabilities.
- **Factor 2** Human Resources, Leadership, Learning and Relationship marketing practices
- **Factor 3** Organizational flexibility to adapt to environmental changes.
- **Factor 4** Market oriented policies and practices
- **Factor 5** Staff development approaches and degree of customer involvement in the decision making process.

The extracted model presents the high significance of all the factors with an adjusted R square of 0.763. In detail the model contribution of each factor is presented as follows:

**Factor 1** “Strategic Management Capabilities” has been identified as having high Beta value (0.556) showing the high importance of the strategic management process in the growth of innovative activities. Beckeikh, Landry and Amara (2006) carried out a detailed survey of 108 papers relevant to innovation management and in his findings among others states that “for managers, encouraging innovation begins, among other things, with a clear and precise definition of their firm’s strategies” which is in accordance with the description of **Factor 1**.

High impact on the degree of innovation process has been also identified by **Factor 5 “Staff development approaches and degree of customer involvement in the decision making process” and Factor 2 “Human Resources, Leadership, Learning and Relationship marketing practices.” Beckeikh, Landry and Amara (2006) stated that “improvement and training programs should be planned for executives and employees”, this is in agreement with the description of **Factor 5**.

**Table 2:** Degree of innovation growth

<table>
<thead>
<tr>
<th>Coefficients a</th>
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<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>B</td>
<td>Std. Error</td>
<td>Unstandardized Coefficients</td>
<td>Beta</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.846</td>
<td>.112</td>
<td>61.264</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>.902</td>
<td>.113</td>
<td>.556</td>
<td>7.986</td>
</tr>
<tr>
<td></td>
<td>.638</td>
<td>.113</td>
<td>.394</td>
<td>5.656</td>
</tr>
<tr>
<td></td>
<td>.404</td>
<td>.113</td>
<td>.249</td>
<td>3.580</td>
</tr>
<tr>
<td></td>
<td>.445</td>
<td>.113</td>
<td>.274</td>
<td>3.941</td>
</tr>
<tr>
<td></td>
<td>.699</td>
<td>.113</td>
<td>.431</td>
<td>6.191</td>
</tr>
<tr>
<td>a. Dependent Variable: Degree of Innovation Growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The value of coefficient of determination $r^2 = 0.787$ (Table 3), indicating that roughly 80% of the variance of the “growth of innovative activities” can be explained by the model.

**Table 3:** Degree of innovation growth - model summary

<table>
<thead>
<tr>
<th>Model Summary</th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>R</td>
<td>R Square</td>
<td>Adjusted R Square</td>
</tr>
<tr>
<td>1</td>
<td>.887</td>
<td>.787</td>
<td>.763</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), REGR factor score 5 for analysis 5, REGR factor score 4 for analysis 5, REGR factor score 3 for analysis 5, REGR factor score 2 for analysis 5, REGR factor score 1 for analysis 5.
Organizational Performance

The discussion that follows gives the linear regression analysis between the five factors that were extracted from the Factor Analysis (independent variables) and the “Organizational Performance” (dependent variable).

The “Organizational Performance” has been calculated by averaging the impact of innovation activities on the following generic competitive priorities:

- Price
- Absolute quality
- Relative quality
- Volume flexibility
- Flexibility in the satisfaction of customer needs

The linear regression results as shown in table 4 below are summarized in the following regression equation:

\[ K_2 = 0.794 \times (P1) + 0.237 \times (P4) + 0.344 \times (P5) \]

Where:
- \( K_2 \) = Organizational Performance
- \( P1 = \) Factor 1 “Strategic Management Capabilities”.
- \( P4 = \) Factor 4 “Market oriented policies and practices”
- \( P5 = \) Factor 5 “Staff development approaches and degree of customer involvement in the decision making process”

\textbf{Table 4: Organizational performance}

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td></td>
<td></td>
<td>62.099</td>
</tr>
<tr>
<td></td>
<td>REGR factor score 1 for analysis 5</td>
<td>1.491</td>
<td>.122</td>
<td>.794</td>
</tr>
<tr>
<td></td>
<td>REGR factor score 4 for analysis 5</td>
<td>.445</td>
<td>.122</td>
<td>.237</td>
</tr>
<tr>
<td></td>
<td>REGR factor score 5 for analysis 5</td>
<td>.647</td>
<td>.122</td>
<td>.344</td>
</tr>
</tbody>
</table>

\( a. \) Dependent Variable: Innovation and Operational Performance

The extracted model presents the high significance of all the factors with an adjusted R square of 0.792. In detail the model contribution of each factor is presented as follows:

**Factor 1** “Strategic Management Capabilities” generated the highest Beta coefficient (0.794) indicating the high influence on the success of the innovative activity and thus the high organizational performance.

**Factor 5** “Staff development approaches and degree of customer involvement in the decision making process” generated also a high Beta coefficient (0.344) giving thus high importance to the proper application of Human Resources approaches and practices as well as application of relationship marketing practices. If those are in place then the innovative process has a high chance to lead to high organizational performance. This is a crucial outcome if one takes into consideration the fact that the proposed research was initially focused only on the internal company’s management capabilities and practises.

These results are in harmony with the results presented at the work of Miller and Friesen, 1982. According to this product innovation is directly connected with the way an organisation is structured, organized and managed.
Andreas Efstathiades

The above results are also in line with the suggestions presented in the OSLO handbook indicating that organizational innovation is associated positively with:

- The changes in the organizational structure and
- The implementation of advanced management techniques

The value of coefficient of determination $r^2 = 0.805$ (Table 5) indicates that roughly 80% of the variance of the “organizational performance” can be explained by the above model.

Table 5: Organizational performance - model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.897a</td>
<td>.805</td>
<td>.792</td>
<td>.85697</td>
</tr>
</tbody>
</table>

- Predictors: (Constant), REGR factor score 5 for analysis 5, REGR factor score 4 for analysis 5, REGR factor score 1 for analysis 5

5. Conclusions

The results of this study and the subsequent factor analysis give a five factor dimensional structure that explained 72.69% of the variance. The factors identified that are contributing to the level of innovativeness of the firms are:

- Strategic Management Capabilities
- Human Resources, Leadership, Learning and Relationship marketing practices
- Organizational flexibility to adapt to environmental changes.
- Market oriented policies and practices
- Staff development approaches and degree of customer involvement in the decision making process

Strategic Management capabilities are considered as major competencies that impact the innovative effort and behaviour. Strategic thinking is in the forefront of the attention of Business managers in their effort to maintain/increase the market share in the highly competitive environment they operate.

The Human Resources, Leadership, Learning and Relationship marketing practices are determined by (a) the quality control practices, (b) the continuous request for quality work, (c) the proper company management (Dynamic and open minded company management) and finally (d) the provision of good after – sales customer support.

“The Organizational flexibility to adapt to environmental changes” is determined by (a) the willingness for acceptance and adoption of new ideas, (b) the connection with external know-how providers, (c) the prober internal and external communication with the adoption of new communication channels and (d) the involvement of all departments in the process of introduction of innovation practices.

“The Market oriented policies and practices” are focused on the development of market oriented policies, the exterior orientation and the sensitivity to the customers’ needs, the provision of customer training and the effective utilisation of advanced technologies.

“Staff recruitment / development approaches and the degree of customer involvement in the decision making process” reflects the high importance given to the ability of the company to implement human resources practices in terms of recruitment and staff development practices.

The linear regression models developed give important insights in the examination of the ability of the companies to innovate as well as the final achievement of a competitive advantage out of this innovative activity.
The existence of Strategic Management capabilities within the company’s environment has been identified as having high impact on both the growth of innovative activities as well as to the final achievement of organizational performance. It is evidenced that companies that are engaged and prepare strategic plans are actively innovative companies.

High impact on the abilities of the companies to innovate is caused by the degree that the company adopts Human Resources, Leadership, Learning and Relationship marketing practices. The implementation of relationship marketing practices is found to be a driving force towards the implementation of innovative activities. Companies who have very closed relationships with the customers are found to be more innovative. Proper application of Human resource practises is found to be a crucial factor that fosters innovative activities, safeguards their successful implementation and have a high impact on the organizational competitiveness.

Staff development approaches and the degree of customer involvement in the decision making process is found to be a factor that generated also a high impact on both the growth of innovative activities as well as on the organizational performance.

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How to Facilitate the Emergence of French new Technology-Based Firms?

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Abstract: Global competitiveness is marked by the economic growth of countries with highly intensive industrial R & D and a system of training and research oriented towards innovation. France, for its part continues to uphold its model of low R & D intensive domestic firms, instead of turning to more active and sustainable support of innovative organizations such as New Technology-Based Firms (NTBFs). It is therefore not surprising that France "lacks the equivalent of 10,000 companies with 300 employees" (Betbèze & Saint Etienne, 2006) despite a series of measures and organizational arrangements, financial, tax and institutional offered by the State at the national, regional and local levels. This poor appreciation of the new international competitive conditions is reflected in the minimization of the fundamental role of NTBFs, a lack of entrepreneurial training in universities and too little investment in R & D. But time is running out because every year, the French position in the global scientific, technological and economic competition deteriorates. The objective of our paper is to shed light on three reasons why France stands in contrast with its partners and competitors in its dealings with NTBFs:

- The first explanation is the inertia of the French system in the relationship between science and industry and its lack of interest in the behavioral and cognitive traits of researchers and innovators. - The second explanation is a purported lack of interest on the part of companies in taking a more aggressive attitude to recruiting PhD graduates and researchers from the universities and encouraging them to migrate to more attractive areas. - The third explanation is based on the uniqueness and specificity of NTBFs, which in France face enormous difficulties to find additional resources to implement and finalize their innovations and bring them to market.

Keywords: NTBF, competitiveness, cognitive entrepreneurship, knowledge brokers, financing - innovation

1. Introduction

In the 21st century, competitiveness in world markets is characterised by the economic expansion of countries whose industrial companies focus intensively on R&D and whose training and research systems concentrate on innovation. France, however, persists in promoting national companies that dedicate relatively few resources to R&D instead of providing long-term aid to innovative organizations such as research-based start-up companies. At the same time, and in spite of a slew of measures and developments (competitiveness clusters, publicly funded incubators, research tax-breaks, innovative start-up status, creation of the Enternext market, etc.) introduced by the state at the local, regional and national levels with a view to encouraging, facilitating and accelerating the creation of New Technology Based Firms (NTBFs), the specific French context does not foster the development of start-ups into medium enterprises, which base their growth on innovation (Picart, 2004); the country “lacks the equivalent of 10,000 companies of 300 employees” (Betbèze & Saint Etienne, 2006).

This misapprehension of emerging conditions of international competition, in which scientific research is a source of value creation, is a result of the marginalization of the fundamental role of NTBFs, of a shortage of courses in entrepreneurship in the universities, and of a lack of investment in R&D. But time is of the essence because, every year, France slides further and further down the scientific, technological and economic rankings.

Three approaches can be applied to explaining this situation, a situation that stands in marked contrast to that of France’s partners and competitors (the United States, Germany, the United Kingdom, Sweden):

- The first explanation is the inertia of the French system in the relationship between science and industry and its lack of interest in the behavioral and cognitive traits of researchers and innovators. Henri Guillaume’s reports, published in 1999 and 2007 on the economic exploitation of research, outline the weak performance of French industry in a number of technological sectors, attributing it in reference to the fact that the economic structure is dominated by branches of industry in which R&D does not play a central role, and to a lack of links between science and industry.

- The second explanation is a purported lack of interest on the part of companies in taking a more aggressive attitude to recruiting PhD graduates and researchers from the universities and encouraging them to migrate to more attractive areas better adapted to the specific needs of highly innovative firms.
The third explanation is based on the uniqueness and specificity of NTBFs, which in France face enormous difficulties in finding the additional resources required to implement and finalize their innovations and bring them to market (problems of financing, lack of human resources). It is NTBFs specializing in nanotechnology, biology, IT and cognitive science that are most likely to carve out leading positions in world markets for themselves. Focusing on developing innovations based on scientific and technological knowledge, these firms often have great difficulty in finding the additional resources required to bring their innovations to fruition and find a niche for them in the market:

- **Funding problems linked to technological and market risks**
- **Lack of qualified personnel leading to management problems**

In this context, what can we expect from the state, local authorities, private actors and support structures in terms of finding solutions to the problems inherent in this situation and promoting the emergence and development of NTBFs?

This paper is divided into two sections:

In the first (Section 2), it will be demonstrated that the emergence of NTBF is complicated by a number of factors. Unlike the normal processes by which enterprise creation is characterized, we are, here, confronted by a learning process – **cognitive entrepreneurship** – involving a form of economic irrationality linked to a context of uncertainty implying a high degree of risk. This part of the article posits that, largely for cultural reasons, France has already lost ground to other countries in this area.

In the third section, three essential measures are suggested with a view to realigning the role of NTBFs in terms of competitiveness in global markets and providing the French economy with a sustainable approach to improving its position vis-a-vis its competitors.

### 2. Cognitive entrepreneurship, or how NTBFs emerge

In French research on R&D-based start-ups, a number of terminological approaches are applied. These approaches do not necessarily represent the same reality. For example, the terms “university spin-off” and “university essaimage” are frequently used. However, some researchers make no distinction between the terms “essaimage” and “spin-off”, using them interchangeably to describe any company based on a parent organization, whether the “spin-off” is a researcher or a technology developed by the organization in question. This use of terminology generally eludes the question of the kind of mechanisms characterizing the company. Thus, an attempt will be made to clarify certain ambiguities, even if it is not possible to elucidate them entirely.

Adopting a dynamic approach, we shall define cognitive entrepreneurship “as a learning process in which researchers research, acquire and recombine, by interacting with their environment, a range of cognitive capacities enabling them, on the one hand, to transform, bring to market, and profit from their scientific discoveries and, on the other, to transform their status from researchers to entrepreneurs (Frémiot, 2007).

In other words, the creation of NTBFs is associated with a complex learning process during which researchers must make three distinct leaps into the unknown: firstly, they must transform the results of their research into a finished technological object capable of meeting a given demand in a profitable manner; secondly, they must transform their behaviour from that of researchers to that of entrepreneurs, with the specific responsibilities implied by such a status; and transform their business plan into an innovative, competitive, sustainable organization. The simultaneous articulation of three specific transformations – product, agent, idea – is problematic for two reasons. The first is economic: scientific capacities have to be transformed into commercially exploitable products or services. The second is both psychological and cultural: researchers have to make the transition from the academic and scientific sphere to the economic sphere (and, indeed, in the broader sense, to the industrial sphere).

Consequently, an analysis will be made of the three major phases of the process in order to identify the main risks that it entails.
2.1 From public good to private good: The problem of the “marketization” of scientific knowledge

The marketization of knowledge can be defined as its transformation into an “economic statement” capable of being exploited privately (Frémiot, 2007). In the case of an NTBF, the marketization of scientific knowledge raises two issues. On the one hand, as a public good, its properties of non-excludability, non-rivalry and cumulativeness are opposed to those of private goods. On the other hand, this transformation is limited or constrained by its level of "embedded" specificity (Polanyi, 1962; Granovetter, 1985; Williamson, 1988). If it is too specific, researchers who have a strong incentive to marketize their knowledge will find themselves in a bind when it comes to identifying and investing in specialized additional assets (Teece, 1986) required for bringing the process to a successful conclusion. On the other hand, a low level of specificity combined with the emergence of undesirable effects (externalities, imitation, etc.) discourages researchers from marketizing their research. This split between the public and the private poses a dilemma for researchers. The process of marketization obliges them to strike a subtle balance between the divulgence of their scientific knowledge to suppliers of specialized additional assets (i.e., financiers) and the secrecy required to maximize future profits.

2.2 From researcher to entrepreneur: A “schizo-transformation”

Caught in a kind of vice between the demands of the scientific community and those of the market, researcher-entrepreneurs experience a kind of psychological and behavioural “schizo-transformation” which can, ultimately, lead to failure. In effect, while researchers benefit from their scientific training, which gives them the ability to select, combine and recombine different areas of knowledge and scientific techniques more effectively than others, it nevertheless remains that this change of identity is accompanied by tensions deriving from the different rules governing science, on the one hand, and the market, on the other (mechanisms of sanction and incentivization).

Source: Frémiot (2007)

Figure 1: The process of triple co-evolution required for the emergence of NTBFs

Figure 2: Scientists and entrepreneurs: Distinctive characteristics

Source: Frémiot (2007)
This “schizo-transformation” is characterized by three factors: Culture, time and skills.

- **Culture**: Researchers are generally involved in projects the results of which have to be rapidly made public to the scientific community, in which decisions are based on consensus, in which there is no personal financial interest, and in which recognition from one’s peers is of vital importance. On the other hand, entrepreneurs do not divulge knowledge, actively seek profit, base their decision-making on efficiency and performance, and accept a system of sanction dependent on the market. This culture clash thus obliges researchers to transform their culture.

- **Time**: While scientists are committed to long-term research projects, entrepreneurial projects are defined in terms of time and costs (Samson & Gurdon, 1993). This factor means that researcher-entrepreneurs have to affect a delicate balance between, on the one hand, minimizing costs and judging the amount of time required to marketize their knowledge and, on the other, their desire to offer the market a product that respects the rules of the scientific community.

- **Skills**: Enterprise creation requires researchers to take an open-minded attitude to other people with a view to accessing and appropriating a range of learning capacities. But this logic of openness is not easy to apply (Blondel, 2002). Familiar with the “know what” and “know why” approach, their learning capacity is not as great when it comes to the “know how” and “know who” ethos. This problem is generally manifested in their difficulty in producing and acquiring complementary skills, especially in terms of funding.

Source: Frémiot (2007)

**Figure 3**: The “schizo-transformation” of the researcher-entrepreneur

### 2.3 From the idea to the firm: An uncertain process strongly marked by a series of specific risks

Few orthodox or heterodox analyses of the firm deal with the phenomenon of the emergence of its emergence because, in most cases, their normative approaches ignore the firm’s multifaceted and continuously evolving character (Bréchet, 1994, 1996). The articles of Branscomb & Auerswald (2001, 2002) on the emergence of NTBFs describe the transition between invention and innovation as a complex process characterized by various phases of development (seeking out technological opportunities, “Death Valley” and the growth spiral) dominated by interaction mechanisms (Kline & Rosenberg, 1986).

Source: Branscomb & Auerswald (2002)

**Figure 4**: Sequential model of the emergence of a research-based innovative start-up
Emmanuel Fremiot

- **Seeking out technological opportunities**: A period in which researchers have to demonstrate not only the existence of a niche in the market for their scientific research, but also their capacity to produce sufficient product at a relatively low cost to survive in the market. Associated risks include the tensions caused by the science-market dichotomy mentioned above, and the researcher’s lack of expertise in bringing their discovery to market (i.e., patenting discoveries).

- **Death Valley**: A period dominated by five fundamental challenges that have to be met by researchers if they are to transform themselves into entrepreneurs and demonstrate the relevance and coherence of their commercial projects over the long-term: psychological, intellectual and cultural challenges; financial challenges; the absence of infrastructure; and capturing value.

- **The organizational growth spiral or the point of non-return**: A period marked by self-reinforcing mechanisms that consolidate the NTBF’s development trajectory: the emergence of organizational routines, the acquisition of funding, the development of competitive advantages and an improved strategy for anticipating market needs, as well as the researcher-entrepreneur’s development of “managerial skills and a management team that shares his or her objectives and provides the necessary economic competencies” (Blondel, 2002).

These factors reveal the dilemmas with which researchers are faced when setting up NTBFs and explain why they need a specific support environment to help them create their companies.

However, in this field, France lags behind (Battini, 2014) not only its traditional competitors (United States, Japan, Sweden, Finland), but also emerging industrial economies in Asia, economies the strength of which is based on a combination of low salaries and a high level of skills. It has been claimed that this gap has developed mainly due to the lack of reactivity of French companies to new competition. While the US scientific labor market has been transformed into a Centre of attraction for scientists and researchers, French firms have tended to relegate the issue of economic growth and job creation to the margins. This divide can be explained in reference, on the one hand, to weak links between science and industry (Guillaumé, 1998; Guillaumé, 2007), and, on the other, to the continuing propensity of private research centers to recruit engineers: “In effect, having a university thesis sends a ‘negative message’ to recruiters, who highlight both the weakness inherent in its exaggerated tendency towards specialization, and its supposed lack of relevance the business world [...]. The main reason that they are less than overwhelmed with PhD students who have carried out fundamental research, is that they think that they are unsuited the challenges of the market and its time-dependent demands. Like all other employees, researchers must display good managerial qualities, since careers are built on those skills” (Duhautois & Maublanc, 2006).

This “cultural exception,” exacerbated by the fact that relatively few PhD graduates are employed in private research centers, generates a vicious circle within science/industry/state relations, reducing the capacity to foster a pool of actors able to take risks in developing products and services based on sometimes radical innovations. Coupled with the passive attitude of the universities to the needs of the knowledge-based economy, this model of industrial growth not only wastes the potential of scientific research, but also deprives it of real opportunities to introduce a greater number of innovations to the global market by setting up NTBFs. This situation – a situation from which France suffers – should be addressed by means of the introduction of a more audacious R&D policy involving science PhDs and other individuals willing to set up companies in order to exploit their research economically.

### 3. Three prioritary approaches to promoting the role of NTBFs in encouraging competitiveness in global markets

In this context, the instruments already developed, for example incubators and enterprise hotels (supplying logistical and administrative services) appear to be insufficient. As well as equipped and facilities, projects of this kind require highly qualified personnel and considerable capital to protect them against very high levels of technical and commercial risk and uncertainty. This analysis is backed up by examples from outside France demonstrating that the most efficient NTBFs are developed at universities that not only provide courses in entrepreneurship, but that possess incubators supported by specific networks of actors and funding mechanisms (Degroof & Roberts, 2004). These intermediary learning organizations provide researchers with a relevant, effective solution which enables them to minimize risks and rationalize a large number of factors of uncertainty that emerge at every stage of development of their projects.
3.1 Encouraging the development of a scientific environment favourable to cognitive entrepreneurship

Measures should be taken to encourage university culture to become more entrepreneurial, improve processes designed to identify research that can be successfully exploited in the economic sphere, and encourage the development of relations between science and industry. Such measures should focus on modifying the cultural and organizational attitudes of scientific bodies, providing additional education in the field of entrepreneurship and improving processes for identifying and selecting research that can be exploited economically, thereby delivering better assessments concerning potentially possible research.

3.1.1 Encouraging the emergence of new cultures and organizations within the scientific system

In France, there seems to be something heretical about legitimizing the transformation of knowledge into profit through the creation of NTBFs. This social norm, collectively imposed on the scientific community, obliges researchers to forego the possibility of exploiting their work commercially, even if many of them would be willing to do so. Bureaucracy and administrative constraints also complicate the task of organizing joint-projects with industrial companies. This situation often creates blockages that have the effect of perplexing industrialists and dissuading them from collaborating with scientists. This kind of organizational approach that is particularly inappropriate to promoting and encouraging activities and services that contribute to set up NTBFs. The scientific bureaucracy's stranglehold on the management of research activities in general is, without doubt, a major handicap.

3.1.2 Bridging the gap in entrepreneurial education

Fayolle (2000) demonstrates that entrepreneurship studies feature much more heavily in business schools than in engineering schools and universities. Most entrepreneurship programs in engineering schools and universities take the form of introductory courses, primarily aimed at a public of students rather than researchers. As a “disciplinary field,” entrepreneurship studies is thus characterized by its emergent character and by the fact that its impact on students is still marginal.

Due to this situation, scientists often have a poor understanding of the issues and constraints of the business world and the processes involved in setting up a company; this lack of understanding contributes to a feeling of mistrust in regard to entrepreneurship and can, in some cases, inhibit researchers from exploiting business opportunities.

The deficit in entrepreneurial education, coupled with the universities’ lukewarm attitude in regard to developing a policy more favourable and more open to the setting up of NTBFs, causes serious difficulties for researcher-entrepreneurs. This confirms the comments of Julien (2000), according to whom the survival rate after three years of new companies whose members have followed courses in entrepreneurship is higher than average.

3.1.3 Providing the scientific system with the means to prospect, evaluate and select ideas providing economic opportunities

The scientific system is in a privileged position in terms not only of evaluating its research centres’ most promising ideas, but also of developing joint-projects with external partners with a view to encouraging the creation of new firms. This capacity to prospect business opportunities and provide additional incentives to researchers to become the entrepreneurs of tomorrow is faced with a number of obstacles associated, notably, with independence of scientific thought, as well as the sheer diversity of research activities carried out within the universities. In effect, asking research centres to communicate their results to administrative bodies is problematic. Furthermore, the diversity and sophistication of university research presents a problem for those charged with identifying opportunities. Lastly, it is difficult to assess the potential industrial applications of ongoing research, which, in turn makes it hard to evaluate its economic potential.

Universities are therefore obliged to choose between two opposing strategies. Either they can opt to focus on prospecting for new ideas to develop, or they can adopt a “laisser faire” attitude. There are many problems associated with the first approach, since the systematic identification of promising research projects requires a degree of investment that, in regard to the initial objective, may seem exaggerated and difficult to justify. Meanwhile, the second solution exposes the universities to the risk of missing out on opportunities and,
consequently, in a sense, of falling short in their mission to develop and promote their research. Therefore, neither of these models provides the universities with an efficient and effective prospecting strategy.

In these circumstances, the development of joint-projects with external partners represents a compromise between the two prospecting strategies described above. On the one hand, research centers will tend to view the demands of industrial companies as failing to correspond to their specific concerns, while, on the other, industrial companies will often have the impression that their demands are not being fully met.

Aware of this dilemma, universities have gradually introduced specific bodies dedicated to this form of development, including public sector incubators in 1999; Mutualized Technology Transfer Apparatuses (DMTTs); Accelerated Technological Transfer Companies (SATTs), both introduced in 2010; and “labcoms,” introduced in 2013. These bodies employ individuals with knowledge of both science and industry who are capable of assessing opportunities from both the technological and commercial points of view. In this perspective, the role of the scientific system consists in identifying and guaranteeing the interest of a range of competent experts, and then managing and coordinating that network by, amongst other things, making sure that they are correctly remunerated and dealing with the inevitable problems of confidentiality involved in such an approach. But, here again, various approaches applied in the past — from the development of partnerships with business incubators to the creation of technology centers — have focused exclusively on technological aspects and neglected, in spite of their essential importance, management issues.

3.2 Developing and strengthening knowledge brokers with a view to facilitating the emergence of innovations

Rendering this “public scientific reservoir” accessible to the market and integrating it into entrepreneurial innovation clusters depends on the systematization of relations between regulation, R&D financing and the allocation of public funding, university strategy, the economic environment and the spirit of enterprise. Public policies must also be developed to create a virtuous circle encompassing the multiple links between transversal networks associated with the various stages of the innovation process.

Within the framework of this new approach, the public incubator as a tripartite innovative organization meets the various needs of competitiveness clusters, primarily by reducing waste in scientific research by setting up NTBFs and creating new arenas dedicated to the production and exchange of knowledge based on the hybridization of scientific, technological, industrial and financial activities. The public incubator thus becomes the emblematic figure of the “Knowledge Broker” (KB) by facilitating “the creation, exchange and use of knowledge” (Blondel, 2006). This is especially true in that Knowledge Brokers have practically no influence on and play only the most marginal of roles in the traditional Triple Helix model (Science/Industry/State) (Metcalf, 2005).

In this new model encompassing the co-construction of cognitive and material resources, the importance of intermediary organizations outweighs that of the traditional actors of the Triple Helix. These knowledge-intensive bodies make it possible, on the one hand, to build a bridge between public research centers and private companies with a view to benefitting from the externalities deriving from their relationship, and, on the other, to develop or reinforce a localized innovation dynamic. Intermediary organizations improve efficiency in terms of exploiting scientific capacities in the industrial sphere, organize the exchange of resources (thereby reducing transaction costs), reinforce absorption capacities, and enable members of the scientific research community to apply a more effective approach to solving problems associated with new logics underpinning the production of use values associated with academic assets. From this point of view, Knowledge Brokers contribute to “decomplexifying” or shifting the frontiers between science, industry and the state. Their outward-looking approach enables them to appropriate external resources in order to re-combine, thereby transforming them into economic opportunities. This new rational configuration created by Knowledge Brokers has myriad fields of application that encourage the development of projects combining science and technology beyond the areas described by traditional categorizations, deconstruct vertical approaches to the division of labour, and introduce original perspectives on the search for new economic opportunities. On the one hand, this process encourages traditional actors to reappraise their strategies and render them more sophisticated, and, on the other, it announces the obsolescence of the “Colbertist” political model constructed on the basis of a vertically organized nomenclature of actors.
Thus, in a strategy designed to re-establish a balance between the structure of French industry and the new conditions defining global competition, Knowledge Brokers introduce a highly qualified labour force into the very heart of competitiveness. In effect, their original positioning in the Science/Industry/State circuit of production and diffusion of knowledge encourages them not only to seek out scientific experts capable of identifying new problems, produce state-of-the-art reports, and apply new methods to both old and new problems, but also to incorporate a wide range of different kinds of knowledge (know how, know who, know why) into a collective learning dynamic. For Knowledge Brokers, science PhD graduates are an important target. If the existence of Knowledge Brokers seems justified, it remains to be seen just how these new actors can accumulate the kind of capital required to survive in the market. In other words, to what degree are the state and its agencies willing to transfer to Knowledge Brokers missions such as education and training, the exploitation of scientific knowledge, funding, aid in setting up new companies, and so on, bearing in mind that these last could thereby acquire a stranglehold on decisions concerning public sector objectives and orientations, and that there would be a possibility of direct competition between the state, on the one hand, and Knowledge Brokers on the other?.

3.3 Ensuring long-term funding for research-based SMEs

Amongst the sources of start-up capital for NTBFs are government subsidies (French Senate funds, ministry funds, BPI France subsidies, etc.), and, in the private sector, business angels and venture capitalists. The financial support provided by business angels and venture capitalists, who work with own capital, is substantially greater that that furnished by government bodies. In return for the risks they take, these investors obtain a right to information about the firm and even, in some cases, the right to control the firm, bringing in more experienced managers and demanding high returns in the form of dividends when they give way to new investors or industrial companies, or when the firm in question is floated on the stock exchange. The objectives of these investors are to inject sufficient capital to enable the start-up to reach break-even, develop management routines, and control costs with a view to generating profits and acquiring a positive reputation in the market in order to attract potential buyers or be floated on the stock exchange. In spite of the efforts of a number of government agencies and public bodies to encourage this kind of investment, results have been very disappointing. While, in the United States, funds like Sequoia Capital (which has invested in, amongst others, Sun Microsystems, WhatsApp, Google and Yahoo!) invest massively in NTBFs and have played a central role in the last five industrial revolutions, in France, sources of venture capital are drying up. This negative development can be, at least partially, attributed to legislation introduced by Brussels in the form of the Basel III and Solvability II reforms that have had the effect of reducing the role of banks and insurance companies in this type of investment. This has raised a cry of alarm in the profession. Demands have been made for monies to be transferred from the French government’s life insurance fund, which is currently valued at 1.45 billion euros.

Table 1: Comparison between levels of French and US venture capital

<table>
<thead>
<tr>
<th>Sector</th>
<th>Average amount France</th>
<th>Average amount USA</th>
<th>Average amount G4 IPO France</th>
<th>Average amount G4 IPO USA</th>
<th>Average amount acquisition France</th>
<th>Average amount acquisition USA</th>
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</thead>
<tbody>
<tr>
<td>All sectors (average)</td>
<td>21,5</td>
<td>6,54</td>
<td>90,76</td>
<td>316 14,69 more</td>
<td>34,5</td>
<td></td>
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<tr>
<td>New Tech sectors (average)</td>
<td>1,21</td>
<td>5,54</td>
<td>5,4</td>
<td>38,85</td>
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</tr>
<tr>
<td>IT</td>
<td>n.c</td>
<td>6,48</td>
<td>151,8</td>
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<td>51,2</td>
<td>12,5</td>
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<tr>
<td>No New Tech</td>
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<td>6,8</td>
<td>59,3</td>
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</tr>
</tbody>
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Source: adapted from AFIC & Grant Thornton, 2013 and NVCA, 2013

Consequently, it comes as little surprise that the CAC40 has only three companies founded thirty years ago or less, while only one of the six biggest companies in the USA was founded over one hundred years ago.
4. Conclusion

A comparison between the French situation and the knowledge economy suggests a highly critical diagnosis of the role of the state and the importance of the future role of NTBFs in improving competitiveness in world markets. While Google invests massively in nanotechnology, biology, IT and cognitive sciences, French politicians remain blissfully ignorant of their potential. Worse, in the 2013 Accenture report listing the countries that will count in innovation two years from now, France is notable by its absence. It has gone, in the words of Pierre Battini, “off the radar” (Battini, 2014). In spite of the introduction of a series of measures, successive French governments have proved incapable of engineering a transition between a “centralizing state” and an “enabling state” focusing on technological development through proliferation. The vital issue with which we are faced is France’s capacity to make this transition quickly enough to be able to bridge the gap with more dynamic countries. It would, therefore, be unwise to view ongoing developments as a prefiguration of the ineluctable victory of market values. Lastly, it can be maintained that the fate of NTBFs mirrors tensions linked to attempts to modernize the French R&D system. In effect, beyond their capacity to boost the dynamic of French companies in terms of competitiveness in world markets, these tensions symbolize the multitude of compromises and self-interested arrangements made by science, industry and the state at the expense of complex learning processes and the development of innovative configurations. The failure of NTBFs would be perceived as the failure of the kind of public policies that attempt to demonstrate by example that, now more than ever, science and technology are essential if levels of economic performance and social wellbeing are to be improved.

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Future Studies and new Product Development: Scenario and the Fuzzy Front end

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Abstract: This paper contains reflections on connecting two disciplines, Future Studies and New Product Development. Of the tools and methods that belong to Future Studies, the focus is on Scenario Planning, while within New Product Development, it is the Fuzzy Front End phase of the development process that is highlighted. The paper investigates the literature from these two disciplines with regard to overlapping of useful tools and practices for better performance, i.e. reducing the risk of an unexpected future. It considers possible gaps or lack of interaction between the two disciplines. The paper gives a short overview of Future Studies and New Product Development as a field of study and the tools and methodologies used in Future Studies as well as the Fuzzy Front End of developing products and services. The main theme of the paper is to probe the importance of further research in this area, for dialogue on effective tools that would improve performance and the effectiveness in commercialisations of new product and services. There is literature which underlines the importance of Scenario Planning in this respect, especially in dealing with strategy and innovation planning. Moreover there are also indications and findings that show that the usefulness of this tool can be much wider. Other tools under the discipline of Future Studies are also mentioned as possibilities for dealing with the unpredictable futures and challenges in Strategy Planning, and the process from idea-to-launch. However there is limited research on the benefit of different tools and approaches in the area of Future Studies in connection with performance and effective use in the New Product Development processes. Overall, there is a need to research the commonality of these fields with the objective of improving the innovation and performance of companies. It is also important for these two platforms to foster synergy, thereby increasing knowledge and improving effective management practices.

Keywords: product development, fuzzy front end, scenario

1. Introduction

In societies and businesses, the importance of knowing the past and the present conditions is not questioned. Nor is it much questioned that businesses are moving ever faster toward increased future uncertainties. Although methods and tools of Future Studies have been adopted in the field of Strategy Planning to better address future uncertainty (Mootee 2013, Wade 2012, Bishop et al. 2007), until recently it seems to have been ignored by many researchers and professionals (El Kerdini & Hooge 2013, Rohrbeck 2012, Postma et al. 2012, Rohrbeck 2011, von der Gracht et al. 2010) in the field of New Product Development and Innovation (Rohrbeck 2014).

The purpose of this paper is to discuss possible shortcomings in the integration of the two aforementioned fields of study. Is it possible that there exists a knowledge gap between the fields that needs to be identified and addressed? The focus is mostly on the Fuzzy Front End of New Product Development and the use of Scenario Planning, which is seen as one of the most interesting tools of Future Studies (Coates 1996, Bishop et al. 2007, Rohrbeck 2014). The importance of idea management at the Fuzzy Front End and the lack of research in that area, has been pointed out (Cooper & Edgett 2008). It has also been identified that while there exits considerable research and attention on the incremental process and issues of New Product Development, there is a lack of research on radical or discontinuous innovation concerning New Product Development (Heger & Rohrbeck 2012). It has also been shown that radical or discontinuous innovation can play a vital role in ensuring competitive advantage and profitability of companies (Ali 1994, Kleinschmidt & Cooper 1991). A contribution to better understanding the value of further integration between the two fields of study is of interest, especially in time of emerging technologies and convergence, e.g. on subjects such as nano-, info- and biotechnology and artificial intelligence (Hacklin 2008). Both fields are dealing with the future and how to handle the uncertainty that it generates.

Peter Drucker once pointed out, “the future is always on” and therefore one should not use the time or resources on defending yesterday, (Drucker cited in Rosenstein 2014, p. 4). Drucker (2008, 1996) and many other scholars (Heger & Rohrbeck 2012, Wade 2012, Saritas & Aylen 2010, Bishop et al. 2007, Andriopoulos &
Gotsi (2006) agree that while the future cannot be predicted, it can however be influenced, and it is far too important to leave in the hands of others, or to fate. Knowing the past performance and present situation is vital in every innovation project, but it is both important and necessary to be able to analyse the future (Hamel & Prahalad, 1994), i.e. the upcoming trends which are on the way towards us. Most of the tools in Future Studies have past and present diagnoses as a starting point in the analytical process to anticipate possible futures (Glenn et al., 2003), but when it comes to addressing the future and generating new ideas the methods on Future Studies are not always included. Cooper and Edgett (2008) have for example studied the effectiveness and popularity of methods used by 160 companies in generating new ideas. Eighteen conventional methods were mentioned, three most successful in relation to the criteria were, customer visit, focus groups and leaders user analyses. The methods often listed under Future Studies were not mentioned. One wonders whether this is because of lack of knowledge or effectiveness of the methods in question.

In this paper we are working with the following questions: How can the tools of Future Studies with emphases on Scenario Planning be of added value in reducing risk of failure in the Fuzzy Front End of New Product Development, and why are these tools and methods not used more extensively in this phase of product development, especially when dealing with high-risk product concepts. These questions have motivated our research for quite some time and are based on present and past literature reviews. Although some studies have been focused on this issue (El Kerdini & Hooge, 2013, Postma et al., 2012), the proposition here is that there is a need for further research in this area, especially regarding the potential of using Scenario Planning in the Fuzzy Front End phase (Andriopoulos & Gotsi, 2006).

2. Future studies and future research

One of the most comprehensive overviews on Future Studies and Future Research, including methodologies and tools in recent years, is Futures Research Methodology conducted by The Millennium Project, Global Futures Studies & Research, edited by Glenn & Gordon (2003). Moreover, El Kerdini & Hooge (2013), give a good overview of tools for Future Studies. Rohrbeck (2014) and Coates (1996) have likewise looked at different tools from different points of view.

In his introductory chapter of Future Research Methodology, Glenn (2003), discusses the role and position of Future Studies as a field of study. Glenn points out that both practitioners and theoreticians have not reached consensus on a name or definition for their activities, i.e. should it be referred to as Future Studies or as Future Research. He also states the following: “Futures research is not yet universally recognized as academically an established field for doctoral research. Few universities offer graduate futures degrees. However, countless doctoral dissertations have used the methods discussed in this series and concepts pioneered by futurists. The World Futures Academy organized by the Finnish Futures Academy and the World Futures Research Federation are attempting to create more universal academic recognition. The World Future Society has been a common ground through which many efforts to improve the position of futures research in universities have been facilitated” (Glenn, 2003, p. 7).

Glenn also points out that there are nonetheless assumptions behind Futures Research that most futurists would accept, such as (2003, p. 6):

- You cannot know the future, but a range of possible futures can be known;
- The likelihood of a future event or condition can be changed by policy, and policy consequences can be forecasted;
- Gradations of foreknowledge and probabilities can be made; we can be more certain about the sunrise than about the rise of the stock market;
- No single method should be trusted; hence, cross referencing methods improves foresight; and
- Humans will have more influence on the future than they did in the past.

The changes that take place in the future are shaping the driving forces in society: social and political forces, scientific and technical discoveries and even the forces of nature. But businesses and societies can influence the course of things by systematically exploring possible and desirable futures, threats and opportunities that can be used for better decisions in creating strategies, new products and organizational changes (Cuhls, 2003, Glenn, 2003, Coates 1996, Postma et al., 2012). When it comes to applying Future Studies, Coates (1996, p. 57) has mentioned a few reasons: “Identify what possibilities lie ahead. Negative possibilities are a warning while
positive possibilities may offer new opportunities. Another purpose of exploring the future is to evaluate plans or to identify their likely consequences or outcomes."

There are a range of tools and methods that have been classified under Future Studies. Usually the aims of the tools are to explore and test possible and desired futures. The underlying reason is probably that it is better management to anticipate rather than just respond to changes i.e. be proactive rather than reactive.

Within the literature there are both normative and explorative approaches, as discussed in the following: “Futurists distinguish normative forecasting from exploratory forecasting. Normative work is based on norms or values. Hence, normative forecasting addresses the question: What future do we want? What do we want to become? Exploratory forecasting explores what is possible regardless of what is desirable. This general division of futures work into normative and exploratory can be misleading when applied to methodology. Many techniques can be used for both normative and exploratory forecasting,” (Glenn 2003, p. 9).

One of the classic examples of a normative forecast is the statement by Kennedy to put a man on the moon and bring him back safely. "The normative forecast sets the goal and presents the alternative path to that goal, while the exploratory forecast looks at the forces at play to see where they might lead us," (Coates 1996, p.58).

The following list (Table 1) gives overview of tools and methods used in Future Studies and how they can be related to normative and/or explorative forecasts, and as quantitative and/or qualitative research methods.

**Table 1**: A simple taxonomy of futures research methods (Glenn & Gordon 2003)

<table>
<thead>
<tr>
<th>Method</th>
<th>Quantitative</th>
<th>Qualitative</th>
<th>Normative</th>
<th>Exploratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent Modeling</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Causal Layered Analysis</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Cross-Impact Analysis</td>
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<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Decision Modeling</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>Delphi Techniques</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Econometrics and Statistical Modeling</td>
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<td>X</td>
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<tr>
<td>Environmental Scanning</td>
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<tr>
<td>Field Anomaly Relaxation</td>
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<td>Futures Wheel</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Genius Forecasting, Vision, and Intuition</td>
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<tr>
<td>Interactive Scenarios</td>
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<td>Multiple Perspective</td>
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<tr>
<td>Participatory Methods</td>
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<tr>
<td>Relevance Trees and Morphological Analysis</td>
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<tr>
<td>Road Mapping</td>
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<tr>
<td>Scenarios</td>
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<tr>
<td>Simulation-Gaming</td>
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<tr>
<td>State of the Future Index</td>
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<td>X</td>
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<tr>
<td>Structural Analysis</td>
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<tr>
<td>Systems Modeling</td>
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<tr>
<td>Technological Sequence Analysis</td>
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<tr>
<td>Text Mining</td>
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<tr>
<td>Trend Impact Analysis</td>
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</table>

Our literature research revealed that it seems to be rare that Future Studies are part of the discussion when it comes to the Fuzzy Front End of New Product Development activities or other phases of the process (Rohrbeck 2014). However, there are exceptions showing successful results (Postma et al. 2012). Emphasis is on the current business environment, today’s customers and rivals. Future Studies methods are, however, discussed in a few textbooks. The PDMA Toolbook, 2002, gives a short version: “Scenario planning provides a disciplined approach for imagining and preparing for the future. It stimulates decisions that one would otherwise ignore, and it confronts the prevailing mind-set. The challenge for the company is to use scenario development methods to create multiple views of the future. The multiple views will yield insight into the future environment,” (Belliveau et al. 2002, p. 16.). Crawford & Di Benedetto (2010) discuss Scenario Analysis and the Delphi method in their book, *New Products Management*. The focus is on solving the “future problem of the customer.” Their logic in using the Scenarios in the concept phase is well founded by quoting ex-hockey star Wayne Gretzky: “I don’t skate to where the puck is. I skate to where it’s going to be.” They point out a few drawbacks using the scenarios, for example, that it is hard to do well, the need for choosing the right participants, and that the participants “will likely have difficulty understanding really complex scenarios,” (Crawford & Di Benedetto 2010, p. 136).
Rohrbeck (2014), points out increasing interest in foresight projects, i.e. Future Studies, in recent years and compares the development with the rise of Innovation 30 years ago. Beating the competition requires abilities to track early signals in future trends, and to grasp opportunities at an early stage. Building this capability into a company's infrastructure is an important but difficult task. “Using traditional techniques of evaluating innovations, such as discount cash-flow analysis, to decide which new innovation project to fund would practically always lead to the ones in established product categories being chosen over the ones in new product categories,” (Rohrbeck 2014, p. 1).

3. Fuzzy front end and stages in new product development

New Product Development as a discipline is more established by the theoreticians and practitioners than Future Studies (Brown & Eisenhardt 1995). It is widely accepted to discuss different stages of the New Product Development process (Cooper & Edgett 2012, Brown & Eisenhardt 1995). One of better known processes in this field is the Stage to Gate process laid down by Robert G. Cooper (Cooper 1990). The stage/phase procedure is the fundamental part of developing a successful product (Cooper 2011, Crawford & Di Benedetto 2010). It enables participants to coordinate all the necessary activities for successful product development, and by doing so reduce the risk of failure. New Product Development has also often been divided into two parts:

- The Fuzzy Front End or Pre-Project-Activities, which is a stage of the process whereby the product concept defined,
- The development activities or operational aspect, i.e. managing the process from the concept stage to the successful product on the market.

Many see the Fuzzy Front End as interdependent activities rather than a structural process such as the Stage to Gate process mentioned (Crawford & Di Benedetto 2010, Postma et al. 2012). The main characteristic of this phase of development is uncertainty. This phase has however been defined in numerous ways, for instance identification of opportunity, screening opportunities, idea generation, screening ideas for success and finally developing a product concept. (Belliveau et al. 2002, Friðriksson 2004). The Fuzzy Front End is a fundamental part in successful implementation of development, and is widely accepted (Postma et al. 2012). This is where strategy and investment decisions are needed to be taken. It affects the project portfolio of the company and determines the future profit or losses of the activity in question (Cooper et al. 2001, Cooper et al. 1999, Rosenau & Githens 2005).

The following are some accepted assumptions that most scholars would agree on relating to the Fuzzy Front End in New product Development in terms of Future and forward thinking:

- As has been mentioned, the future is unpredictable and will never be reached as such, but is however always there (Rosenstein 2014).
- Driving forces in an unpredictable world are on the one hand natural and social forces, and on the other hand technical and knowledge based. These forces are the basis for constant changes in business environments, and some of them are accelerating (Glenn & Gordon 2003).
- Changes are managerial issues. To lead and manage one needs to tend to the future and future challenges (Rosenstein 2014).
- Many of the future changes have already started, in the past or today. One needs to look out the window to spot them (Rosenstein 2014).
- One of the riskiest parts in the New Product Development process is the Fuzzy Front End, which is simultaneously one of the most important stages in the process, i.e. where strategic decisions are needed to be taken and product concepts formed (Cooper 2001, Crawford & Di Benedetto 2010, Postma et al. 2012, Ulrich & Eppinger 2012).
- The fundamental platform for New Product Development is the strategic planning of the businesses. This effects the direction and portfolio of the company’s R&D activities (Cooper 2001, 2011).

Although scholars mostly agree that the Fuzzy Front End stage of New Product Development is probably the most vital and riskiest part of the process, one can undermine other stages towards commercialisation. The possibilities of losing track of important trends and market needs, from concept stage to markets, are always reason for concern (Maack 1991). This is of course especially important in radical innovation projects that have
long project duration, e.g. in cases of incorporating artificial intelligence into conventional products such as in developing prosthetic solutions (Össur, 2014) or other high-tech products. One can say that it is the nature of Future Studies, especially in Scenario Planning, to focus mostly on two aspects in the analytical part of each project, i.e. those aspects that have high uncertainty and those that are most important for effective performance (Ingólfsson et al. 2007, Wade 2012). The Fuzzy Front End stage is concerned with the two aforementioned characteristics.

4. Scenarios and scenario planning

In the report mentioned earlier, Futures Research Methodology, Glenn (2003) describes the applications of the scenarios method and it’s strengths and weaknesses. There it is stated that “the term ‘scenario’ comes from the dramatic arts. In the theatre, a scenario refers to an outline of the plot; in movies, a scenario is a summary or set of directions for the sequence of action,” (Glenn 2003, p. 3). In The PDMA Glossary for New Product Development, scenario analysis is defined as “a tool for envisioning alternate futures so that a strategy can be formulated to respond to future opportunities and challenges,” (Glossary in Kahn et al. 2012). Herman Kahn is often named the father of the term “scenario” when he introduced it in connection with strategic studies conducted by Rand Corporation in the 1950s. He defined scenarios “as narrative descriptions of the future that focus attention on causal processes and decision points” (Kahn in Kahn et al. 2012). Strengths of the method that have been highlighted are e.g. participative, rich, broad, systemic, narrative and externally focused, while weaknesses mentioned are lacks of rigor, lacks of consensus, biases and problems regarding quantification (Miller & Waller 2003).

The method is widely used today in an array of situations ranging from analysing global trends for different sectors by international bodies such as World Economic Forum, to being used as a tool in strategic planning in almost all industries in both the private and public sectors (Cuhls 2003, Ingólfssson et. al 2007, Wade 2012, El Kerdini & Hooge 2013). Foresight and scenario activities of large corporates such as IBM and Siamens are well known as strategic and innovation drivers. It has also been shown to be of benefit in design and developing consumer products (Reinders et al. 2006, Mootee 2013).

5. The fuzzy front end and the scenario planning

In the book Product Leadership: Pathways to Profitable Innovation Robert G. Cooper states that new products are critical to long-term success. He emphasizes the importance of keeping the product portfolio competitive, and thereby providing companies with long-term competitive advantages. For that purpose the importance of having a strategy is emphasized and research evidence to support the success of having a well-defined product innovation strategy is pointed out (Cooper 2005).

Both Rohrbeck (2012) and Postma et al. (2012) bring forward the importance of connecting strategy and foresight in product development. Postma et.al. highlight six functions on how scenarios can contribute in the initial phase of product development, i.e. the Fuzzy Front End. These functions are (2012, p. 645):

- evaluation and selection of strategies.
- integration of various kinds of future-oriented data.
- exploration of the future and identification of future possibilities.
- making managers aware of critical environmental uncertainties.
- stretching of managers’ mental models.
- triggering and accelerating processes of organizational learning.

These functions illustrate the reasons why Future Studies are becoming a more important focal point in the field of New Product Development (Rohrbeck 2014), when taking into consideration that development is oriented towards the future and is becoming more and more unpredictable (Glenn & Gordon 2003, Postma et al. 2012). Similarly Cooper’s Innovation Diamond (Cooper, 2005) systematically discusses the interdependencies mentioned. Nevertheless it is worth while to ask why Future Studies methodologies, like scenarios, are not used more by practitioners and researchers in the field of New Product Development. Is it due to lack of awareness, or scepticism of new practices? Are the methods of Future Studies unacceptable, i.e. not trustworthy, too complicated or even to “Fuzzy”? What is the added value for business using the methodology?
There are papers mapping different value contributions using Future Studies, i.e. Scenarios Planning in a very positive ways (Rohrbeck 2012, Rohrbeck 2014, Postma et al. 2012, Rohrbeck & Gemünden 2011, El Kerdini & Hooge 2013, Mietzner & Reger 2005), but there are also questions concerning the implementation and credibility of the methodology (Bishop et al. 2007, Crawford & Di Benedetto 2010, El Kerdini & Hooge 2013, Mietzner & Reger 2005). It seems that “future research often remains on the side line, not integrated with operational and strategic management” (Rohrbeck 2012, p. 440).

6. Conclusion

This paper gives an overview of relatedness and interplay between two disciplines i.e. Future Studies and New Product Development. It highlights important points from a literature review concerning uncertainty in developing products and services. In the following we make use of the Innovation Diamond (Cooper 2005, p. 48) to summarize the discussion and quest for further research.

In the first two parts of the Diamond, i.e. Product innovation and technology strategy, and Resource investment and focus on the right projects, the strategy part of the process is emphasized. The review of the literature indicates that the effectiveness of Scenarios planning is rather well established in the field of strategy and there are new research papers showing the usefulness of the tool in the Fuzzy Front End of the New Product Development. There are also indications of the relevance of this tool in other phases in the process dealing with market uncertainty. Part of the strategy debate is the question about Project Portfolio, i.e. use of R&D resources, which is interrelated with the Product Portfolio Assessment, i.e. the question of right projects and efficient product mix and the management balance between the two parts. Other tools in the arsenal of Future Studies are rarely mentioned in the literature in this respect. From both the literature and the practitioner viewpoint there seems to be a lack of overlapping and/or ignorance among the aforementioned disciplines in this field of research. There also appears to be a lack of awareness and/or appreciation of tools and methodology of Future Studies among the business community in the area of innovation. One of the exceptions from this is the application of Scenario Planning, which has been highlighted more in recent years but further research is apparently needed.

The two aforementioned parts of the Innovation Diamond are the basis for the remaining activities when developing new products. The third part of the Innovation Diamond, The process from idea-to-launch, is a vital process, but more established than the Fuzzy Front End. The role of tools of Future Studies in this area is probably dependent on innovativeness of the project and the project duration, which also partly relates to the fourth part of Cooper’s Diamond which focuses on The right climate and environment for innovation. But the effectiveness of the tools of Future Studies needs to be studied more thoroughly, despite the indications of the benefit of tools such as Scenarios planning (Mootee 2013), and Postma et al. (2012) mentioned two functions in this respect: stretching the manager’s mental models, and triggering and accelerating processes of organisational learning.

While research on effectiveness of most popular methods in New Product Development is of importance, it seems vital to include a new horizon to this field of study by including future oriented methods like Scenario Planning. But further research is needed e.g. on the obstacles of using the methods and on how can they be added value for new products or services.

7. Limitations and further research

This paper is conceptual and is based on a literature research in an area that is of great importance for efficient business operations. While it brings forward an understanding of the subfield of Scenario Planning and The Fuzzy Front End of New Product Development it highlights that more research is needed on numerous activities when dealing with future market uncertainties. Both theoretical and empirical research is needed to improve further the validity and usefulness of tools and methodology of Future Studies, thereby increasing their acceptance by the business community.

References


Karl Friðriksson and Runólfur Smári Steinþórsson


Abstract: Review of relevant literature highlighted that entrepreneurs need help to reflect on, and make sense of, the challenges and opportunities that occur during the entrepreneurial process. For students who are unfamiliar with the entrepreneurial process, the notion of reflection can be even more daunting. The project outlined in this paper was set up to explore the design and development of learning resources to help students make sense of the complexities of an entrepreneur’s learning environment, and to develop effective reflection habits as a means to improving their own entrepreneurial practice. A guided approach to reflective practice was devised for students for use as they enact the entrepreneurial process during their venture creation projects. Although a full evaluation of the project is not yet complete, initial results indicate that students are finding the approach helpful, their fluency in reflection is increased and their understanding of the value of “chewing over” entrepreneurial challenges and opportunities has grown. The breadth and depth of their learning environment seems to be clearer to them, and the importance of developing the habit of reflection is taken on board. Wider application of the project outcomes and outputs is envisaged among nascent entrepreneurs in mentoring / business advisory contexts.

Keywords: entrepreneurship education; experiential learning; informal learning; incidental learning; professional development; learning journal; reflective practice; enactment

“If you want to teach people a new way of thinking, don’t bother trying to teach them. Instead, give them a tool, the use of which will lead to new ways of thinking.” (Richard Buckminster Fuller)

1. Introduction

The document “Enterprise and entrepreneurship education: guidance for UK Higher Education providers” published by the Quality Assurance Agency for Higher Education” (QAA 2012) contains inter alia a timely reminder of some of the key national and international drivers for enterprise and entrepreneurship education, and of the importance for Higher Education Institutes to “offer learning opportunities that are meaningful, relevant and lead to skills that enhance lifelong learning” (QAA 2012:2). The benefits of “learning about and experiencing enterprise whilst still at university” are stressed:

- It gives students an alternative career option and confidence that they can set up their own business or social enterprise. Enterprise skills will also be useful to those in employment, or those who will become self-employed and work on a freelance or consultancy basis, helping develop a ‘can-do’ confidence, a creative questioning, and a willingness to take risks – important to provide readiness for a rapidly changing economy, and to enable individuals to manage workplace uncertainty and flexible working patterns and careers (QAA 2012:4).

One aspect of the Guidance is concerned with the active promotion of teaching and learning strategies that will:

- Foster enterprising and entrepreneurial mindsets
- Develop enterprising and entrepreneurial graduates
- Help students develop enterprising and entrepreneurial capabilities that can be applied in a range of contexts
- Encourage students to consider new venture creation and self-employment as valid graduate career options
- Help students develop an awareness of intellectual assets and enhance their capacity to manage and exploit them
- Enhance graduates’ lifelong learning skills, personal development and self-efficacy, allowing them to contribute to economic growth and to society more generally (QAA 2012:3).

According to the QAA Guidance, the “ultimate goal of enterprise and entrepreneurship education is to develop entrepreneurial effectiveness” (QAA 2012:11), with this effectiveness being defined as the “ability to behave in enterprising and entrepreneurial ways”, and which can be achieved through the “development of “enterprise awareness”, “entrepreneurial mindset” and “entrepreneurial capability” (QAA 2012:10). The Guidance further
emphasises the value of including both opportunities for learning “about” entrepreneurship as well as learning “for” entrepreneurship, the latter typically being achieved through “experiential learning opportunities that engage and enhance the student’s abilities and skills” (QAA 2012:9). However, it is stressed that the focus of experiential learning should not simply be on action, but rather also on reflection:

... It is important to encourage students to reflect on their experiences, and to appreciate the capabilities they are developing and how these can be applied or extended (QAA 2012:14).

Turning to the section of the Guidance on learning outcomes, more detail is provided regarding reflection:

Individuals successful in enterprise or entrepreneurship often have heightened levels of self-awareness developed through reflecting upon, and continually learning from, their actions.

Students should be able to:

• Reflect upon, review and evaluate the solutions they have explored
• Identify personal development needs and other changing factors through the reflective process
• Evaluate their own learning and respond to identified shortfalls (skills gaps)
• Show resourcefulness in seeking development guidance or mentoring from both external and internal contacts.

Delivery should include opportunities for:

• Developing reflection techniques
• Skills analysis
• Reviewing networks
• Self-development
• Action planning
• Use of iterative, discovery and learning processes, including learning from failure (QAA 2012: 20).

Emphasis on the importance of reflection has been stressed for some time in the literature of enterprise and entrepreneurship education. Jack and Anderson (1999), for example, argued that universities should play to their strength of “developing higher level skills and nurturing analytic ability” rather than focussing on a “production line for the creation of low value SMEs” (1999:111). They went on to suggest that the role of universities in “enhancing entrepreneurship” is the “production of reflective practitioners”, that is to say “individuals who, through their knowledge and critical ability, are capable not only of starting new businesses but also of ensuring the continuing viability of businesses by enhancing the capacity for them to develop through a richer understanding of the entrepreneurial process” (1999:111). Pittaway and Cope (2007), in their article on simulating entrepreneurial learning, suggested that the “development of the reflective practitioner” could be achieved in experiential learning “via learning coaches and assessment techniques” (2007:218). The importance of reflection in assessment of practice in enterprise education was stressed in (Pittaway et al. 2009), particularly in activities in which “students ‘feel’ the life-world of the entrepreneur” (2009:81). More recently, Neck and Greene (2011) noted that:

Reflection is particularly important for perplexing experiences, working under conditions of high uncertainty and problem-solving. As a result, it should not be a surprise that reflection is an integral component of entrepreneurship education and also a way of practising entrepreneurship (2011:65).

In their discussion of Donald Schön’s work on reflective practice, Neck and Greene commented that:

... Schön distinguished “reflection-on-practice” (do-learn-think as a process) from “reflection-in-practice” (do-learn-think as a behaviour). [...] Given the nature of entrepreneurship as a continuous cycle of action, learning, testing, and experimenting, developing students as reflective entrepreneurs requires reflection-on-practice and reflection-in-practice as part of a pedagogy portfolio (2011:66).
Despite references, such as those noted above, to the importance of stimulating reflective practice in entrepreneurship education programmes, there is relatively little detail in the research or teaching literature about how enterprise and entrepreneurship educators can, or should, approach this task.

In the light of this gap in the research and practice literature, a project was set up to explore the design and development of learning resources to help students make sense of the complexities of an entrepreneur’s learning environment and to develop effective reflection habits as a means to improving their own entrepreneurial practice. The project team was able to draw on experience working in a number of areas, permitting us to bring together insights from working with graduate interns on work placements in small businesses (Fulford, Marcella and Levie 2013), the design and delivery of entrepreneurship education programmes (see for example Fulford 2010), and research on formal and informal learning in professional practice (see for example Bailey 2011; Bailey 2013; Fulford 2012).

From the outset of the project, it was noted that the task of stimulating reflective practice presents the entrepreneurship educator with challenges which are not unique to entrepreneurship education. First, reflection is perceived by some to be a difficult task (Moon 1999:173), with the “difference between a descriptive account and a reflective or analytical one” often not appreciated (Thompson and Thompson 2008:148). Second, some do not recognise the validity of reflective practice. As Senge et al. (1994) commented in his well-known book on organisational learning ("The Fifth Discipline"):  

If someone is reflecting, it’s considered perfectly acceptable to interrupt them, because “they’re not doing anything.” (Senge et al. 1994:60)

The key implications of these challenges are arguably that in order to be able to integrate reflective practice into our entrepreneurship education programmes, we need to help students grasp the difference between description and reflection, and second demonstrate to them the value of devoting time and effort to reflection during their action-oriented entrepreneurship projects.

We turned to the literature on entrepreneurial learning to gain insights into the issue of reflective practice among entrepreneurs. A brief summary of that literature is provided in the next section, and acts as a basis for the development of the core resources explored and developed during our project. A framework for reflection triggers and a guided / structured approach to reflective practice have been devised to help students learn the skills of reflection and develop the habit of reflective practice. Presentation and explanation of the framework and guided approach to reflective practice form the focus of the remainder of the paper.

2. Background

In his discussion of what makes for an effective entrepreneur, Smilor (1997:344) claimed that “effective entrepreneurs are exceptional learners”. He noted that they require “quantitative information and qualitative insights” and rely on a mix of data, experience, judgement, objectivity and “personal involvement and commitment” 1997:344). Smilor further suggested that as “exceptional learners”, entrepreneurs “learn from everything”:

   … They learn from customers, suppliers, and especially competitors. They learn from employees and associates. They learn from other entrepreneurs. They learn from experience. They learn by doing. They learn from what works and, more importantly, from what doesn’t work.” (1997:344).

Elsewhere, it has been recognised that Smilor’s assumption of a link between entrepreneurship and learning cannot necessarily be taken for granted (see for example Harrison and Leitch 2008:5). Instead, reality tends to present us with a rather more complex situation, in which learning can in fact be inhibited by a tendency to focus on action rather than on reflection (Senge 1995, cited in Harrison and Leitch 2008:5). Deakins and Freel, in their earlier study of entrepreneurial learning and growth in SMEs, also suggested that entrepreneurs need help to draw out the learning from what they experience through enactment of the entrepreneurial process. Focusing specifically on novice entrepreneurs, they argued that:
... there is a role for mentoring support for new and early-stage entrepreneurs, mentors who can show entrepreneurs how to reflect from experience and to absorb knowledge from learning events (Deakins and Freel 1998: 53).

Other researchers have endeavoured to unpack the notion of entrepreneurial learning in order to understand *inter alia* where and how learning occurs, and to provide rather more detail to Smilor’s rather broad-brush suggestion that “entrepreneurs learn from everything” (Smilor 1997:344). For example, in their study of entrepreneurial learning and growth processes in SMEs, Deakins and Freel (1998) highlighted that:

... for SMES to grow, entrepreneurs must be able to learn from decisions, from mistakes, from experience and from their networks (Deakins and Freel 1998:153).

They further observed that the “entrepreneurship and growth process is essentially non-linear and discontinuous” and that it is a “process that is characterised by significant and critical learning events” (1998:153). Importantly, their study found that “the ability of entrepreneurs to maximise knowledge as a result of experiencing these learning events will determine how successful their firm eventually becomes” (1998:153). This seems to align with Harrison and Leitch’s comments (2008:5) mentioned above regarding the fact that learning cannot necessarily be assumed in entrepreneurship.

In their study of the life stories of entrepreneurs, Rae and Carswell (2001) highlighted the important role played by “social relationships” in their learning. All of the participants in Rae and Carswell’s study noted instances of how “they had learned skills and insights from others, including parents, business owners and managers, employees and non-executive directors” (2001:156). Taylor and Thorpe (2004) stress that an entrepreneur’s learning network may be complex, involving a variety of relationships, not simply “a definable spatial entity made up of a finite, identifiable set of individuals such as a breakfast club, business unit or cluster” (2004:204). The entrepreneur’s network is likely to be “fluid”, with the actors in it playing different roles according to the critical events or episodes the entrepreneur experiences and the decisions he or she is faced with making.

Cope and Watts (2000) explored the “learning process of entrepreneurs and its impact on both their personal development and that of their firms” (2000:104). Like the authors cited above, Cope and Watts noted that entrepreneurs’ learning often takes place through “critical moments” or incidents. Echoing Deakins and Freel (1998:53), Cope and Watts also noted, however, that entrepreneurs may need support or mentoring to help them reflect on those moments in order for the learning to take place. Cope (2003) developed this discussion further in his paper on entrepreneurial learning and critical reflection (2003), suggesting that “entrepreneurs can experience distinctive forms of ‘higher-level’ learning from facing, overcoming and reflecting on significant opportunities and problems during the entrepreneurial process” (2003:432).

This brief discussion of some of the literature on entrepreneurial learning serves to remind us that entrepreneurs learn in a variety of ways and in a range of contexts, some formal and some less formal, some planned and some unplanned. What is also clear from the literature is that entrepreneurs may need help to draw out their learning and master the skills of reflection. Returning to Smilor’s (1997:344) statement about effective entrepreneurs being exceptional learners, it can perhaps be argued that those who recognise the breadth of their entrepreneurial learning environment and have also mastered the skill of deep thinking through reflection are the “exceptional learners”. In the next section, we show how we have drawn on these notions of the breadth and depth of the entrepreneurial learning environment in order to devise a framework of reflection triggers for students participating in enterprise and entrepreneurship learning programmes, which then forms the basis of our guided approach to reflective practice.

3. A guided approach to reflective practice

The guided approach to reflective practice outlined in this section was established to help students begin to grasp the complexities of the entrepreneur’s learning environment and to understand how and where learning may occur for an entrepreneur. An important underlying aim of the approach was to alert students to the fact that their learning, in an experiential entrepreneurship learning programme, will take place both inside and outside the classroom, and will typically involve a mix of the formal, informal and incidental (see Marsick and
Watkins 1990 for detailed explanations of the distinctions between each of these forms of planned and unplanned learning).

Before detailing the development of our guided approach to reflective practice, a word of explanation and background regarding our enterprise and entrepreneurship teaching programmes to which our approach is being introduced is needed. Our enterprise and entrepreneurship staff members have responsibility for designing and delivering modules and units to students on undergraduate and postgraduate programmes in a number of faculties and departments, including business and management, law, art and design, and commercial photography. We also contribute enterprise workshops to a range of employability awareness training days for students. In addition, we are involved in a national project with responsibility for delivering enterprise and employability training to both undergraduates and graduates who are employed on placements in SMEs.

Our modules and units include a mix of learning about and learning for entrepreneurship, and involve case studies, discussions of theory, talks from local entrepreneurs, and a range of experiential venture start-up projects. For these projects, we utilise Anderson’s metaphor of theatricality and “enactment” (Anderson 2005) as a means of helping students to adopt the mindset of an entrepreneur and to enact the behaviours of an entrepreneur as they progress through the various tasks required to complete their projects. Anderson made the point that the metaphor of theatricality is a useful one particularly for nascent entrepreneurs (2005:597). In our experience, it is a fruitful one to explore in our learning environment as the notion of enactment helps students enter more fully into the entrepreneurial process.

A feature of our delivery is the use of a number of structured approaches for idea generation, opportunity recognition, business modelling, and so on. To date, whilst reflection has been integrated within our learning programmes, it has perhaps not been as explicit a feature as it is now becoming with the introduction of our guided approach to reflective practice. The approach allows us to highlight to students that reflection is one of the behaviours they need to learn to enact as they go through the entrepreneurial process and develop the mindset of an entrepreneur.

The design and development of our guided approach to reflective practice is detailed below, broken down into a number of stages.

**Stage one:**
Through review of the literature, four key triggers to reflection were selected for use in our approach. In summary, these triggers are:

- **Events:** Refer to reflection triggered by participation in training sessions (typically classroom-based learning activities) or professional development events, and personal/private study.
- **Enactment of the entrepreneurial process:** Refers to reflection triggered by performing tasks during an enterprise or entrepreneurship project, such as the tasks typically forming part of a project to set up a student business (including idea generation, market research, marketing, financial management, and so on).
- **Encounters:** Refer to reflection triggered by networking activity, whether organised and scheduled professional networking events, or more ad hoc meetings or discussions with individuals or groups of individuals.
- **Experiences:** Refer to incidents (positive or negative) that occur during enactment of the entrepreneurial process, including things that go wrong, mistakes made, or opportunities that arise.

Figure 1 below provides an indication of the learning situation for each of these triggers, ranging from the formal, through the informal, to the incidental. It serves to illustrate the breadth of the learning environment that students will be operating within during their experiential learning. We use it as tool to help students understand the range of contexts in which their learning is likely to take place during an experiential learning project in entrepreneurship, and as we introduce to them the notion of enacting the role of an entrepreneur.
Having considered the breadth of the learning environment, our next stage in the development of our guided approach to reflective practice was to look at fostering reflection skills in order to help students grasp the depth of their learning environment. The challenge here, as noted earlier, is that reflection can be poorly understood, with some finding it difficult to move from mere description to analysis and sense making. A glance at the literature of learning and professional development reveals that a number of examples of tools and resources to aid reflection have been developed, with reflective journals or learning logs perhaps being among the most commonly discussed (see for example Moon 1999; Moon 2006). From our own experience of using learning logs with student and graduate interns on residential training programmes (see Fulford, Marcella and Levie 2013), as well as in classes in various business and management disciplines, we recognised that students need help in understanding the difference between description and reflection, and that it takes time for them to develop fluency in the skills of reflection. So, inspired by the “Left-hand Column” technique outlined in Senge et al. (1994) and the “double-entry journal” technique described in Moon (1999), we devised a visual resource to aid the development of reflective fluency in our students.

In summary, we produced a two-sided postcard system for students to use, allowing students to respond to each of the four triggers outlined above (events, enactment, experiences, and encounters) by recording what happened (descriptive) and then reflecting on it (analytical). The visual tool of postcards is introduced to students by discussing with them typical picture postcards from holidays and so on: the picture side representing the recording of the situation (descriptive) and the text side of the card representing the reflective side (analytical). A sample of each side of the cards is shown in Figures 2 and 3 below. Our entrepreneurship modules lend themselves well to the use of these cards as mentoring-type tutorial sessions form an integral part of the students’ experiential learning projects. Students typically work in small teams, and are given copies of the postcards each week. They are encouraged to return to their tutorial the following week ready to discuss the progress of their business start-up project with their mentor/tutor. Part of this discussion involves them bringing their completed postcards, indicating the areas or issues they have been reflecting upon during the week. Through these discussions, and using the two-sided postcard approach, it becomes much easier to convey to students the distinction between recording and reflecting. Experience to date has shown that as a module (or student project) progresses, the students tend to need less help understanding this distinction between description and reflection, and so reflection starts to become a more natural and habitual activity.

Typical examples that students bring to these discussions include planned or unplanned meetings with potential suppliers or potential clients, new opportunities or offers of support that were not originally

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**Figure 1:** Reflection triggers

**Stage two:**
Having considered the breadth of the learning environment, our next stage in the development of our guided approach to reflective practice was to look at fostering reflection skills in order to help students grasp the depth of their learning environment. The challenge here, as noted earlier, is that reflection can be poorly understood, with some finding it difficult to move from mere description to analysis and sense making. A glance at the literature of learning and professional development reveals that a number of examples of tools and resources to aid reflection have been developed, with reflective journals or learning logs perhaps being among the most commonly discussed (see for example Moon 1999; Moon 2006). From our own experience of using learning logs with student and graduate interns on residential training programmes (see Fulford, Marcella and Levie 2013), as well as in classes in various business and management disciplines, we recognised that students need help in understanding the difference between description and reflection, and that it takes time for them to develop fluency in the skills of reflection. So, inspired by the “Left-hand Column” technique outlined in Senge et al. (1994) and the “double-entry journal” technique described in Moon (1999), we devised a visual resource to aid the development of reflective fluency in our students.

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Typical examples that students bring to these discussions include planned or unplanned meetings with potential suppliers or potential clients, new opportunities or offers of support that were not originally
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envisioned, problems (incidents) or setbacks that have occurred in their projects, challenges of team working, and so on.

Using the cards serves also to provide focus and structure to their discussions with their mentor/tutor, ensuring that their contact time is well spent and constructive. We sometimes encourage team reflections, whilst at other times we encourage individual reflections and then use the tutorial sessions to explore the similarities and differences in their recording and reflecting on what has occurred in their project during the week.

Figure 2: Postcard: the “recording side”

Figure 3: Postcard: the “reflecting side”

**Stage three:**
The postcard reflection system outlined above, and used in the tutorial context as a student project progresses, covers essentially quite short-term reflections (typically involving looking back at learning triggers from just one week). We have found that this helps students to rehearse and refine the skill of reflection and
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move away from being merely descriptive. The use of the postcards means that the task is also not terribly onerous from the students’ point of view, but has the advantage of encouraging them to be concise. At this point their reflections are essentially in the form of brief jottings. However, we recognised too that the students need to develop longer term reflective skills, enabling them to aggregate their reflective jottings over the life of a project and piece together a more substantive reflective account of the overall experience. To this end, we use more reflective journals towards the end of a project.

In order to facilitate this, in the third stage of our guided approach to reflection, we have introduced a database of tools to help students plan their learning, produce reflective journal accounts of their projects, and so on. It is envisaged that this database will be a tool they can go on using as they move beyond education into employment or self-employment. Having rehearsed and refined their reflective skills in their taught environment through using the postcard system, we would anticipate that students would be able to use the database resources independently as self-directed learners. In other words, the habit of reflection will have been developed and incorporated into their professional mindset and form an integral part of their professional and entrepreneurial behaviours.

The current features of the database are: an electronic version of the “postcard reflection system”, a free-text journaling facility, a professional skills audit tool, a personal development planning tool, a CV repository, a facility for recording professional contacts, a learning record tool, and an audiovisual guide to developing the skills of reflective practice.

4. Concluding remarks and next steps

Review of relevant literature highlighted that entrepreneurs need help to reflect on, and make sense of, the challenges and opportunities that occur during the entrepreneurial process. For students who are unfamiliar with the entrepreneurial process, the notion of reflection can be even more daunting. The project outlined in this paper was set up to explore the design and development of learning resources to help students make sense of the complexities of an entrepreneur’s learning environment and to develop effective reflection habits as a means to improving their own entrepreneurial practice. A guided approach to reflective practice was devised for students for use during their venture creation projects.

Although a full evaluation of the project is not yet complete, initial results indicate that students are finding the approach helpful. Scrutiny of their completed reflective postcards and analysis of their discussions during sessions with their tutors suggest that as projects progress, their fluency in reflection increases. and their understanding of the value of “chewing over” challenges and opportunities grows. The breadth and depth of their learning environment seems to be clearer to them, and the importance of developing the habit of reflection is taken on board. We note also an increased focus on decision making based on reflection of what has gone before. One finding that we are starting to explore in more depth is the notion of networking: through the use of the reflective postcards, we see evidence of the students beginning to develop contacts who can help them in their projects, and in so doing they are starting to grasp more fully the value of fostering their own learning network. A full evaluation of the approach is currently underway, results of which will be reported in due course.

Beyond the current project, we envisage application of the tools and resources with nascent entrepreneurs in mentoring / business advisory contexts. Furthermore, we are introducing the tools and resources to business and management modules outside entrepreneurship to increase our emphasis on the value of developing reflective practice.

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Entering the World of Nanotechnology: Three Different Perspectives

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Abstract: The aim of this paper is to build a holistic theoretical framework of factors that influence, positively or negatively, companies to enter the nanotechnology industry, with a particular focus on France. Since the beginning of the 21st century governments have invested heavily in nanotechnology research and development (R&D). The understanding and control of matter at such a small scale will impact nearly every industry sector and profoundly change production mechanisms and products of all sorts. After having invested heavily in R&D, governments now turn to new challenges, namely creating a positive environment or infrastructure that allows national companies to venture into this new technology to find new fields of application. Bozeman et al. (2008, p. 750) underline, that the extent and the speed of commercialisation “depend in large part on the extent to which barriers to companies’ adoption and integration of nanotechnology can be identified and then lessened”. The identification of these barriers is thus particularly important for governments in order to win the global nanotechnology race and to support economic growth. Our methodology is based on a systematic literature review on nanotechnology, focusing particularly on three literature streams: the “green” view (e.g. sustainability, eco-design), the entrepreneurship view and the French view. We use the systematic literature review methodology (Tranfield et al., 2003) and thus explain explicitly how we searched for the relevant articles and on which articles we base our conclusions. Our findings show that the three investigated literature streams on nanotechnology (“Green” literature, Entrepreneurship literature and French literature) have some similarities but also several differences. All three literature streams underline the importance of knowledge sharing across boundaries, access to university scientists and facilities, and government intervention in order to accelerate the diffusion of nanotechnology. However, the main differences between the three views is that the “green” view is the only one that puts a lot of emphasis on integrating civil society, the entrepreneurship view particularly underlines the importance of venture capital, and the French view particularly concentrates on the role of clusters. All three views are thus very complementary and important to take into consideration in order to overcome barriers of nanotechnology diffusion.

Keywords: nanotechnology, systematic literature review (SLR), entrepreneurship, France, barriers, policy

1. Introduction

The European Union identified nanotechnology as one of the driving technologies for the coming decade (see Europe 2020 strategy, http://ec.europa.eu/europe2020/index_en.htm, accessed 16 04 2014) and invests heavily in R&D. However, transforming the new nanotechnology inventions into innovations is still a big challenge. Since the beginning of the 21st century governments have invested heavily in nanotechnology research and development (R&D). They now turn to new challenges, namely creating a positive environment or infrastructure that allows national companies to venture into this new technology to find new fields of application. Bozeman et al. (2008, p. 750) underline, that the extent and the speed of commercialisation “depend in large part on the extent to which barriers to companies’ adoption and integration of nanotechnology can be identified and then lessened”. The identification of these barriers is thus particularly important for governments in order to win the global nanotechnology race and to support economic growth.

The management literature focusing exclusively on nanotechnology companies is still scarce (for example Woolley, 2013, Woolley and Rottner, 2008, Bozeman et al., 2008, Thukral et al., 2008, Wang and Shapira, 2012). The literature tends to focus on high technology companies in general (for example Brinckmann et al., 2011, Li et al., 2013, Baum et al., 2013), and to build recommendations on mixed data sets with companies operating in a multitude of different high technology fields (for example biotechnology, life sciences, information and communication technology or nanotechnology). However, there is a necessity for scholars to start focusing solely on nanotechnology companies. Woolley et al. (2008) for example underline that nanotechnology companies need specific policy interventions as they are different from other high technology companies. The particularly of nanotechnology companies is that they “are not unified by a particular purpose or market, but merely share a common focus on the nanoscale”, thus there is no “preexisting path” that they can follow which renders the commercialisation process more difficult (Woolley and Rottner, 2008, p. 796).
Also Schiffauerova & Beaudry, using patent databases, have separately analysed the Canadian biotechnology industry (Schiffauerova and Beaudry, 2011) and the nanotechnology industry (Beaudry and Schiffauerova, 2011). They observed that the development of both industries seem to be different. For example one of their results is that with time "a high number of nanotechnology inventors are leaving and more inventors in less central positions within new nanotechnology specializations emerge. [...] [However, this] is not the case of biotechnology" (Schiffauerova and Beaudry, 2011, p. 362). Clarysse et al. (2005) analyse the incubation strategies of new ventures spinning-out from European research institutes. Their analysis of incubator models is based on biotechnology and microelectronics research institutes. In their conclusion, they underline that it is not clear if the same models would be found in nanotechnology.

2. Methodology

In this paper, we use the systematic literature review methodology (Tranfield et al., 2003), and we explore the existing literature that focuses already solely on nanotechnology. We focus particularly on three literature streams: the "green" view (e.g. sustainability, eco-design), the entrepreneurship view and the French view.

The paper is split in three parts. We first explain in detail the used methodology, then discuss the three thematic literature reviews in detail and finally conclude with a holistic theoretical framework summarizing the important elements that have to be considered in order to accelerate the diffusion of nanotechnology.

Literature reviews in management studies are traditionally conducted in a descriptive and narrative manner (Denyer and Neely, 2004). However, very often these reviews are biased because they only reflect the authors’ perspective which ultimately reduces the utility of these reviews for policy recommendations (Denyer and Neely, 2004). Therefore, due to the explosion of articles and contradicting opinions, more and more scholars urge researchers to conduct systematic literature reviews (SLR) (Tranfield et al., 2003, Pittaway et al., 2004, Leseure et al., 2004, Thorpe et al., 2005, Pittaway and Cope, 2007).

SLR emerged in the United Kingdom among medical professionals (Thorpe et al., 2005, Mulrow, 1994) who underlined the necessity that only through a systematic review of past literature, intelligent policies might be implemented for the future. The literature reviews “should enable readers, whether academics, practitioners or policy-makers, to determine for themselves the reasonableness of the decisions taken and the appropriateness of the conclusions” (Denyer and Neely, 2004, p. 133). The main difference between a traditional descriptive or narrative literature review and an SLR is that in the latter “the [investigation] process is reported openly in the same way that empirical research would be” (Pittaway et al., 2004, p. 480). SLR thus include a detailed methodology section, to render explicit on which data the authors have based their interpretations and conclusion, which thus makes their thought process more clear and creates transparency (Thorpe et al., 2005).

Tranfield et al. (2003) were the first who adapted the SLR methodology to the field of management, and were followed by a multitude of scholars. Denyer & Neely (2004, p. 133) (based on Tranfield et al 2003) summarized in a consistent manner the most important elements that have to be followed in an SLR: “the development of clear and precise aims and objectives; pre-planned methods; a comprehensive search of all potentially relevant articles; the use of explicit, reproducible criteria in the selection of articles for review; an appraisal of the quality of the search and the strength of the findings; a synthesis of individual studies using an explicit analytical framework; a balanced, impartial and comprehensible presentation of the results.” In this section, we first explain the context of this study and then explain in detail how we conducted our literature review to render it transparent and increase the usefulness of this study.

2.1 Context

France is not a worldwide leader in nanotechnology, but recent government investments try to bring France to the forefront of this new technology. Lee et al. (2011) established a country ranking regarding the number of articles published on nanotechnologies (based on the 10 journals with the highest impact factor in the field) and compared 2001 to 2009. The analysis showed that the USA has stayed since the beginning the leading force in nanotechnology publications, as scientists of this country accounted for 43 % of all publications in the field in 2009. The following countries in the ranking are China (13%), Germany (8%), South Korea (6%), England (5%), Japan (5%) and France (4%). France improved its nanotechnology publications since 2001, where it still ranked one place lower, accounting for only 3% of all publications. France is thus still behind similar countries.
like Germany or England but gaining in power. While France increased its relative publication score (+1.4 points), Germany (-2.7 points) and England (-3.8 points) decreased in their relative publication scores compared to 2001.

In 2010, the French government launched a special investment programme of 35 bn euros to support specific sectors considered as particularly important for France in the future and one of these sectors was the nanotechnology sector. In the programme, 22 bn euros went for investment in higher education and research, and 90 million were earmarked for LABEX research consortiums focusing on nanotechnologies (source: http://www.enseignementsup-recherche.gouv.fr/cid55892/comprendre-le-programme-investissements-d-avenir.html, accessed 15 04 2014).

2.2 Three different entrance points to a systematic literature review

In our research, we decided to focus on three major entrance points to explore the literature regarding the barriers and challenges for the “nano” sector: literature focusing on nano* & “green” issues (for example sustainability, eco-design), nano* & entrepreneurship and nano* & France (see Figure 1).

![Image](image_url)

**Figure 1:** Main entrance points to the literature review on barriers for the “nano” sector

*1st literature review: “Green” & Nano*

As mentioned above, our first objective was to explore the topic, and to bring together a wide area of research focusing on challenges to be considered to develop the “nano” sector. Our first literature review was conducted by using different types of databases to explore the barriers related to the development of nanotechnologies in a perspective of sustainability. In this first phase, we conducted a generic research by searching in different types of databases and reading reports (European Commission, OECD) to get a feeling about the state of the art of the field. This first literature review made clear that not much was written on the topic of nanotechnology and eco-design or eco-innovation in management literature. Our next step was thus to conduct a more systematic literature review and to broaden our horizon by not only focusing on management journals.

- **Article search.** We conducted our first systematic article search on the 29th of November 2013. We searched within the document type “Article” and the source type “Journal” for: “nanotechnolog* AND ‘eco-innovation OR green OR sustainab* OR eco-design OR ecodesign OR eco design’” within the title, abstract or keywords. The general subject area was defined as Social Sciences & Humanities. This search allowed identifying 117 articles.

- **Analysis of article search.** All 117 article citations were downloaded into Endnote and based on the abstracts coded into homogenous groups. Even though coding of abstracts is sometimes criticised (Pittaway et al., 2004) due to some quality issues, it is also considered a useful tool “for creating a thematic structure around which more detailed reviewing can take place” (Pittaway and Cope, 2007, p. 481) Due to our previous reading on the topic, we already developed a feeling for the subject which helped us in the coding process. The result of this step is summarized in the thematic analysis chapter.
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2nd literature review: Entrepreneurship & Nano*

The second literature review took a disciplinary stance by exploring journals listed within “entrepreneurship” rankings (Pittaway and Cope, 2007). We selected the most important entrepreneurship journals defined by Harzing’s (2013) quality journal list (see Table 1). After the identification of the most important journals, the search process encompassed several stages:

- **Article search.** Search of “nano**” in every identified journal (search included title, abstract, keywords, and full text) on the 28th January 2014. At this stage we identified that 123 articles in entrepreneurship journals mention the word “nano**”.

- **Article access.** We were able to access and download 102 of the 123 articles. We were not able to download the articles of the “International Journal of Entrepreneurship and Innovation” and some articles of the “International Journal of Entrepreneurial Behaviour and Research” as well as “Journal of Small Business and Enterprise Development”.

- **First article screen.** The first article screen consisted in doing a word search (“nano”) in each of the 102 articles. This full text screening allowed us to classify the articles in three categories (A, B, C). In articles of Category C the word nanotechnology, nanomaterials, etc. was just mentioned but the whole article focused on another empirical or theoretical topic. In articles of Category B, nano companies were part of a high-technology data sample but no explicit conclusions regarding the nano companies were drawn. We identified 9 articles belonging to this category. In articles belonging to the Category A, nano companies were explicitly studied and the dataset was not mixed up with other high-technology companies. We identified 8 articles belonging to this category.

- **Second article screen.** The second article screen was now focusing and studying in detail the 8 articles belonging to the Category A. The result of this step is summarized in the thematic analysis chapter.

To conclude, most important entrepreneurship journals treating the “nano” topic, either within a mixed dataset or in a focused dataset, are “Entrepreneurship Theory and Practice” (6 articles), “International small business journal” (5 articles) and “Small business economics” (3 articles).

<table>
<thead>
<tr>
<th>Journal Title</th>
<th># of articles mentioning “nano**”</th>
<th># of articles accessed</th>
<th># of articles using a high technology mixed data set (“nano** included)</th>
<th># of articles explicitly focusing on “nano**”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics of Innovation and New Technology</td>
<td>17</td>
<td>17</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Entrepreneurship &amp; Regional Development</td>
<td>8</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Entrepreneurship Theory and Practice</td>
<td>14</td>
<td>14</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Industry &amp; Innovation</td>
<td>22</td>
<td>22</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>International Journal of Entrepreneurial Behaviour and Research</td>
<td>4</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>International Journal of Entrepreneurship and Innovation</td>
<td>16</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>International Small Business Journal</td>
<td>13</td>
<td>13</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Journal of Business Venturing</td>
<td>15</td>
<td>15</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Journal of Small Business and Enterprise Development</td>
<td>4</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Journal of Small Business Management</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Small Business Economics</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>123</strong></td>
<td><strong>102</strong></td>
<td><strong>9</strong></td>
<td><strong>8</strong></td>
</tr>
</tbody>
</table>

3rd literature review: France & Nano*

The third and last step focused only on French “nano” articles. This necessity emerged because, as we will still see in the thematic analysis, most of the entrepreneurship journal articles used an American company dataset. As our ultimate goal is to investigate the French nanotechnology world, we decided to do a specific literature search to identify articles that use French nanotechnology data. This search was split into several stages:
Anna Glaser, Claire Auplat and Sonia Ben Slimane

- First article search. We used two databases to track down articles published on nanotechnology in France. The search in both databases took place on the 3rd of April 2014. First we used the French journal database CAIRN. Within this database we searched within the publication type “journal”, within the disciplines “Economics & Management” and “Geography”, and used the search term “nano” in abstract or title. This allowed us to identify 15 articles and one special issue on nanotechnologies (Couveinhes, 2010).

- Second article search. The second article search used the database Scopus in order to track down as well articles published in English language that might concentrate on France and nanotechnology. We searched within the document type “Article” and the source type “Journal” for “nano* AND ‘France OR French’” within the title, abstract or keywords. The general subject area was defined as Social Sciences & Humanities, more precisely we searched within Business, Management and Accounting; Social Sciences; Economics, Econometrics and Finance; and Earth and Planetary Sciences. This second step allowed us to identify 35 articles.

- Merging the first and second article search. Some articles were referenced in both databases (CAIRN & SCOPUS). After eliminating the duplicates, we finally arrived at 39 articles.

- First article screen. The last step was now an article in-depth screening to identify which of the articles contributes to our own research goal, namely identifying the mechanisms that participate to or the barriers that hinder the diffusion of nanotechnology. A total of 5 articles were retained after this in-depth screening.

- Second article screen. The second article screen was now focusing on and studying in detail the 5 articles identified after the first article screen. The result of this step is summarized in the thematic analysis chapter.

3. Thematic analysis

3.1 The “green” view

Nanotechnology will probably transform plenty of products into more sustainable or “greener” products. The application field of this new technology is very large: sustainable textiles, architects using nanomaterials for better air quality or solar functions, enhancing security in food industry, product and workplace design regarding health and safety, sustainable impact on utilities like highway infrastructure, water, or energy. However, as with all nascent technologies, the long-term impact on human beings and the environment cannot be measured yet. Rivera et al. (2012, p. 807) underline in their article that it is “imperative that all stakeholders including industry, academia, government entities, and the public adopt a proactive attitude to ensure that nanotechnology matures in a sustainable manner.” Table 2 summarizes our findings regarding the role of the individual stakeholders in the development of a “green” nanotechnology.

<table>
<thead>
<tr>
<th>Main stakeholders</th>
<th>Main challenges per stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic</strong></td>
<td>- Inadequate number of universities involved in nanotechnology activities and reorganisation of research necessary (Iyuke et al., 2007)</td>
</tr>
<tr>
<td></td>
<td>- Integrated approaches and targeted transdisciplinary research collaborations from the earliest stages (Faunce et al., 2008)</td>
</tr>
<tr>
<td></td>
<td>- Awareness raising initiatives already necessary during primary and secondary education (Sharma et al., 2012, Lee et al., 2006, Tafrova-Grigorova et al., 2011)</td>
</tr>
<tr>
<td><strong>Business</strong></td>
<td>- Value chain gap: a gap between the promises of nanotechnology and its integration in products (Manoharan, 2008)</td>
</tr>
<tr>
<td></td>
<td>- Paradigm change in innovation management: nanotechnology is processed based and not technology product based (Gopalakrishnan et al., 2010, Linton and Walsh, 2008b)</td>
</tr>
<tr>
<td></td>
<td>- Brokering: collaboration is crucial but barriers of collaboration might exist which comprise the positive outcomes of the collaboration endeavour (Maccoby, 2009)</td>
</tr>
<tr>
<td></td>
<td>- Commercialization: is driven by small and medium-sized firms, SMEs seem to be more “adept at addressing social needs which appear to be key factors in the nano-commercialization process” (Andersen, 2011, p. 680)</td>
</tr>
<tr>
<td></td>
<td>- Valuation: new for nanotechnology companies, model needed (Coleman, 2005)</td>
</tr>
<tr>
<td><strong>Civil Society</strong></td>
<td>The integration of civil society as early as possible in order to generate trust and understanding (Groves, 2011, Hällström, 2008, Harwood and Schibeci, 2008)</td>
</tr>
<tr>
<td><strong>Government</strong></td>
<td>Government has a role regarding implementing policies to regulate nascent science &amp;</td>
</tr>
</tbody>
</table>
### 3.2 The entrepreneurship view

In this section we focus on nanotechnology articles published in entrepreneurship journals. The first important result is that there are very view articles focusing only on the nanotechnology industry. A multitude of entrepreneurship studies base their results on mixed databases of high-technology companies, that include nanotechnology companies, but also several other high-technology companies. Altogether, we identified only eight articles focusing exclusively on nanotechnology companies, and those mostly focused on the USA.

One important element for the development of a nanotechnology sector seems to be the implementation of government policies targeted to support this sector (Woolley and Rottner, 2008, Woolley, 2013, Bozeman et al., 2008, Wang and Shapira, 2012) or the use of opportunity recognition frameworks in laboratories (Linton and Walsh, 2008a). On the entrepreneurial level some dos and don’ts were identified (Wry and Lounsberry, 2013, Thukral et al., 2008, Groen et al., 2008).

Table 3 summarizes several important factors that might help the nanotechnology industry to diffuse faster. The diffusion can be accelerated either by creating a more favourable institutional environment or by certain behaviour of the entrepreneur himself.

**Table 3:** Summary of the entrepreneurship view

<table>
<thead>
<tr>
<th>Institutional environment</th>
<th>Behaviour of entrepreneur</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General:</strong></td>
<td><strong>General:</strong></td>
</tr>
<tr>
<td>- Implementation of Economic (for more short term results) &amp; Science &amp; Technology (for more long term results) policy initiatives (Woolley and Rottner, 2008)</td>
<td>- Certain decisions taken by the nano entrepreneur can also foster its development.</td>
</tr>
<tr>
<td><strong>Specific:</strong></td>
<td><strong>Specific:</strong></td>
</tr>
<tr>
<td>- Fostering systemic coevolution and boundary obfuscation (Woolley, 2013)</td>
<td>- Focused patenting (horizontal or vertical) allows accessing more venture capital (Wry and Lounsberry, 2013)</td>
</tr>
<tr>
<td>- Providing access to early stage capital (Bozeman et al., 2008)</td>
<td>- Developing a long term vision (not only a patent-licensing strategy) (Thukral et al., 2008)</td>
</tr>
<tr>
<td>- Providing access to university equipment and facilities (Bozeman et al., 2008, Wang and Shapira, 2012)</td>
<td>- Balanced development of strategic, economic, cultural &amp; social capital (Groen et al., 2008)</td>
</tr>
<tr>
<td>- Using idea generation and opportunity recognition models to foster commercialization in laboratories (Linton and Walsh, 2008a)</td>
<td>- Limiting the strategic, cultural, social, and/or economic distance between one’s company and one’s partner (Groen et al., 2008)</td>
</tr>
</tbody>
</table>

### 3.3 The French view

In this section we focus on articles that analyse challenges and main factors that enhance the development of nanotechnologies in France. The five articles we retained for this analysis adopt a systemic approach by comparing empirically the French cluster “Minalogic” in Grenoble to European clusters such as Catania in Italy (Baglieri et al., 2012), and Twente in Netherland (Robinson et al., 2007), or describe in depth the French nano cluster (Therme, 2008, Finardi, 2013). The comparison concerns mainly the nanotech clusters “in charge of brokering research and other collaborations between research, education and industry” (Baglieri et al., 2012, p. 249). The main results are summarized in the Table 4.

### 4. Conclusion

The systematic literature review (SLR) approach provided us with an original methodology for mapping the challenges and barriers facing the nanotechnology diffusion. Based on an SLR search process we identified articles in three different categories that all treat the nanotechnology issue from a different angle: the “Green” angle, the Entrepreneurship angle and the French angle. Despite the differences of the three categories, the
results also highlight some common elements. Figure 2, graphically illustrates our talk. We identified three recurrent issues in all three streams of literature:

Table 4: Summary of the French view

<table>
<thead>
<tr>
<th>Cluster features</th>
<th>Implications for policy makers</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Geographic proximity: opportunities for hybridization as scientists (from academia or firms) may share research facilities (Finardi, 2013, Baglieri et al., 2012, Robinson et al., 2007, Therme, 2008)</td>
<td>- Strengthen diversity within the cluster both at the organizational and scientific levels (Finardi, 2013, Baglieri et al., 2012, Robinson et al., 2007)</td>
</tr>
<tr>
<td>- Coexistence of competing actors: competing actors (in coopetition) explore different technological trajectories and slow down potential lock-in (Baglieri et al., 2012, Therme, 2008)</td>
<td>- Public initiatives should encourage collaboration outside the cluster (Baglieri et al., 2012)</td>
</tr>
<tr>
<td>- Collaboration with external actors: to avoid lock-in of the clusters within an existing trajectory (Therme, 2008)</td>
<td>- Pay attention to actors who are important in the global network (and not located locally) (Baglieri et al., 2012)</td>
</tr>
</tbody>
</table>

Figure 2: Summary of literature review

- **First, sharing of knowledge across boundaries**: in order to facilitate the emergence and thus a greater efficiency in the diffusion of nanotechnologies, the three views underline the role of trans-disciplinary scientific collaborations with the aim of enhancing integrated approaches and targeted collaborations using complementary expertise.

- **Second, access to university scientists and facilities**: The nanotechnology domain is complex. The easy access to scientists as well as to capital-intensive equipment and facilities would accelerate the experimental phase of scientific results but also enhance their industrial implementation. The proximity between scientists and industrials could also enhance further collaborations and increase the company’s reputational value to attract more venture capital.

- **Third, the government implication**: This point is evident for all the three different literature views but the type of implication may differ from one view to another. Indeed, according to the entrepreneurial point of view, government play a crucial role of financial support at the early stage to support the development of startups in nanotechnologies in order to avoid the valley of death, whilst the nano activity is emergent and the risk of market failure is high. It could also play a role in promoting ideas generation. According to the
“Green” view, the role of government is more institutional and consists mainly in implementing policies to regulate nascent science and technology domains and to support the creation of schools involved in nanotechnology. Finally, according to the French view, and specifically in the case of clusters, governments have to strengthen the diversity of collaborations not only between actors within the clusters (at the organizational and at the scientific level) but also to the “outside” world.

Finally, an interesting observation concerns the role of the civil society. The “Green” view is the only view that highlights the importance and necessity to integrate the civil society as early as possible in the nanotechnology process in order to avoid future problems in their diffusion.

This research allowed us to discuss a broad spectrum of challenges and barriers for the diffusion of nanotechnology. However, this research also has some limits, first of all we focused on French, “Green” and entrepreneurship literature but we did not focus on innovation or general management literature. This could be another article in order to broaden our theoretical framework. Secondly, it “just” stays a literature review and is not yet an empirical paper. However, our objective is to confront our different identified categories with an empirical fieldwork in the future.

Acknowledgements

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The Analysis of Business Preferences to use Internal and External Sources of Research and Development

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Abstract: The research and development is a critical process providing business technological competitiveness and progressive position in innovation systems. The perspectives of this process are largely determined by research facilities of a business community and enterprise linkages in the area of external research and development (R&D) performed by government and higher education organizations. In turn, such primary factors as a stage of technological development, which a country is passing, an economic situation, a state of business environments, design and power of public policy affect business preferences in choosing the internal and external types of R&D sources. In the study, business preferences are derived from complementarity and substitution effects of R&D sources and changes measured by shifts in their employing. Effects of complementarity and substitution are discussed in terms of interactions of macro-objects, i.e. institutional sectors. The main sector is a business enterprise one. The other institutional aggregates are higher education and government sectors. Linkages inside sectors are not considered. The study takes into consideration two groups of countries. The first one encompasses European innovation leaders, outsiders and countries occupying a middle position in terms of innovation. The second group comprises a number of BRICS countries: Russia, China and South Africa. In addition to the BRICS countries, Korea as a holder of the technological frontier of these countries is taken into consideration. The investigation shows that the business preferences for using internal and external sources of R&D depend largely on primary factors. Particularly, if a country proceeds to the development stage driven by national innovation, the external R&D sources of business sometimes replace internal ones during economic downturns. As a result, the cross-sectoral linkages between business enterprises and non-business organizations doing R&D are disturbed. For a country being on the investment-driven stage of development, the opposite effect, i.e. the substitution of internal business R&D sources with external ones takes place. This phenomenon creates a danger of a significant weakening of business research capacity. However, a strong public policy in R&D area can counteract the negative impact of these factors or reinforce their positive influence.

Keywords: R&D, internal and external sources, substitution, complementarity, business preferences

1. Introduction

The research and development (R&D) increases the knowledge stock and allows enterprises, involving the use of this stock, to “devise new or enhanced materials, products, devices, processes or services” (OECD 2002).

The effectiveness and perspectives of this process are largely determined by business research capacities and industrial relationship with external R&D sources. Business preferences for employing these sources may vary due to the development of a new paradigm of innovation activity under the influence of uncertainty and complexity of technological and economic conditions (Teece 1986, 1992; Narula 2001, OECD 2013). In recent years, to build their innovative capabilities, more firms track an ‘open innovation’ approach (Chesbrough 2003) and leverage their internal and external R&D facilities (Hagedoorn and Wang 2012). They open their boundaries for tapping into external knowledge (Berchicci 2013).

The literature devoted to examinations of business preferences in choosing between internal and external sources of R&D draws considerable attention to the complementarity and substitution of these sources (Cecagnoli, et al. 2014). On the one hand, a number of recent empirical studies demonstrate that the complementarity takes place between them (Cassiman and Veugelers 2006, Lokshin et al. 2007, Catozzella and Vivarelli 2014). On the other hand, the rich body of research literature identifies the presence of substitution effects between internal and external R&D activities (Laursen and Salter 2006; Vega-Jurado et al. 2009; Watkins and Paff 2009, Hess and Rathaermel 2011).

Some papers address to a trade-off between these sources of R&D activities, their substitution and complementarity. For example, Berchicci (2013) tries to answer the question how this trade-off influences the firm’s innovation activity. Grimpe and Kaiser (2010) point out that firm’s research resources could be destroyed if the firm relies strongly on external R&D sources and its competitors have a full access to these sources. Besides, R&D outsourcing prevents sometimes to build the firm’s integrative capabilities that are required to absorb
and effectively employ external knowledge (Helfat and Raubitschek 2000; Weigelt 2009). Hagedoorn and Wang (2012) conclude that internal and external R&D sources are substitutive at low levels of in-house R&D, and complementary at higher levels of in-house R&D investments.

For the most part of the above-mentioned papers, the object of study is a company and its external relations. The latter are considered as a result of interactions between the company and actors which occur both within and outside the business community. This means that the actors of the interactions can be individual firms, universities, research organizations, etc. The subject of this study is not an individual enterprise or an entity caring out R&D but aggregates of these actors. These aggregates are specific institutional sectors. The main one is a business enterprise sector. The other institutional aggregates are higher education and government sectors, which are the most significant external sources of R&D for the business enterprise sector in national innovation systems.

Therefore, the notions of the business research capacity and R&D relationships in this study have a different meaning in comparison with these of micro-level studies (Narula 2001, Lokshin et al. 2007, Watkins and Paff 2009). The study considers the internal research capacity of the business enterprises sector not only as facilities of companies of the sector but also as characteristics of their interactions. In other words, the internal business research capacity is defined as an aggregate of the R&D capacities and relations of firms inside the business enterprise sector. In turn, the business external linkages describe the interaction of the business enterprise sector as a whole with other institution sectors in the field of R&D.

The indicator of business inclination for external sources of R&D is the value of business investment in R&D performing by higher education and government sectors. The study refers to this investment as external (extramural) business expenditure on R&D. For the similar indicator of business orientation for internal research capacity, the business enterprise expenditure on R&D performed in the business enterprise sector is used. According to the accepted terminology, this indicator is named “internal (intramural) business enterprise expenditure on R&D”

The primary (macro) factors are associated with characteristics of a stage of country’s development, an economic situation, business conditions, efficacy and dimensions of impact of public policies on R&D. Business preferences are derived from complementarity and substitution effects of internal and external R&D sources and changes measured by shifts in their employing. Effects of complementarity and substitution are discussed in terms of interactions of macro-objects (i.e. sectors), and linkages inside sectors are not considered.

The research uses the following constituents of statistic information:

- Business spending on internal research capacity covered by data on Expenditure on Business Enterprise R&D (BERD financed by industry).
- Financing of external R&D sources provided by data on Government Intramural Expenditure on R&D (GOVERD) and Expenditure on R&D in the Higher Education Sector (HERD) financed by industry.

The information of primary factors is derived from the data about GDP in constant dollars in PPP, the ease of doing business index of World’s Bank and the economic literature concerned public policy in the R&D area (Taxand 2011; Deloitte 2012, OECD 2013). The main sources of statistics are databases of Organization for Economic Cooperation and Development (OECD) and the World Bank. To ignore or downplay the scale effect of national economies, the corresponding types of R&D spending are measured in terms of their share of GDP.

2. The analysis of the dynamics of business expenditure on research capacities and external R&D relationship

In the frame of this paragraph, the levels of the corresponding country’s R&D expenditure components are compared with the EU-15 average. It is worth noting that the EU-15 includes the following 15 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

Among the developed EU countries, Finland and Germany possessed the most advanced relationship and capacities in R&D area. However, the corresponding indicators of expenditures were significantly higher in Finland than in Germany in 2003. It is worthwhile to note that the growth of business expenditure on both inter-
nal and external sources of R&D occurred in 2007-2009. However, in 2010, business sector R&D financing on external sources decreased in Finland while increased in Germany. The EU-15 as a whole had demonstrated a growth of this indicator, albeit this rise was small. Eventually, by 2010, the business expenditure on external R&D in Finland became lower than in Germany and the EU-15 average (1.3 and 1.5 times, respectively).

In Finland, the following factors triggered a decline of this indicator relative to the EU-15 average: 1) the reduction of the business funding for the HERD and GOVERD, relatively; 2) the increase of the EU-15 average of this kind of funding. As a result, despite a slight drop of business R&D expenditure, the gap between the expenditures on internal and external sources had grown significantly. In this country, the sharp decline of business spending on external R&D linkages may be associated, by and large, with the rather acute economic crisis of the last decade (see paragraph 3).

![Graph](image)

**Figure 1:** Business expenditure on internal and external R&D in EU countries (relative to the EU-15 average)

As regards business expenditure on internal and external R&D sources, France and Czech Republic lagged far behind both Finland and Germany. In France, the pre-crisis trend of falling business spending on internal research capacities persisted up to 2008. The trend changed to an upward tendency in 2009-2010. Czech Republic had the opposite tendency. In 2007, the fall reversed pre-crisis trends of augmentation of business expenses on internal R&D. Only since 2010, these expenditures had begun to grow. In 2011, the value of this indicator exceeded the pre-crisis level.

The crisis years exhibit a drop in spending on external sources of R&D in both France and Czech Republic. In 2010, this trend changed only in France when the expansion of the corresponding expenditures occurred. In total, France exceeded the EU-15 level of business expenditure on internal research capacities.

The business enterprise sectors of these two countries, as well as that of Finland, diminished the relative level of support for relations with other R&D doing sectors during the crisis. They tried to preserve and develop their internal research facilities. It is worth noting that the business community of Czech Republic, furthermore, raised the funding of these facilities. The expenditure level measured relative to that of the EU-15 average became higher.

In the second group of countries, the stable growth of business expenditure on internal research capacities is peculiar to China. China’s business expenditure outstripped the EU-15 average. In Korea, there was a reverse tendency from 2008 to 2010. Meanwhile, despite the downward trend, Korea’s expenditure on internal research capacities was around twice that of China and more than twice the EU-15 average in 2010 (Figure 2).
The business expenditure on external R&D sources had an oscillatory nature from 2003 to 2010 both in China and Korea, but there was a tendency to increase their value. In the EU-15, the tendency of growth of the business expenditure on external sources of R&D took place, but the growth rate of the EU-15 average was much higher than the corresponding rates in both countries (Figure 2). As a result, in 2010, the countries' business expenditure on external R&D sources decreased greater than the EU-15 average, although they had remained above the level of this average. It is worth noting that, in China, the expenditure exhibited abrupt reduction in 2010, and their value became 1.4 times lower than in 2003.

In Russia, as in South Africa, there was a general tendency to reduce the business expenditure on internal R&D, but the fall was more profound for Russia than for South Africa. In 2010, the Russian expenditure turned out 1.5 and 4.8 times lower than that of South Africa and EU-15 average, respectively. In these two countries business expenses on external R&D sources decreased during the crisis years. However, the depthness of the drop in the expenditure varied considerably. In South Africa, the value of these expenses was 1.45 times lower in 2008 than it had been in 2003, while, in Russia, these expenses decreased only by 10% in 2003-2010.

3. Analysis of business preferences for in-house versus external R&D

To determine a change of business preferences for internal or external R&D sources, the growth rates of components of business enterprise expenditure on R&D are used. These components are correspondingly the intramural R&D (BERD) funding by business enterprises and expenditure on external sources (HERD and GOVERD) financed by industry. In this paragraph, the growth rate of each component is expressed as a percentage ratio of its current value to one in 2000.

If the growth or fall of the expenditures on external or external sources of R&D is observed, this suggests that the effect of complementarity takes place. Otherwise, if the values of these indicators have opposite dynamics, the substitution effect appears. When this occurs, the R&D source having a positive rate of expenditure growth displaces the other one which has negative dynamics.

In 2003-2010, the effect of shifting business interests to a more intensive use of external relations in R&D doing was observed for the EU-15 as a whole. During these years, the relative growth of business investments in external sources of R&D was outpacing the business expenditure on intramural R&D for the EU-15 as a whole. By 2010, the business spending for internal R&D was up by 7% while the expenditure on external R&D had a 39% increase (Figure 3).
Below, the shift of business interests is measured by the difference between the growth rates of R&D expenditures for external and internal sources, relatively. With regard to the case just mentioned, such a shift was 32% in 2010. However, as far as the pace of expenditure growth of the EU-15 increased for both external and internal R&D sources, the effect of complementarity of these components was in evidence.

**Figure 3:** The rates of the growth of internal and external business R&D expenditures of EU countries (relative to 2000 as base year)

Among the countries of the first group, Germany had the greatest value of the displacement of business preferences. This value was significantly higher than the EU-15 average and equaled to 78%. In France, despite the increase in growth rates of business enterprise expenditure on extramural R&D, the business interest shift was zero. This means that French enterprises had not changed their preferences for R&D sources funding. Besides, the effect of complementarity had also taken place for the considered period (Figure 3). In Finland and Czech Republic, the values of shifts in business preferences were negative and equal to -12% and -47%, respectively. This demonstrates the business intention of a preferential use of their research facilities. It is worth noting that the growth rate of the Czech business enterprise expenditure on internal R&D in 2010 was 1.2 times the EU-15 average. At the same time, substitution effect took place in both Finland and Czech Republic.

**Figure 4:** The rates of growth for internal and external business R&D expenditures of BRICS countries and Korea (relative to 2000 as base year)
*The growth rates for South Africa are given with respect to 2001; the data for 2010 are not available and the corresponding figures are taken for 2009.

In the second group of countries, the shift of business interests towards using external sources was observed for Korea and Russia just as for the EU-15 as a whole (Figure 4). The positive values of the shift (10% and 61%, respectively) argue that this phenomenon took place. However, while Korea had an effect of complementarity, in Russia, there was a substitution effect. The later means that there were inclinations of Russian enterprises to substitute their research facilities by outside sources of R&D performance.

On the contrary, in China and South Africa, there were shifts in business preferences to support their internal research capacities. In 2010, the values of these shifts were negative and equal to -123 % and - 43%, respectively. According to Figure 4, there was also an effect of complementarity. However, while this effect had a negative value in South Africa, both components of R&D expenditures were growing in China. At the same time, it is worth noting that the increase of Chinese business enterprise expenditure on the external R&D was negligibly small (only 1% increase in 2010 relative to 2003) while business spending on internal R&D was almost doubled in this period.

4. The primary factors determining business preferences for using internal and external sources

The business preference between employing either internal or external sources of R&D is affected by various factors. However, ones determining the shape of this impact can be identified as the following: stages of technological development, which countries are passing, conditions of the economic situation and business environment and public policy in R&D area.

*Czech Republic.* During 2000-10, the substitution of external R&D sources with internal research facilities of enterprises occurred. In addition, the intensive growth of R&D investments in the business research facilities was observed. It should be noted that the growth of these investments had also led to a significant increase in the number of business enterprise researchers (Figure 5).

![Figure 5: Growth rates of business enterprise researchers (FTE) as a percentage of labor force (relative to 2000 as base year)](image)

The investment flow into internal R&D capacities had been increased possibly due to business expectations to quickly surmount the crisis that had a financial nature. The creation of new technologies based on using business R&D facilities could allow enterprises to get competitive advantages in advance of a post-crisis period. The incentive to develop these facilities was also enhanced by diminishing interaction opportunities due to deterioration of the business environment during the crisis period. The additional factor of enlarging the substitute for external linkages was a need for the country to pass the investment-driven stage and attain the Eu-
European level of enterprise research capacities. The design of public policy also supports the orientation to develop in-house R&D (Taxand 2011; Deloitte 2012 OECD, 2013).

Finland. In this country, as in Czech Republic, there was also a similar substitute for internal R&D sources during the study period. However, the shift of business interests was significantly lower in in Finland than in Czech Republic and caused by entirely different reasons. Among these reasons was the considerable crisis of the national economy. In Finland, the crisis impact was greater than in any other country of the first group. The significant decline in GDP rate (more than 6 %) in 2009 confirms this conjecture. In addition, there was business environment deterioration, evidenced by declining the ease of doing business index. This decline could result in the weakening of business incentives for high-risk investments including ones in R&D performed by outside organizations. The direct government support of cooperation and partnership in the R&D area mitigated, by and large, the effects of these negative factors.

France. The effect of complementarity could be caused by relatively stable economy development (GDP growth declined with a drop of 0.6 % in 2009) on the one hand and by well-balance conditions for business doing on the other hand (Table 1). Besides, the French enterprises have had significant tax incentives to investment in in-house research facilities. These tax incentives deal with human resources in science and technology. As a result, a relatively high rate of growth of domestic research facilities has taken place (Figure 5), and the growth rates of business expenses on internal R&D exceeded ones on external R&D.

Germany. In Germany, the reduction of GDP growth rate in 2009 was about 4%. Despite this decrease, the country has managed to achieve a pre-crisis level of business funding on R&D in 2010. The domestic business, possessing high absorptive capacity and being stimulated by government programs, displaced preferences to investment in external R&D sources. The conditions of doing business also contribute to this preference shift.

China. China’s transition to the next development stage gives priority over any other matter in public policy. In other words, the transition is supported by a strong public policy design. The country has been improving steadily business environment, and its economy has been rather stable despite the global disturbances. While the effect of complementarity of different types of R&D sources took place, China demonstrated the highest growth rate of business investment in internal R&D capacities. In 2010, the increase of this rate was 94% relative to the rate level in 2003. The number of researchers in the business enterprise sector as a percentage of labour force grew significantly in 2010.

Russia. In Russia, the outside R&D became a considerable substitute for intramural R&D. The reason of this phenomenon is a weakening of the research capacity of Russian companies during last 10-15 years. By 2010, the number of researchers (in full time equivalent) as a share of national labour force equaled only 70 % of the corresponding value in 2000, whereas the value of this indicator was 80% in 2007. The weakening of the research capacity was caused not only by the economic crisis but also by a significant decrease in competition during the “fat” years (2003-2006). The low research capacity makes enterprises seek external sources of R&D, and it occurs despite the deterioration of the business environment (Table 1). The infirmity and inconsistency of public policy does not allow business to overcome the negative trends.

South Africa. The country is passing the investment-driven stage. The situation foreshadows the necessity of its domestic business to invest in developing own research capacities. This proposition is confirmed both by a shift of business preferences for financing outside R&D and an increase of the number of researchers (Figure 5). Nevertheless, the level of investment in in-house research became significantly less than that of the EU-15 average (see paragraph 1). However, over the decade from 2000 to 2010, South Africa was the only country of the group in which the business reduced investments both in internal and external R&D. The extent of this reduction depended on pessimistic business expectations in consequence of the economic crisis. The GDP growth rate diminished between 2008 and 2009. However, in 2010, it was still almost 95% of the pre-crisis value of the GDP growth rate. Against the backdrop of the crisis, business conditions got progressively worse. In the R&D area, the design of public policy was not powerful enough to compensate for these negative effects.

Korea. In Korea, the level of business research facilities exceeds the EU-15 average. The trends of funding on various sources of R&D by business are similar to these in the EU-15. In particular, the effect of complementarity occurred. At the same time, there were strong preferences of Korean business to invest in their internal
research facilities. The public policy supported this inclination. Its dimension and design focused business incentives on caring out internal R&D. In recent years, the public policy has encouraged also small high-tech enterprises to develop their own research capacities. Along with these incentives, the improvement of the economic situation and business environment also induced domestic companies to invest in external R&D.

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5. Conclusions

In recent years, the business of the most of EU countries has focused on the development of external relations with R&D sources. This happened in many respects owing to the existence of the advanced research capacities of business in these countries. The overall increase in business enterprise expenditure on R&D in the EU-15 was based on an effect of complementarity. The extent of the crisis and the worsening of the economic situation had not affected these trends.

Among EU countries, there are few exceptions, such as Finland. In this country, the study has revealed the substitution of external business R&D sources with internal ones. This deviation from the common trends is, apparently, associated with considerable impact of the economic crisis.

Among BRICS countries passing the investment-driven stage, China was the most consistent in shaping the business research capacities. However, the complementary effect took also place, i.e. the use of external sources of business R&D was growing, albeit very slowly. The analyses of the dynamics identified the factors associated with: 1) the China’s rapid economic growth, 2) the business environment that is the most satisfactory among BRICS countries, 3) the considerable public support for business investment in R&D.

The most severe impact of the crisis on business preferences for using outside R&D sources has been observed for South Africa. The situation is different for Russia and Korea. In these two countries, there was a shift of business interests to external R&D sources. However, if, in Korea, the effect of complementarity was just the case, in Russia the substitution of internal with external R&D sources occurred.

In Korea, the effect of complementarities was driven by factors such as a favorable business environment and effective government policy. These factors largely neutralized the short-term negative influence of global economic downturns. The Russian substitution effect was a result of opposite factors, i.e. significant deterioration in the economic and business environment, inefficient government R&D policy. As a result, despite the ongoing need to pass the investment-driven stage, business expenditure on the internal research capacity had declined sharply by 2010

Thus, the preferences of business to use internal and external sources of R&D depend largely on factors such as a stage of the country’s development, an economic situation and a state of the business environment.

Under the influence of economic downturns, the complementarity may change the substitution of R&D sources. Particularly, if the country proceeds to a development stage driven by national innovation, the external R&D sources of business can replace internal ones during economic crises period. As a result, the cross-sectoral linkages between business enterprises and non-business organizations doing R&D are disturbed. Finland gives just such an example of these disturbances. For a country being on the investment-driven stage of
development, the opposite effect, i.e. the substitution of internal business R&D sources with external ones, is able to occur. This phenomenon (see also Hagedoorn and Wang 2012) creates a danger of a significant weakening of business research capacities. Russia demonstrates the likelihood of this situation.

The study shows that strong public policy in R&D area can counteract negative impacts of these factors or reinforce their positive influence. Besides, the effectiveness of public policy is largely determined by its impact on the uprise and efficacy of substitution and complementary effects needed to pass by a country the corresponding stage of technological development.

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References


The Co-Operative Difference in Behavioural Innovativeness

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Abstract: Innovativeness is a decisive factor for a firm’s performance since it reflects its capability to adapt to changing conditions. When behavioural innovativeness is concerned, the socially oriented activities of co-operatives suggest that specific values and behaviours within such organisations may influence their innovativeness. Hence, this research aims at better understanding how this co-operative difference impact on the co-operative innovativeness. In order to answer this objective, the research focused on the particular case of the Fédération des caisses populaires acadiennes (FCPA), a Canadian second-level financial service co-operative, and 13 of its credit unions. A questionnaire was administered online to a population of 888 employees, with a response rate of 65.1% (578 respondents). The component analysis of 9 statements on behaviours and values oriented towards innovation and improvement resulted in two factors accounting for a satisfactory 62.5% of the variance. The two factors represented components of the behavioural innovativeness in terms of the supervisor’s transformational leadership, and team collaboration. Hypotheses were made suggesting the positive relationship between the two factors and behavioural innovativeness as expressed by the commitment of the employees towards the success of the cooperative and the improved quality of its services. Moreover, it was suggested that a co-operative difference, as perceived by the employees, would positively affect the relationship between the cultural factors and the behavioural innovativeness. Results of the structural analysis of the conceptual framework, using Lisrel 9, showed a significant and positive full mediation of the co-operative difference between the supervisor’s transformational leadership and the co-operative behavioural, and a partial mediating role of the co-operative difference between team collaboration and behavioural innovativeness. These results are of interest for cooperative managers. With a focus on specific human resources practices aimed at enhancing an innovative culture at the management and the team levels, they could contribute to build a co-operative difference in the workforce and from these efforts, develop the organisational commitment towards innovation.

Keywords: co-operative difference, behavioural innovativeness, transformational leadership, team collaboration, innovative culture

1. Introduction

Innovation defines in great part the competitiveness of enterprises since it allows for their renewal and adaptation, or even their setting of a new industry. This is not exclusive to commercial business since social enterprises also face changing demands, and fight against commercial enterprises for the best resources, the best practices, the best offer. It is the case of financial service co-operatives and credit unions that have to distinguish themselves in the very competitive industry of financial services in order to answer the changing demands of their members and succeed in their social mission.

In such a context, innovativeness describes the capability of an organisation to innovate in terms of innovation output, product or service newness, process improvement, or innovative culture. Although it may be difficult to assess the innovativeness of an organisation, these last factors allow for the identification of elements that contribute to a continuous capability to innovate. Of interest for the social enterprises such as financial co-operatives and credit unions is their specific social goal that may contribute to their distinctive culture, and hence to their innovativeness. From the point of view of governance, for example, financial co-operatives differ from capitalistic firms due to their democratic management and their efforts to respond adequately to the social and economic needs of their members. In other words, the specific values and behaviours inherent to financial co-operatives could possibly foster their preparedness and culture towards change and innovation.

Based on the idea of a socially driven distinction in co-operatives, the objective of this research is to better understand how organisational behaviours and values oriented towards innovation and improvement could benefit from such a co-operative difference, as perceived by the employees, to contribute to the co-operative’s innovativeness. In order to answer this objective, the research focuses on the particular case of Fédération des caisses populaires acadiennes (FCPA), a Canadian second-level financial service co-operative, and 13 of its
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credit unions. This financial co-operative faces many challenges in its competitive industry, among which the recruiting and retaining of skilled labour, the offering of innovative and competitive services, all in fulfilling its social goal of servicing its members. Thus, the FCPA needs to innovate to remain competitive while retaining its co-operative social mission. As such, the FCPA becomes a representative field to study the possible influence of a co-operative difference on the innovativeness of the social enterprise.

In the coming sections, both the concept of innovativeness and the nature of co-operatives are described in order to address the more specific case of behavioural innovativeness in co-operatives. Hypotheses are then formulated regarding the relations between organisational behaviours and innovativeness, and the influence of a co-operative difference in that relationship. Then, we explain the methodology used to study the case of FCPA, including the survey, factorial analysis of innovativeness components, and structural equations involving the concepts being studied. Results and then presented and discussed. Finally, a conclusion presents and overview of the research and its contribution to the management of co-operatives.

2. Theoretical framework

2.1 Innovativeness

Innovativeness of an organisation is seen as its propensity to innovate in a durable manner (Salavou, 2004). Forced to adopt a more adaptable posture in their competitive environment, organisations consider innovativeness as a strategic resource that can provide them with a competitive advantage (Gopalakrishnan and Damanpour, 1997).

Several research streams exist on the concept of innovativeness, and innovativeness is nowadays seen as involving multiple dimensions such as output innovativeness, product innovativeness, technological innovativeness and strategic innovativeness (Pallas et al., 2013). Following their review of various researches, Wang and Ahmed (2004) identify the presence of five areas that determine the overall innovativeness of an organisation: product innovativeness, market innovativeness, process innovativeness, behavioural innovativeness, and strategic innovativeness. This research follows their perspective as it better serves our purpose involving the cultural aspects of innovativeness through its dimension of behavioural innovativeness.

According to Wang and Ahmed (2004), the dimension of behavioural innovativeness represents an organisational sustained capability for change towards innovations, as shown in an innovative culture with an overall internal receptivity to new ideas and innovation. Because of its reach through the entire organisation, behavioural innovativeness reflects innovativeness at the individual, the team, and the managerial levels.

The individual component of behavioural innovativeness depends essentially on the willingness of the individual to change (Hurt et al., 1977, cited by Wang and Ahmed, 2004). Then, at the team level, innovativeness lies in the synergy among the team members so that the team adapts to change (Loveace, Shapiro and Weingart, 2001). Finally, Riney (1999, cited by Wang and Ahmed 2004) explains that the managerial component of innovativeness results from the management’s willingness to change, their encouragement for new ways of doing things, and their support for new ideas.

Altogether, these components at the individual, team and managerial levels contribute to the behavioural innovativeness of the organisation and construct its innovative culture. In consequence, behavioural innovativeness is not based on punctual innovation events. Instead, it is measured through the organisational commitment to change and innovation (Avlonitis, Kouremenos and Tzokas, 1994). In the case of the financial co-operative at study, similar behavioural innovativeness could be measured with commitment to quality and adaptation for success.

2.2 Co-operatives

Defourny & Develtere (1999, 16) define social economy as: “The social economy includes all economic activities conducted by enterprises, primarily co-operatives, associations and mutual benefit societies, whose ethics convey the following principles: 1. placing service to its members or to the community ahead of profit; 2. autonomous management; 3. a democratic decision-making process; 4. the primacy of people and work over capital in the distribution of revenues”. In Canada, the Chantier de l’économie sociale add a fifth principle: 5.
“and operations based on the principles of participation, empowerment, and individual and collective accountability”.

Those principles are compatible with the three sets of statements (values, ethical values and principles) proposed by the International Co-operative Alliance (1996) to define the specific nature of co-operatives and guide their decisions.

In Canada, caisses populaires and credit unions are the most important co-operative sector. At the end of the first quarter of 2014, they had 10.1 million members and $314 billion in assets. There were 702 financial service co-operatives all around the country offering services in 3,007 locations. (CUCC, 2014)

The FCPA operates since 1936 in New Brunswick, a province of Eastern Canada. This second tier co-operative is owned by a network of 15 local caisses populaires. They are active in 53 locations and serve 150,000 members. The total assets of this financial network are $3.4 billion (FCPA, 2014).

2.3 Behavioural innovativeness in co-operatives

2.3.1 Role of the managerial innovativeness

At the managerial level of behavioural innovativeness, we recall that management’s willingness to change, their support of the employees’ development and their openness to new ideas are necessary to implement an innovative culture in the organisation. To our point of view, these characterize the management’s leadership style.

Bass and Avolio (1994) define leadership as the ability of an individual to influence, motivate and mobilize others in a lasting manner for them to contribute to the group or to the organization efficacy. In other words, it is through leadership that management could inspire, influence and guide their employees towards change and improvement.

According to Bass (1985), a same leader could adopt different behaviours described as transactional and transformational leadership along a continuum called leadership range. At one end of the continuum, transactional leadership bases its influence on daily exchanges between the leader and the followers whereby the transactional leader provides his followers with contingent rewards in exchange for their success in attaining role objectives. As shown by Tremblay et al. (2005), the exchanges are of economic nature and they seek to achieve accrued performances. However, Bass (1997) explains that transactional leadership may be better suited for stable environments where expectations towards contingent rewards are clear and attainable. In consequence, transactional leadership would not be as efficient in managing organisations involved in dynamic environments.

At the other end of the continuum, transformational leadership reaches beyond the daily performance for it seeks to transform a vision into reality (Bass 1997).Thus, transformational leaders demonstrate to the members of the organisation the importance of their contribution. Doing so, they help the members in expanding their horizon beyond their personal interests in order to achieve the collective mission. Four dimensions characterize transformational leadership. First, the leader has an idealized influence on the employees who emotionally identify to their leader. The leader becomes a model to follow for he or she is able to concretise a captivating vision beyond the actual reality. Second, the transformational leader inspires and motivates his or her employees so that they adhere to the organisational objectives and find in them a meaningful cause. Third, the transformational leader seeks to stimulate intellectually his employees in order to develop their conceptualization competences. They are seen as collaborators who can question actual practices and who have the potential to learn, to be creative and innovative. Finally, the transformational leader considers each employee individually in order to provide a rich support and advice with coaching or mentoring (Bass and Avolio 1994).

In the context of a co-operative where the organisation is built on collective values and a social mission, transformational leadership is seen as the appropriate style of leadership to influence and guide the members. As it gathers the members along the same collective goal, transformational leadership enhances the employees’ satisfaction, their commitment and trust. As a result, the transformational leader motivates the
members in out-of-role performance such as innovation (Podsakoff et al. 1998; Korek et al. 2010). For these reasons and because leadership is more strongly perceived from the direct leader, we formulate a first hypothesis as follows.

**H1:** Leadership of the direct supervisor is positively related to the behavioural innovativeness of a co-operative.

### 2.3.2 Role of team innovativeness

For the last twenty years, we have seen an increasing and considerable trend in implementing work teams. These work collectives, especially those of semi-autonomous workgroups (SAW), represent the most advanced form of work organised in teams because of their high degree of autonomy (Roy, 1999), which provides the members with a power of decision during the act of production itself.

In implementing SAW, organisations seek for the ultimate benefit of a competitive advantage. In fact, organisations using SAW rely on the will of their employees to deploy discretionary efforts in order to be more productive. Hence, they estimate that they will distinguish themselves from competition because the final production will result from the integration of specific competences from their workforce. According to this stream of ideas, implementing SAW would seemingly represent a change of paradigm in the ways to manage organisations, from a model based on authority and supervision to one oriented on the principles of empowerment and responsibility (Saba and Dolan, 2013).

In the literature, some failures have been reported in implementing this kind of work structure (Dessler, 2009) mainly regarding the work experience of the workers and their productivity. Some reasons being evoked concern peer pressure, augmentation of the workload, or even more invisible forms of supervision within the computer production system (Bélanger, Giles and Murray, 2004). On the other hand, other experiences have allowed organisations to positively distinguish themselves, as they report gaining productivity, reducing their rejection rates, lowering their operation costs or their production cycle times (Roy, 2001).

However, it appears that salaried satisfaction towards their work experience in teams, as well as their efficiency as a team, depend on several factors: training of the workforce, demonstration of a solid leadership from the management, formulation of clear collective goals, pertinent selection of personnel, constructive retroaction on the co-workers’ performance, good work climate, trust within the team, etc. (Dessler, 2009; Mathieu, Maynard, Rapp and Gilson, 2008). But most important in the success of a team is that such factors concretely result in the emergence of productive behaviours on the part of co-workers (Aubé and Rouseau, 2009). First, with regards to the structural dimension of the collective work performance, one can find the elaboration of a collective work plan, and the collective agreement to adhere to it and to control its implementation. There is also the support of co-workers for innovation in order to efficiently integrate new practices in the work collective. Second, the more social dimension of collective work evokes behaviours that bring interpersonal support within the team so that a better quality of interaction is favoured among the members. Hence, behaviours related to co-operation among the co-workers, sharing of information, psychological support among peers, and efficient conflict management all contribute to successful semi-autonomous workgroups.

Obviously, the emergence of such behaviours implies a considerable dose of trust among the co-workers as well as with the immediate supervisor since the role of the latter then relates to that of a coordinator or facilitator who helps the team accomplish its mandate in an autonomous fashion (Roy, 2001).

In sum, these structural and social circumstances favour the emergence of productive behaviours that allow for a substantial optimisation of team cohesion, and performance criteria based on creativity and innovation. Such behaviours foster the idea of providing the organisation with a durable competitive advantage as it can count on the commitment of its workforce towards change and improvement.

Following this, a second hypothesis is formulated.

**H2:** Team synergy is positively related to the behavioural innovativeness of a co-operative.
2.3.3 Role of a difference in values and behaviours in co-operatives

We have defined the specific nature of a co-operative in section 1.1. As illustrated by Marcoux, Guihur & Leclerc (2014), this setup creates particular managing rules for the employees and hence influences the HRM practices. Using a construct to measure the co-operative difference, they identify the determinants of the employees’ perception of a co-operative difference through the HRM practices and verify the existence of a relationship between the perception of the co-operative difference, organizational commitment, socio-demographic variables and the employee’s intent to leave the organization. The co-operative difference bundle was composed of four statements: link between the co-operative nature of the organization and commitment, contribution to the mission, being important for the organization, and being part of a team.

Those statements are directly linked to some of the principles that define a social enterprise: participation, empowerment, and individual accountability. Even if we are not analysing the case of a worker co-operative, it is important that the values that define the organization go beyond the specific relation between the co-operative and his members, meaning savers and borrowers.

The employees’ perception of a co-operative difference directly influences their relationship with supervisors and colleagues. If so, it should also determine their attitude towards innovative behaviour. Those links brings us to the following hypotheses:

\( H_3a: \) The co-operative difference mediates the relationship between the supervisor’s leadership and the co-operative behavioural innovativeness

\( H_3b: \) The co-operative difference mediates the relationship between the team synergy and the co-operative behavioural innovativeness

The three hypotheses are illustrated in the following theoretical model (Figure 1).

![Figure 1: Theoretical model of behavioural innovativeness in co-operatives](image)

3. Research design

3.1 Sample

Many validated questionnaires are available in the literature on employee satisfaction and commitment. (e.g. Weiss et al., 1967; Mowday, 1982; Lee et al., 2001; Meyer & Herscovitch, 2001) Our questionnaire builds on those tools and adds specific items about co-operative difference. A total of 92 items were included (questions, statements and personal information). Statements were measured using a scale from “strongly disagree” (1) to “strongly agree” (5), completed with a “no response” option (6).

Two groups of employees were invited to participate to an online survey, those from the Fédération des caisses populaires acadiennes (from March 19th to April 6th, 2012) and those from 13 credit unions (from November 19th to December 14th, 2012). This network of financial service co-operatives operates mainly in French speaking regions of New Brunswick, a province of Atlantic Canada. Total population included 888 employees. The response rate was 65.1% (578 files). In this type of survey, it is never easy to validate the quality of the sample. The only benchmark that we have is the distribution of the population by gender. There are 82.3% of women in the population and 80.4% of women in our sample. This small underrepresentation of women in our sample is acceptable.
3.2 Factorial analysis

To define the components of behavioural innovativeness both at the management and team levels, we included 16 statements in a component factor analysis using orthogonal rotation and a loading factor ≥ 0.6. The Bartlett’s test of sphericity was statistically significant (sig.<0.000), indicating that sufficient correlations existed among the statements (variables) to proceed to the analysis (Hair et al., 2010). Two factors resulted, defined by 9 statements and accounting for a satisfactory 62.50% of the variance. Based on the statements they included, the factors were given the following interpretation. First, the transformational leadership of the direct supervisor with 6 statements related to the supervisor’s openness and support towards the workers and the trust felt by the workers for their supervisor (Cronbach α = 0.88). Second, team collaboration was defined by 3 statements on the support among co-workers and their perception of a good work climate in their unit (Cronbach α = 0.65)1. Appendix A sums up the statements and the results of the factor analysis.

The proposed conceptual model made of our hypotheses also included second and third levels of relations with two latent variables. The co-operative difference variable was composed of four statements (Cronbach α = 0.79) while behavioural innovativeness consisted of three (Cronbach α = 0.60). Appendix B identifies the statements for each latent variable.

3.3 Structural equations

In order to select an estimation method for the confirmatory analysis of our model, we evaluated the normal distribution of the different variables. As in many surveys about employees’ perception and commitment, the data were positively biased. Because they were also ordinal, a recommended estimation procedure is the diagonally weighted least squares (DWLS). According to Mîndrilă (2010), DWLS provides more accurate parameter estimates compared to maximum likelihood (ML), and a more robust fit of the model to the variable type and non-normality. The DWLS procedure of Lisrel 9 was thus used for this structural equations modeling.

4. Results and discussion

The results of the structural equations representing our hypotheses involving the specific components of the factorial analysis are shown in figure 2. All relationships but one are found to be statistically significant between the innovativeness components at the managerial and team levels, the co-operative difference, and the behaviourally innovativeness. Accordingly, hypotheses 2, 3a and 3b are confirmed with regards to a positive relationship between team collaboration and behavioural innovativeness, and a positive influence of a co-operative difference between both the supervisor’s transformational leadership and team collaboration, and the behavioural innovativeness of the co-operative. Hypothesis 1, however, on a positive and direct relationship between the supervisor’s transformational leadership and behavioural innovativeness is found inconclusive.

Altogether, this model possesses a satisfactory goodness-of-fit to explain the observed data. We used several statistical tools suggested by Mîndrilă (2010) to evaluate the validity of the measurement model, or in other words, the quality of the structural equations’ model. First, the root mean square error of approximation (RMSEA) results in a statistic of 0.0625, which reflects a fair model fit as it falls between 0.05 and 0.08. Second, the standardized root mean square residual (SRMR) of 0.0573 is also satisfactory. It reflects the size of the fitted residuals, and also indicates a better fit when the statistic is lower. Finally, the adjusted goodness of fit index (AGFI) shows how much of the variance is explained by the model. Here, its value of 0.987, above the criteria of 0.95, indicates that the model fits the data very well (Hair et al., 2010).

According to these results, the behavioural innovativeness of the co-operative is positively influenced by managerial innovativeness and team innovativeness through the concept of a co-operative difference.

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1 Although the Cronbach’s α is below the usual 0.70 limit to be considered acceptable (Nunnally, 1978), the validity of this value is found acceptable down to 0.60 (Robinson et al., 1991). The main reason to explain this weak value is that few items measure the concept (Hair et al., 2010). Future research should include additional statements.
**Figure 2**: Empirical evidence of a co-operative difference in behavioural innovativeness

Even more interesting is to note that there is no significant direct link between the managerial innovativeness, in the form of the supervisor’s transformational leadership, and the behavioural innovativeness of the co-operative. In other words, the supervisor’s leadership can only enhance behavioural innovativeness through the co-operative difference perceived by the workforce. Because only an indirect link may be observed between the supervisor’s transformational leadership and behavioural innovativeness, it can be concluded that the co-operation difference act as full mediator of the relationship (Hair et al., 2010). Hence our results indicate that enhancement of the co-operative behavioural innovativeness requires the building of a co-operative identity among the workers before it can profit from managerial practices like transformational leadership of the supervisor.

On the other hand, a partial mediation of the co-operative difference as perceived by the employees occurs between team collaboration and behavioural innovativeness of the co-operative. Indeed, team collaboration directly influences the behavioural innovativeness of the organisation. However, the enhancement of innovativeness through a co-operative difference is significant and brings a better explanation of the variance, hence confirming a partial mediation of the co-operative difference in this relationship (Hair et al., 2010). Thus it can be interpreted that team innovativeness built through team collaboration profits from the leverage of a co-operative identity on the part of the co-workers to enhance the behavioural innovativeness of the co-operative in terms of commitment to improvement.

These results also offer rich interpretation for managerial practices. First, it can be observed that the perception of a co-operative difference has a very strong and significant impact on the behavioural innovativeness of the cooperative. It is thus of interest to build such a co-operative identity among the workers. Then, our model identifies two human resource management practices that directly contribute to the construction of such a perception of co-operative difference, those being the transformational leadership of the supervisor and team collaboration. Regarding transformational leadership, our model stresses the importance of supporting the development of the worker’s potential, trust and recognition from the supervisor in order to nurture the perception of a co-operative difference, and then the commitment of the employee towards improvement. Previous research shows the significant link between the perception of being supported and the employees’ commitment (Rhoades and Eisenberger, 2002). Also, Clegg et al. (2002) find that trust involved in the innovation process rises the expectancies that the organisations takes one’s ideas seriously and hence, facilitates ideas implementation. On the side of team collaboration, our model suggests to seek for mutual support among the workers and their appreciation of an agreeable work climate. Nsenduluka and Shee (2009) find similar results whereby group climate and group self-efficacy are significant predictors of service innovativeness.

In sum, these results shed light on the role a perceived co-operative difference could play in enhancing the behavioural innovativeness of a co-operative. Such a co-operative identity would be necessary to transcend

---

**Significance level:** * (p<0.05); **(p<0.01); *** (p<0.001); n.s. (non significant)
the managerial component of the co-operative behavioural innovativeness, and would leverage the impact of team synergy on this form of organisational innovativeness.

5. Conclusion

The importance of innovation for social enterprise like financial co-operatives has been discussed, which led us to the objective of better understanding how a co-operative difference could influence its behavioural innovativeness.

This project has advanced knowledge on co-operatives’ innovativeness in a number of ways. First, an empirically derived model was developed that identifies the role of a distinctive identity in the behavioural innovativeness of the organisation. The stronger the co-operative difference perceived by the employees, the more its cultural innovative components of leadership and team collaboration impact on its innovativeness. Second, this study showed that such a co-operative difference act as a mediator between the components of innovativeness and the overall innovative capability. Thus, it brings finer and specific understanding of the mechanisms involved between organisational characteristics of co-operatives and their behavioural innovativeness.

The results are also of interest for the managers of co-operatives. Although some human resource management practices such as motivation from transformational leadership, or empowerment through teamwork are known to favour innovativeness, co-operative managers should first put efforts towards building a co-operative difference in the eyes of the employees. Indeed, our research finds that the perception of a co-operative difference is necessary before the leadership can inspire the employees towards improvement, and that it leverages efforts of team collaboration in adapting collectively.

Future research should seek to include other components of behavioural innovativeness at team and managerial levels. Moreover, the results of this research are limited to a single co-operative network. It would be important to study other co-operative networks, from the financial sector and others. Finally, future work should include more items to measure the concepts and then strengthen the structural analysis.

Appendix A: Results and statements from the factorial analysis of main components

<table>
<thead>
<tr>
<th>Component</th>
<th>Cronbach’s α</th>
<th>Statements</th>
<th>Factor loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor’s transformational leadership</td>
<td>0.88</td>
<td>34. My supervisor is open to hearing my opinions or feedback.</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>35. My supervisor helps me develop my fullest potential.</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>44. The collaboration between employees and supervisors is adequate.</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45. The way supervisors show team spirit is satisfactory.</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>46. My supervisor does what he/she says and says what he/she does; therefore, I can trust him/her.</td>
<td>0.78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>55. I am satisfied with the recognition I get from my supervisor for work that’s well done.</td>
<td>0.71</td>
</tr>
<tr>
<td>Team collaboration</td>
<td>0.65</td>
<td>27. I am satisfied with being able to help my colleagues.</td>
<td>0.62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60. I am satisfied with the working climate in my unit.</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>61. I am satisfied with the supportive attitude of my co-workers.</td>
<td>0.90</td>
</tr>
</tbody>
</table>

Appendix B: Statements in latent variables

<table>
<thead>
<tr>
<th>Concept</th>
<th>Cronbach’s α</th>
<th>Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-operative difference</td>
<td>0.76</td>
<td>18. Since it is a co-operative, my commitment with FCPA-credit union is stronger.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31. I feel I am contributing to FCPA-credit union’s mission</td>
</tr>
<tr>
<td></td>
<td></td>
<td>32. I feel I am important to FCPA-credit union.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33. At FCPA-credit union, I feel part of a team working towards a shared goal.</td>
</tr>
<tr>
<td>Behavioural</td>
<td>0.60</td>
<td>19. I am willing to take on additional projects and tasks in order to</td>
</tr>
<tr>
<td>Concept</td>
<td>Cronbach’s α</td>
<td>Statements</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>innovativeness</td>
<td></td>
<td>help FCPA-credit union be successful.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>69. I am ready to put a lot of effort to help FCPA-credit union offer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>higher quality service to members and customers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>71. I feel personal accomplishment when I deliver high quality service</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to members and customers.</td>
</tr>
</tbody>
</table>

References


The Enterprise Dynamic Indicators Matrix: Top Management Tool for Stable and Mature Process Sustainability

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Abstract: The current evolution of the world economy influences the enterprises’ behavior in relation to their customers, shareholders and society. Therefore, the strain of the organizations to reach excellence in business is even greater than ever. More managers are interested in creating a robust business with stable and mature processes in order to create value and profit. The current paper highlights the importance of the integrated approach of the customers, strategic objectives and continuous improvement. For this purpose, the author presents an instrument, The Enterprise Dynamic Indicators Matrix (EDI – Matrix), created to sustain an organization transformed from an unstructured one into a structured organization with mature and stable processes able to generate satisfaction to the customers, profit to shareholders and safety to society. The author presents a case study made into a Farmland Register Romanian Company with the main objective to help design and validate the EDI – Matrix. Thus, in order to create the instrument, the author used six steps methodology split into two phases. The purpose of the first phase was to develop a transfer matrix in order to identify the relation among critical factors of the business and in the second phase, with the help of the transfer matrix and other concepts and methods, to obtain the main instrument EDI – Matrix. The concepts used for this research were “Business Process Management”, “Lean Six Sigma”, “Design for Six Sigma”, and “Balanced Scorecards”. In addition, for developing and calibrating the transfer matrix, the author involved the multiple regression analysis and other advanced linear algebra tools. The results of the paper show a consistent increase of productivity and company turnover (amounts doubled) during monitored period. The future steps of this initiative are to broaden the area of interest of making research in “online services”, “e-commerce” and other industries in order to validate the benefits of the tool (EDI – Matrix) and the method. As a result, the instrument proved to be useful to the company management. The implications are important for practitioners (entrepreneurs and managers) as well as for researchers and academics, who are interested in developing management tools. The paper presents an original method for Land Book Registration service area to design a cyclic tool able to generate and sustain stability and profit. The designed instrument helps the company to adapt continuously to environment changes by monitoring the correlation among relevant elements of the business in a holistic way. Paper relevance: Innovation in Land Book Registration is something not very usual in Romania. From this perspective based on our current information our paper is a premier, because it combines Balanced Scorecard and Transfer Function Matrix (survey of the key variables) with continuous improvement initiatives in a consistent way through the Enterprise Dynamic Indicators Matrix, designed by the author based on Process Management and Lean Six Sigma philosophy.

Keywords: land book registration, process management, transfer function, multiple regression, balanced scorecard, lean six sigma

1. Introduction

The author of this paper conducted a three year research (2011 – 2014) in order to design a general method to transform the unstructured activities of a traditional hierarchical company activating in services area into mature and stable processes. The experiment had been successfully deployed within a Cadaster Company involved in farmland Land Book registration (Iorga, 2012, 2013). The author developed a method to conduct the transformation, which concluded with an original result named Matrix of the Enterprise Dynamic Indicators - created to harmonize and to continuously adapt the company’s processes to the dynamic environment. In order to accomplish this tool, the author was inspired by concepts as Business Process Management, Six Sigma, Design for Six Sigma and Lean Operations (Iorga, 2012), (Breyfogle, 2003), (Pyzdek and Keller, 2010), (Yang and Haik, 2003). Moreover, the paper proposes to management the EDI – Matrix as a valuable tool able to link three important areas of the business: customers, strategic objectives and continuous improvement for process-oriented organization from services area. The current paper shows some of the barriers faced by the research team and the solutions adopted by the author to capitalize the mathematical models and theoretical concepts from practical perspective.
2. Literature background

The major issue in traditional companies (from a functional point of view) is the “silo effect” over the information flow and over the production processes. A negative element is the oversight of the real objectives, when different functional areas face particular events (Jeston and Nelis, 2008). In general, the challenges generated by the “silos” inputs and outputs are seen as elements that must be “passed on” to the following department as soon as possible with negative impact on the overall process (Pyzdek and Keller, 2003), (Breyfogle, 2003). Therefore, over the years many companies decided to solve their problems using continuous improvement philosophies (TQM, JIT, Lean, Six Sigma) in order to optimize the results of their activities by identifying and fulfilling their internal and external customer needs (Pepper and Spedding, 2010). After the success of Six Sigma implementation at Motorola and General Electric, some of the specialist and academic researchers identified the importance of an effective linking of the two critical areas, strategy (using Balanced Scorecard) with continuous improvement (Lean Six Sigma) (Duarte, et al., 2012). Thus, one of the business dimensions mentioned by Kaplan and Norton (1996), Business Processes, start to be treated as the leverage element for performance achievement. As Pourshahid said, “Business processes and their management have always represented challenges for organizations. These difficulties are now amplified by processes that are often cross-functional in the organization or that are crossing the organization’s boundaries.” (Pourshahid et al, 2009). From this perspective, Hayler and Nichols (2006) propose a new approach integrating Business Process management (“structured approach employing methods, policies, metrics, management practices and software tools to manage and continuously optimize an organization’s activities and processes”) with Six Sigma methodology, thus enhancing the continuous improvement effect using the power of the process centered organization philosophy in the endeavor to reach operational excellence.

3. Methodology

The author developed a two-phase design method and each phase has three steps. In the first phase, the objective is to create a correlation instrument of process variables vs. result critical parameters (Iorga, 2012 and 2013) and in the second phase the objective is to design the Matrix of the Enterprise Dynamic Indicators (EDI – Matrix), Figure 1.

![Diagram](image-url)

**Figure 1**: EDI matrix methodology – phase 1 – transfer function matrix

The end of the first phase was marked by the creation of a Transfer Function Matrix, which represented the main driver of the processes' transformation. Thus, in the first step, the author together with the organization management decided the objectives, the strategy of the project, the project members, and the scope of the project. In addition, in the first step, the author involved the people from the process to build the frame of the future Transfer Function Matrix (TFM). The design of the matrix took into consideration the general conditions of the business and the environment influence. One of the main purposes of TFM is to align the results to the strategic objectives (Iorga, 2013) and to critical customer requirements by establishing clearly defined specification limits, Figure 2.
For example, if it is needed to keep $Y_2$ variance range within LSL$_2$ – USL$_2$, than must be found a distinct mathematical model in which $X_{11}$ variance should be maintained within LSL$_1$ – USL$_1$ range. During this research, TFM was used as a tool, that helped to leverage the rolling down of the strategic objectives in the entire organization, setting measurable limits for relevant factors (West, Dellana and Jaret, 2002).

![Figure 2: Specification limits for input and output](image)

**Figure 2:** Specification limits for input and output

Figure 3: EDI matrix methodology – phase 2 – design of the matrix of enterprise dynamic indicators

The objective of the phase 2 (Figure 3) was to obtain mature processes, to create an instrument capable to maintain the stability and profitability of the business processes and to adapt these processes to the environment changes. Thus, the forth step represented the moment when the team started to drill down for all the critical factors of the business in order to be surveyed with the help of the TFM to reach the targets imposed by shareholders and revealed by the market. The author used Design for Six Sigma technique to identify and sort the relevant elements of the Transfer Function Matrix and to develop the Enterprise Dynamic Indicators – Matrix (EDI – Matrix). The fifth step focused on EDI – Matrix development and was the moment when the logic of the strategy and the business processes were revealed to the entire organization. In the sixth step the EDI – Matrix was embedded into the day-to-day activity.

To understand the general conditions of the business, in the next paragraphs, the author will present the high-level process steps (Madison, 2005) of the cadaster enterprise (Iorga, 2012 and 2013).

**Logic of the Process:** Registering of the agriculture plots in Land Registry (end to end process)

**Process Input:** Receiving primary information (Documents/papers which show the history of the property right/ownership over the land e.g. property title, heir certificates, legatee certificates, court orders, documents/papers of voluntary separation, sale purchase agreement/contract, donation contract, real estate exchange contract, sale purchase agreement with a maintenance clause)

- **Step 1:** Land identification
- **Step 2:** Land coordinates measurement (in field)
- **Step 3:** Receiving the information from OCPI (Local Office for Land Registry) and Village Hall. Each county from Romania has one or several OCPI’s that acts independently. The organization has contacts with twelve such agencies.
- **Step 4:** Completion of cadastral emplacement and delimitation plan (“PAD”) and cadastral framing plan (“PIT”). Send the complete documentation to the OCPI and Village Hall for validation.
- **Step 5:** Document validation by OCPI and Village Hall

**End of the Process/ Process Output:** Delivering the results to the owner.

The challenges for the business are represented by a cumulative set of elements as: repeatability of the activities, measurability of results and process inputs, critical customer requirements (CCR) and lack of clearly defined internal standards. Other issues rose because of different problems related to internal expectations such as finalized documents, volume was below 25 units/week in spite of the annual objective. At the same
time, local and national agencies were constantly changing the regulations, increasing the negative effect of the land restitution process to villagers after the 1989 Romanian Revolution, which caused many flaws in the property documents that were issued at that moment. Moreover, inertia in the public system was very high and the civil servant was “very demanding” in terms of requests with direct effect in not receiving the document validation (step 5).

Based on this challenges the research was helped to develop a useful TFM (Table 1), which enhanced the knowledge of the people about their processes, facilitated the improvement of the results, and created the platform to structure the business processes (Madison, 2005).

**Table 1:** The transfer function matrix

<table>
<thead>
<tr>
<th>Design Parameters</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
<th>X7</th>
<th>X8</th>
<th>X9</th>
<th>X10</th>
<th>X11</th>
<th>X12</th>
<th>X13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1-Number of land registered docs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y2-Lead Time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Y3-Quality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Y4-Skilled Workforce</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y5-Productivity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

4. **Process variables control with linear models**

Comparing the two perspectives of the mathematical model (practical versus statistical), it could be stated that the Y1 model (Table 2) comprises some correlated terms which show abnormal behavior from a practical point of view.

**Table 2:** Process variables

<table>
<thead>
<tr>
<th>Factors number</th>
<th>Process Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>HR-Training</td>
</tr>
<tr>
<td>X2</td>
<td>Work Instruction</td>
</tr>
<tr>
<td>X3</td>
<td>HR-Knowledge Level</td>
</tr>
<tr>
<td>X4</td>
<td>Village Hall successful number of contacts</td>
</tr>
<tr>
<td>X5</td>
<td>OCPI agency successful number of contacts</td>
</tr>
<tr>
<td>X6</td>
<td>Internal Quality</td>
</tr>
<tr>
<td>X7</td>
<td>Number of delivered requested docs</td>
</tr>
<tr>
<td>X8</td>
<td>FTE (available)</td>
</tr>
<tr>
<td>X9</td>
<td>Frequency of visits OCPI – SME(subject matter expert)</td>
</tr>
<tr>
<td>X10</td>
<td>Frequency of calls OCPI – SME (subject matter expert)</td>
</tr>
<tr>
<td>X11</td>
<td>Workforce Moral</td>
</tr>
<tr>
<td>X12</td>
<td>Frequency of visits Village Hall</td>
</tr>
<tr>
<td>X13</td>
<td>Backlog</td>
</tr>
</tbody>
</table>

Effects of every factor involved in the process of land book registration have been studied and revealed the following two perspectives: individual effect and interactions effect. However, due to the general conditions of the business, it was difficult to plan a balanced experiment in order to obtain the direct influence of the factor interaction effects (Iorga, 2013). For this analysis, the model has been constructed using only six factors out of the original thirteen, because previously the project team consulted by the specialists decided to set specific work levels for the rest of the factors. In conclusion, the survey will comprise the following factors: X4 (Village Hall successful number of contacts), X5 (OCPI agency successful number of contacts), X6 (Internal Quality), X7 (Number of delivered requested docs), X8 (FTE (available)), X9 (Frequency of visits OCPI – SME – subject matter experts). The following picture highlights the most correlated factor X7 among the rest of the other five factors, Figure 4.
During the analysis, the project team observed that X7 is correlated with Y1 only if time is considered to be an additional factor. Therefore, the research took into consideration the volume variation delivered during 8 weeks consecutive analysis. From a mathematical perspective, in order to put forward the time variation of the X7 factor (a column vector \( \mathbf{m}^* \): \( m=50 \)), the research used a transformation matrix aiming to understand the statistical effect of the delays generated by the national agency processing (Lead-Time Variation) [Iorga, 2012]. For example, X7 was decomposed in eight column vectors represented as following: “X7 current week” (docs delivered to the national agency in the “current week”), “X7 minus one week” (docs delivered to the national agency one week before), “X7 minus two weeks” (docs delivered to the national agency two weeks before), “X7 minus three weeks” (docs delivered to the national agency three weeks before), a.s.o. The mathematical expression will be represented as following [Iorga, 2013]:

\[
Y_1 = X_4 + X_5 + X_6 + X_7 + X_{7\text{currentweek}} + X_{7\text{previoussweek}} + \cdots + X_{7\text{previous3weeks}} + X_8 + X_9
\]

(1)

In fact, the X6 factor, Internal Quality, behaves similarly to X7 and is decomposed accordingly. The transformation matrix for the X7 factor minus one week is:

\[
\begin{pmatrix}
0 \\
\vdots \\
0 \\
1 \\
0 & 1 \\
0 & 0 \\
& \ddots \\
& & & & \cdots \\
& & & & & & \cdots \\
& & & & & & & & 0 \\
\end{pmatrix}
\begin{pmatrix}
X_7 \\
X_{7\text{previous1week}} \\
\vdots \\
X_{7\text{previous3weeks}} \\
X_7 \text{currentweek} \\
\end{pmatrix}
= 
\begin{pmatrix}
D \\
X_7 \\
X_{7\text{previous1week}} \\
\vdots \\
X_{7\text{previous3weeks}} \\
\end{pmatrix}
\]

(2)

Therefore the relation between Y1 and X7 minus one week is:

\[
\begin{pmatrix}
Y_{11} \\
Y_{12} \\
\vdots \\
Y_{1m}
\end{pmatrix}
= C
\begin{pmatrix}
0 \\
X_7 \\
X_{7\text{previous1week}} \\
\vdots \\
X_{7\text{previous3weeks}} \\
\end{pmatrix}
\]

(3)

Where: \( Y_{11} = 0 \), rest of the X7 modified factors were obtained using the same method. Hence, the project team and the specialist decided to interpret each combination of factors from the practical perspective. The Minitab best subset combination described in Figure 5 showed that the most relevant factor from the process is the X7 (“Number of delivered requested docs minus five weeks before”) and alone could explain almost 19% of the variation.

The best subset analysis shows, from statistical perspective, that the seven factor combination with adjusted coefficient of multiple determination at 50.1% (adjusted R2) is the efficient model to be chosen. When considering the Cp coefficient (smaller the coefficient, the better), the number of 10.3 is the minimum value observed. Cp coefficient is a measure of goodness of prediction [Montgomery and Runger, 2003]:

\[
C_p = \frac{SSE_p}{(n-p)} - \frac{(n-2p)}{\nu}
\]

(4)

Where \( n = \text{number of observations} \), \( p = \text{number of factors involved in the model} \).
The research has to consider the abnormal negative coefficients values and, accordingly, to take the proper decision in factor survey. In this case, the model comprises two statistical significant factors that do not make sense from practical perspective. The X6 – “additional request 2 weeks before” coefficient -0.779 and X5 – “OCPI agency successful number of contacts” coefficient -2.233 (Figure 5 and 6) introduced an important challenge for the entire research team. Direct survey did not explain entirely the inverse correlation for number of visits. The most accepted explanation was that the number of visits could add success (new validated docs, received by agents) only if the agent is not “pressing” the agency local office. It seems that the agency clerk tries to serve in small batches as many entities (cadaster companies) as he can (Iorga, 2012). Therefore, the agent is not effective when is maximizing his visits to the agency. Consequently, the specialists decided to implement an allocation system of visits to the agency. Until this analysis, three field–agents was allocated to only one certified specialists (SME), and all their activities were aligned to make the link between certified specialists and governmental entities (village hall and OCPI). Thus, the team understood that it is more important to increase the relative number of specialists/week involved in delivering docs with smaller batches instead of increasing the number of visits of field agents. However, the author together with the specialists decided to keep the number of field agent visits at a minimum level using an allocation system and to monitor the documents completion batch per certified specialist per week sent to the local national agencies. From X8 view, the impact is high because actually this term is overlapping the effect of volume of batches divided to number of agents delivered to local agencies. This finding creates an opportunity to survey the batches instead of number of field agents involved.

Figure 5: Best subset multiple regression analysis (minitab)

<table>
<thead>
<tr>
<th>Team</th>
<th>Coef</th>
<th>SE Coef</th>
<th>T</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-24.1106</td>
<td>8.36549</td>
<td>-2.88215</td>
<td>0.006</td>
</tr>
<tr>
<td>X7_saptmana_curenta</td>
<td>0.3438</td>
<td>0.11356</td>
<td>3.07390</td>
<td>0.003</td>
</tr>
<tr>
<td>X7_saptmanian</td>
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<td>0.11345</td>
<td>3.43887</td>
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</tr>
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<td>X7_saptmanian</td>
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<td>0.177</td>
</tr>
<tr>
<td>Compleanari_saptmana_curenta</td>
<td>0.6837</td>
<td>0.43145</td>
<td>1.57436</td>
<td>0.136</td>
</tr>
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<td>Completeari_saptmanian</td>
<td>0.7783</td>
<td>0.43020</td>
<td>1.78099</td>
<td>0.076</td>
</tr>
<tr>
<td>X9_visita OCPI SME</td>
<td>3.4915</td>
<td>1.23371</td>
<td>2.82587</td>
<td>0.007</td>
</tr>
<tr>
<td>X8nr_visitaprimari_agenti</td>
<td>-0.2399</td>
<td>0.15491</td>
<td>-1.54911</td>
<td>0.124</td>
</tr>
<tr>
<td>X4nr_agenti_finalizarie</td>
<td>-0.8409</td>
<td>0.43527</td>
<td>-1.93173</td>
<td>0.059</td>
</tr>
</tbody>
</table>

Figure 6: The regression coefficients analysis (minitab)

Based on the trend showed by the graphic above (Figure 7), “the number of rejected documents by the local agencies”, the process proved that the quality, for the last 14 weeks surveyed, had been improving. From the input perspective, the research team recommended to set an optimal level for the critical process variables (Pyzdek and Keller, 2003).
In Table 3, the author presents the levels for Y1 transfer function factors involved in reaching the target (>25 items/week for Y1).

The TFM was operational when the processes became structured and results had an acceptable level of repeatability within the limits of customer expectations. From this moment, the author and management concluded that the processes became structured.

The author considered three main stages for processes during the endeavor to transform an organization into a process-centered enterprise (Figure 8).

![Figure 7: Quality trend analysis (minitab)](image)

**Table 3: Transfer function process variables specification limits**

<table>
<thead>
<tr>
<th>X Process Variables for Y1</th>
<th>Name</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>X6</td>
<td>Internal Quality</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>X4</td>
<td>Village Hall successful number of contacts</td>
<td>&gt;6 units</td>
</tr>
<tr>
<td>X7</td>
<td>Number of delivered requests</td>
<td>&gt;53 units</td>
</tr>
<tr>
<td>X8</td>
<td>Number of FTE</td>
<td>&gt;5 FTE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;16 FTE</td>
</tr>
<tr>
<td>X9</td>
<td>Frequency of visits OCPI - SME</td>
<td>&gt;1 unit</td>
</tr>
</tbody>
</table>

The methodology in phase one covered the first two stages as the paper presented at the beginning of this chapter. The third stage was accomplished when the author finished implementing the EDI Matrix. Therefore, in the following chapter the paper will present the logic of the EDI Matrix (Iorga, 2013).

**5. Discussion**

The main purpose of the EDI Matrix is to guide the organization management in order to develop the business process architecture according to the environmental changes and business strategy adjustments. The final stage of the business process is the mature and stable one. The moment coincides with the sustainable profit generation of the company and high level of customers’ satisfaction.

This mechanism has five quadrants, and each quadrant comprises elements correlated with other quadrants directly or indirectly. The mechanism has a cyclic principle and binds together the customer needs, the processes’ results and the strategic objectives. Thus, the mechanism helps the organization increase the flexibility in prioritizing the resources according with momentary needs of the company generated by the environment changes. In these conditions, the terms of the objectives should be diminished dramatically from years to months, in order to better adapt to continuous changes of the economic conditions and market requests. The mechanism was designed to fit in an acceptable way to these constraints of the dynamic environment.

The first quadrant of the EDI Matrix (Figure 9) presents the main dimensions that are part of this relationship. The matrix was, consequently, designed to keep both the strategy with operational area correlated and continuous improvement initiatives according with the customer (market) needs. Thus, the results of the processes should be repeatable and predictable. In this context, the Transfer Function Matrix highlights the moments when the elements from quadrants lose the correlation (Montgomery and Runger, 2003) and the
results are not according with the requested expectations. The author created a control plan for monitoring the process variables, critical results parameters and strategic objectives, in order to validate or invalidate the correlation areas of the EDI Matrix (Iorga, 2013).

Figure 9: Quadrant 1
The second quadrant of the EDI Matrix (Figure 10) represents the measurable objectives of the four Balanced Scorecard dimensions that are the main direction chosen by management to achieve the goal of the company (Kaplan and Norton, 1996). Each objective from the matrix is linked, through a correlation matrix, to the functional requirements of the processes (Montgomery and Runger, 2003), (Yang and Haik, 2003). The main advantage of using the BSC classification is that the objectives are, from the very beginning, related to customer needs and to end-to-end process perspective. Thus, the objectives are related to both sizes of the enterprise, voice of the customer and voice of the business. In order to cascade all these objectives, the author and project team used QFD matrix and DFSS tools (Tchidi, Zhen and Zhen, 2010), (West, Dellana and Jarett, 2002), (Yang and Haik, 2003).

Figure 10: Quadrant 2
The third quadrant of the EDI Matrix (Figure 11) is the functional requirements parameters. In this area, the specialists control the processes performance and any loss of correlation among objectives and parameters is analyzed and reported. When improvements in results do not have a significant influence on the strategic objectives, the problem is reported and management takes a decision regarding the matter.

Figure 11: Quadrant 3
For example, if productivity improvement stops giving any significant increase rate in money, this is the signal that the management should analyze deeper the business and try to understand what are the new environment elements that should be taken into consideration.

The fourth quadrant of the EDI Matrix (Figure 12) represents the process variables. In this area, the people from the processes analyze and signal any failure regarding the correlation between quadrant three and four. Thus, the management should analyze any process variable that does not have an impact on quadrant three, therefore on the functional request, implicit on the main objectives of the organization, and finally the
management should decide whether the issue will be transformed into an continuous improvement project (initiative) or if the entire process will be reengineered. The Transfer Function Matrix has the main role in correlation control for this quadrant.

<table>
<thead>
<tr>
<th>Approved equipment and software</th>
<th>Backlog</th>
<th>Village Hall successful number of contacts</th>
<th>Workforce Moral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of calls OCPI – SME</td>
<td></td>
<td>Frequency of visits OCPI – SME</td>
<td></td>
</tr>
<tr>
<td>FTE (available)</td>
<td></td>
<td>Number of delivered requested docs</td>
<td></td>
</tr>
<tr>
<td>Internal Quality</td>
<td></td>
<td>OCPI agency successful number of contacts</td>
<td></td>
</tr>
<tr>
<td>Village Hall successful number of contacts</td>
<td></td>
<td>HR - Knowledge Level</td>
<td></td>
</tr>
<tr>
<td>HR - Training</td>
<td></td>
<td>Work Instructions</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 12**: Quadrant 4

The quadrant five of the EDI Matrix visualizes problem solving initiatives, Six Sigma projects and Process Designing initiatives. This quadrant has three types of initiatives:

- Kaizen is a short-term initiative. These types of initiatives have an average duration of two weeks and they are oriented to quick-win problem solving. For example, the process team set up an error type dictionary. For short term initiatives, people use PDCA methodology (plan, do, check and act) (Liker, 2004)

- Second type is medium term initiatives. For these cases, Lean Six Sigma projects will be the main drivers. These are the situations when the correlation between process variables and quadrant three or two become weak and the processes could lose their stability. The impact is severe and the cause is unknown.

- Third type is the long-term initiatives. For these cases, Process Design or Reengineering could be the answer. These are the situations where the results could transform dramatically the entire organization and could also affect the strategic objectives. Moreover, these initiatives could expose the organization from financial and risk perspective, with high impact on the organizational culture and only the top management is able to handle and mitigate these weaknesses and threats. Therefore, these types of initiatives are under the top management responsibility.

The Enterprise Dynamic Indicators Matrix (Figure 13) is a cyclic mechanism designed to continuously survey the business processes using the results of the Transfer Function Matrix spin wheel effect. The link between these mechanism parts are the mathematical models like Multiple Linear Regression, ANOVA, Hypothesis Testing and other statistical tools (Iorga, 2012 and 2013).

### 6. Conclusions

The paper emphasizes the importance of the holistic approach in business environment based on integrated processes of the organization into the entire value chain that is centered on customer’s needs.

Business Process Management supporters consider that discipline in action and in thinking helps to create a stable, predictable and comfortable environment, favorable for stimulating employees’ creative thinking (Hayler and Nichols, 2006). Nowdays, top companies include continuous improvement initiatives at systemic level, seeking rational means for stimulating collective or individual creativity (projects and improvement initiatives). Created in these circumstances, the circuit for generating ideas is maintained by the relationship between systemic thinking – sustained improvement, based on projects managed by people who know best the business processes, as being their users (Lean Six Sigma) (Breyfogle, 2003), (Moyano et al, 2012), (Pyzdek and Keller, 2010), (Tang et al, 2006).

During the entire research, the author has been inspired from concepts such as Business Process Management, Six Sigma, Lean Operations & Manufacturing and Design for Six Sigma and used specific tools or instruments such as Multiple Linear Regression, ANOVA or elements from Linear Algebra.

The originality of the paperwork consists in designing, for the first time in the Romanian services sector, an instrument (The Enterprise Dynamic Indicators – Matrix) that links three business areas such as customers, strategic objectives and continuous improvement for a management who decided to have a process-oriented organization. The method proved to be effective by doubling the company turnover with direct effects on
productivity, people moral and profitability. The EDI – Matrix has an effective impact only through a continuous correlation, surveyed with The Transfer Function Matrix, between the business process variables and the expected results by customers and shareholders. Despite the fact that the paperwork is limited to one area, cadaster, the author considers that, due to the generality of the tools involved and the relational character of the matrix, the method is appropriate to be used also in other areas where the repeatability of results is high and could be measured. To conclude, the method could add value to the management of any organization in order to increase the predictability of the results and therefore, to increase the performance and profitability in general.

<table>
<thead>
<tr>
<th>Transfer Matrix</th>
<th>Gap Analysis</th>
<th>Improvement Initiatives</th>
<th>Quarterly Objectives</th>
</tr>
</thead>
<tbody>
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<td><strong>1</strong></td>
<td>Approved equipment and software</td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Number of delivered requested docs</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>EDI agent (availability)</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>Customer satisfaction</td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Customer importance (percentage from business)</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>Time to conform to new customer requests</td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Total cost</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Cost of poor quality</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>Volume of delivered docs</td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Service quality</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>delaying</td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Process improvement rate</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>Availability to new conditions encountered</td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Learning rate</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>Number of training hours</td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Availability in working at any workstation</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>1</strong></td>
<td>Number of certified employees</td>
<td><strong>6</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Number of training courses per employee</td>
<td><strong>1</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>

**Figure 13:** The EDI – matrix

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Crowdfunding: An Overview of Valuation Problems

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Abstract: The phenomenon of crowdfunding is a novel financing option related to numerous promising benefits. New bold ideas, startups and projects, which would not be able to get financing using any other way, get a chance to get financed and become a reality. Ordinary people, who are not able to invest large amounts, get a chance to invest small ones. Governments tend to perceive crowdfunding as a way to create jobs and foster economic recovery. Therefore, governments are preparing legal acts to make crowdfunding more popular through legalizing crowdfunding for equity. After that, the scope of crowdfunding would be magnified. In the USA, the JOBS Act was signed in 2012 and provision of the rules to regulate crowdfunding was probably the most anticipated event for entrepreneurs in recent times. The rules were recently proposed by the Securities and Exchange Commission and they were in the 90 days comment period. These rules will allow private companies to offer and sell securities through online crowdfunding platforms and they are also expected to clarify the whole process. Despite the clarifying aspect of the rules, various problems arise as it often happens with novelties. In the press, several problems entrepreneurs face are outlined, including the choice of the platform, disclosure requirements and other responsibilities entrepreneurs undertake, the need to set a share price. Despite the ongoing active discussions in the business press, the phenomenon is also interesting and worth investigating from the science perspective because this way critical aspects of valuation can be identified. It is noted in the introduction that the article concentrates on the valuation problems. It is stated that this article aims at providing an overview of valuation problems associated with crowdfunding. The research question is formed as follows: what valuation problems are associated with crowdfunding and how are they solved? Value theory is applied in the article. Also, such research methods as systematic literature review and comparison are employed. The second part of the article is dedicated for introducing the crowdfunding industry – the utility it provides and the current state of its development. In the third part of the article is noted that there are currently five crowdfunding models: donation-based, rewards-based, debt-based, equity-based and royalty-based. It is noticed that valuation problems could be associated with certain models of crowdfunding. The authors outline six main problems: the existence of tangible and intangible value, uneducated investors ability to valuate, not suitable traditional valuation methods, valuation interference with the later stage, a question of what part of equity should be offered, and high liquidity risk. The discussion part provides an opinion on the current situation of how the identified problems are and could be solved.

Keywords: crowdfunding; entrepreneurship; value creation; business models; valuation

1. Introduction

Acquisition of finance is a very important issue in the entrepreneurial process, and, according to Drover and Zacharakis (2013), “entrepreneurs turn to a number of sources to raise capital”. Lately, there appeared a novel option for entrepreneurs seeking to raise capital – crowdfunding. Crowdfunding is called “such a huge industry evolving right now” by Feldman (in Goodman, 2014: 68), “an unprecedented source of capital” by Warns (in Cocheo, 2013: 36) and even “an investment revolution” by Gilchrist (2014). Currently, there are five crowdfunding models – donation-based, rewards-based, debt-based, equity-based, and royalty-based. Equity-based crowdfunding gains most attention, because legal acts are currently prepared to make it legal. The USA is leading the field, so the article takes into account the rules regarding equity-based crowdfunding, which were recently proposed by the Securities and Exchange Commission.

An emergence of this new financing mechanism raises many important questions. Goodman (2014: 68), Valančienė and Jegelevičiūtė (2014), and Dahl (2014: 72) raised the problem of platform choice. Dahl (2014: 72) outlines the problems caused by huge disclosure requirements. Temes (2013: 58) draws attention to the disruptive power of not realistic expectations of entrepreneurs, the same might apply to investors. Manchanda and Muralidharan (2014: 370) state that very little academic literature is available on crowdfunding. Dahl (2014: 72) notes that certain limitations, such as investors not being able to sell shares for a year, might imply some problems (Dahl, 2014). The valuation problem is noticed by Taylor (2014), Dahl (2014: 72) and Drover and Zacharakis (2013). According to Dahl (2014: 72), entrepreneurs must establish a company valuation to set a share price and that could be complicated for early stage companies. Moreover, as it is noted by Taylor (2014), setting a valuation for business is “one of the most important parts of the fundraising pitch”, Drover and Zacharakis (2013) outline that not sophisticated crowdfunding investors are likely to rely on entrepreneurs to value the business, but “entrepreneurs tend to be tempted to put a high valuation on the company” (Drover and Zacharakis, 2013). This article concentrates on the valuation problems, associated with crowdfunding.
The article aims at providing an overview of valuation problems. The research question is: what valuation problems are associated with crowdfunding and how are they solved? Such research methods as systematic literature review and comparison are employed, value theory is applied.

2. The utility and development of crowdfunding industry

Crowdfunding might be defined as „a method to establish the connection between entrepreneurs, who aim to raise capital, and novel investors, who form an emerging source of capital and are willing to invest small amounts, through internet-based intermediaries” (Valančienė and Jegelevičiūtė, 2013: 41). Efforts to emphasize the influence of crowdfunding are often noticed, as, for example, the influence on entrepreneurship pointed out by Drover and Zacharakis (2013): “crowdfunding – raising resources primarily through an Internet platform through the form of donations, exchange for future products, lending, or equity – is projected to have a profound influence on entrepreneurship”. The tight link between entrepreneurship and crowdfunding is clearly visible – the mechanism of crowdfunding is aimed at fostering entrepreneurship whilst entrepreneurs urge for different financing options.

The utility of crowdfunding industry. Crowdfunding is thought to be useful and create value for all the interested parties – entrepreneurs, investors (backers), governments, and society. According to Warns (in Cocheo, 2013: 36), entrepreneurs now have an access to a “source of capital created from the small contributions of millions of individuals around the world”. It is favourable for entrepreneurs, because they now have one more financing option to choose from, so their concerns regarding restricted access to traditional lending sources or expensiveness of sources might be reduced. Moreover, other benefits of crowdfunding, such as a possibility to validate ideas, are also noteworthy. Investors (backers) are also able to retrieve value – whilst backers get emotional satisfaction and small gifts, investors, with the start of equity-based crowdfunding, are able to receive money. Crowdfunding is perceived as a good “way to directly benefit from the successful investments” (Gilchrist, 2014). To add, according to Warns (in Cocheo, 2013: 36), it is beneficial for “small investors seeking a higher return than conventional investment products”. With regards to governments, crowdfunding is expected to foster economic recovery through job creation. Crowdfunding is already justifying those expectations, and after equity-based crowdfunding becomes a reality there will appear even more potential to do that, because “equity-based crowdfunding will likely fund a sizeable number of startups – resulting in a new pipeline of crowd-funded ventures (Drover and Zacharakis, 2013)”. Society is interested in crowdfunding primarily as in a way to solve societal issues and foster progress. It turns out that very often innovative ideas are not fulfilled due to not being able to get financing. This is where “a very new concept of crowdfunding is coming up which can go a long way in helping the entrepreneurs raise the capital (Manchanda and Muralidharan, 2014: 369)”. According to Gilchrist (2014), “almost all this finance is directed to real investment that will, if successful, increase our collective standard of living”.

The current situation of crowdfunding industry. According to Gilchrist (2014), the purpose of financial markets transformed over past two decades and as nowadays “minimal capital is required to launch an enterprise and most value is created by brains, equity markets serve not to raise capital, but to permit the founders of successful businesses to sell on their own terms (Gilchrist, 2014)”.

Currently crowdfunding receives sufficient amount of attention in the USA, and the USA is leading in terms of creating suitable regulations for equity crowdfunding; the Securities and Exchange Commission proposed rules for Title III of President Obama’s JOBS Act, which will permit startups and intermediaries to finally participate in equity-based online crowdfunding. After those provisions will go into effect, business owners will be allowed to sell securities online to anyone who believes in their companies (Tablas, 2013: 22). The proposed rules raised important issues and provoked discussions about crowdfunding.

Currently crowdfunding is believed to be “on an exponential growth trajectory” (Gilchrist, 2014). This leads not only to appearance of various crowdfunding sites all around the world, but also to modified crowdfunding sites and formation of various organizations. Such industry associations as World Crowdfunding Federation, European Crowdfunding Association, CrowdFund Intermediary Advocates (CFIRA), Crowdfunding Professional Association (CFPA) were established. Also, Crowdfunding Accreditation Platform Standards (CAPS) program was initiated to promote the adoption of best practices for the operation of crowdfunding platforms globally. Various adapted crowdfunding sites were created: Crowdtill Open offers entrepreneurs a possibility to eliminate a middleman and launch own professional crowdfunding page; Funder’s Club is a mix of crowdfunding and ven-
Crowdfunding is still in its growth phase and this phase is expected to last for at least 5-8 years (Startup Juncture, 2013). The platforms, which will have the most volume at the end of this period, will remain (Startup Juncture, 2013). Those platforms should be “the best or most reliable” (Dahl, 2014: 72). So overall crowdfunding is thought to “become a permanent fixture on the entrepreneurial landscape” (Drover and Zacharakis, 2013).

The crowdfunding industry is changing very fast and in numerous directions. Not only the new promising models of crowdfunding appear, but also the whole industry is developing. Fast development might be associated with unexpected issues and problems, but it might also mean timely and effective solutions.

3. Crowdfunding types and the nature of valuation problems

This article concentrates on the bundle of valuation problems associated with crowdfunding. To begin with, valuation problems are likely to be stipulated by the models of crowdfunding. Hollas (2013: 27) distinguishes four models of crowdfunding – debt, equity, donations or rewards – based. The model, according to Hollas (2013: 27), depends on “who is utilizing crowdfunding”. Cocheo (2013: 36) and Outlaw (2013) state that there are five models of crowdfunding now: donation-based, rewards-based, lending-based, equity-based and royalty-based. Donation-based crowdfunding, according to Outlaw (2013), is the most straightforward approach, where contributions are made to the project or cause and donors do not get anything in return except for a good feeling and sometimes a tax write-off. Rewards – based crowdfunding is based on contributors getting a thank-you reward or gift (or “perk”) for their support. Often offered gift is the product entrepreneurs are trying to launch or a discount on services. So, this model functions as a pre-sale. Also, a huge benefit of this model is that entrepreneurs do not have to repay the money (Outlaw, 2013). Debt-based crowdfunding (or peer-to-peer lending) happens when crowd lends money to entrepreneurs through a platform and expect the money to be repaid with a fixed rate of interest (Outlaw, 2013). The equity-based model of crowdfunding permits both accredited and non-accredited investors to acquire a share in businesses in exchange for a proportion of the entrepreneurs’ ownership stake: “thus, through an approach that has traditionally been illegal, investors will soon be able to buy small parts of a venture’s equity stake, giving the entrepreneur an alternative way of raising capital” (Drover and Zacharakis, 2013). Royalty based crowdfunding is based on investors receiving a percentage of revenue from the business once it starts generating revenue (Outlaw, 2013).

<table>
<thead>
<tr>
<th>Table 1: Features of different crowdfunding models</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Targeted at financing</strong></td>
</tr>
<tr>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td><strong>Tangible return for backers (investors)</strong></td>
</tr>
<tr>
<td><strong>Value for entrepreneurs</strong></td>
</tr>
</tbody>
</table>

Table composed by the authors

Valuation problems originate from the model of crowdfunding. As for donation-based and rewards-based models, value for backers (investors) is mainly of intangible origin. In debt-based, equity-based and royalty-based models value of intangible origin might still be relevant, but financial return is also very important. This leads to twofold valuation issues – total value for backers (investors) could only be determined by measuring both intangible value and tangible value. This leads to the first problem of (1) twofold valuation issues – intangible and tangible value.
Another problem arises when taking a look at the possible investors of crowdfunding - (2) investors’ ability to valuate and choose wisely how to behave with own money. Though, according to Tablas (2013: 22), intermediaries are required to provide investor education, collect information about investor income and net worth, and to abide by laws that prohibit money laundering, Conceptionfund states that there still remains an open question for many investors regarding “what is a small company worth and how should one approach valuing its equity?”

Drover and Zacharakis (2013) point out a very important issue for equity-based crowdfunding model – complicated data: “high volume of small investors resulting in a highly unorthodox and complicated capitalization table and messy balance sheet”. Startup Juncture (2013) state, that within equity crowdfunding, valuation is a big problem. It is hard for all parties to estimate the future earnings and traditional valuation methods are not always suitable here (3). As a result, crazy valuations are often seen, in which the value of the company is overestimated (Startup Juncture, 2013). This leads to the next problem. Though crowdfunding is perceived as a good way to raise capital for the first stage, with potentially more possibilities in the second stage (banks, venture capital), valuation issues can sometimes interfere with the later stage (4). Venreport (2012) states, that “the concept of valuation when it comes to equity crowdfunding is so convoluted that it can throw a spanner in the works of a done deal”. It is noticed by both Venreport (2012) and Drover and Zacharakis (2013) that venture capitalist’s idea of appropriate valuation might differ from entrepreneur’s, so company would possibly be worth less at the venture capital round. This might lead to „a severe dilution and loss of value for the crowd funders”. Due to those reasons both later-stage investors and entrepreneurs might lose interest.

Another issue in the case of equity crowdfunding is what part of equity should be offered (5) in return for growth capital. One more important problem in the case of equity crowdfunding is illiquidity. First of all, SEC rules point out that investors must not sell equity for 12 months. Conceptionfund state that equity valuation is relative and it is only worth how much someone else will pay for it. Moreover, investors might face some difficulties to sell equity, because there is no secondary market. Due to those issues, the liquidity risk (6), included in valuation methods, is high.

4. Discussion: Solutions to valuation problems

The above discussed valuation problems cause uncertainty and reserve the positive effects of crowdfunding, therefore efforts are put for solving them. This part of the article is aimed at discussing which of the above identified problems are being solved, who is doing it, and what solutions are offered.

Regarding the problem of (1) twofold valuation issues, attention could be focused on the fact if there is really a need of determining intangible value. Existence of such value is analysed by researchers, who concentrated on motivational issues (Blumenthal, n.d.; Gerber and Hui, 2013). Value theory suggests, that there are several options to determine value, including employing a financial valuation method, a value measurement method, a value assessment method or a measurement method (Andriessen, 2005: 4). Value could be determined by observing a phenomena. So, this problem is actually solved by the process of crowdfunding itself – if the business, idea or project is crowdfunding, this means it creates sufficient intangible value, what is especially clear in donation-based and rewards-based models. Actually, such attitude could even be retrieved from the rules, proposed by the Securities and Exchange Commission, where there is such an idea: “in this role, members of the crowd are not only sharing information about the idea or business, but also are expected to help evaluate the idea or business before deciding whether or not to invest” (Securities and Exchange Commission, 2013: 12). Intangible value is transformed into crowdfunding results and could be measured in terms of those results.

Another important issue is (2) investors’ ability to valuate, which was already indicated at the very beginning of crowdfunding industry. As the definition of crowdfunding reveals it as based on contributions from “the crowd” – “small” investors, usually with lack of investing knowledge, means were employed to protect those investors. Investor protection tools include individual investment limits, required disclosures by issuers, and the use of intermediaries. So, investors are supposed to be protected by strict limitations, intermediaries, and they are supposed to receive all the information they need as disclosures. Actually, strict disclosure requirements could even become problematic to entrepreneurs, as there are “plenty of disclosures to the Securities and Exchange Commission and investors, including financial statements that, depending on the amount you offer or sell during a 12-month period, must be audited or accompanied by a copy of your company’s tax returns. You must disclose information about company officers, directors, and anyone who owns 20 percent or
more of your business. You must also explain what you plan to do with the funds you raise” (Dahl, 2014: 72). Regarding valuation issues, Securities and Exchange Commission (2013: 56) states that „the proposed rules would require an issuer to disclose the offering price of the securities or the method for determining the price, provided that prior to the sale, each investor is provided in writing the final price and all required disclosures”. So, investors should already get prepared information and their input would be valuation, if the proposed data are correct. There are already various companies and internet sites offering valuation for startups so, if there appears one or a few tested and reliable ones, a big part of investors’ concerns would be taken off. Successful communication to investors might also help to solve this issue. Investors should be provided with reliable and easy to read reports. Equidam (2014), a website offering such reports, noticed that their “first report contained a lot of information and suited valuation experts well, but was hard to read for novice crowdfunding investors” (Startup Juncture, 2013), so the form of the report should also be prepared thoughtfully.

The following problem is caused by (3) complicated data and the fact that traditional valuation methods are not always suitable in case of idea or start-up stage companies. Gilchrist (2014) criticizes traditional valuation methods and expresses opinion that “investment advisors and managers are operating in accordance with a manual written a half century ago that no longer applies to the most important aspects of investment”. Attempts to solve the problem are also noticed. Conceptionfund offers two simple approaches for investors – Price to Earnings ratio (taking into account growth expectations) and Annual revenue (using current or projected annual revenue) valuation. According to Conceptionfund, investors must ask the right questions about how that company makes a profit or foresees making a profit. Various websites, such as Equidam (2014), offer valuation reports. Though, despite the criticism on traditional methods, they are included in the valuation reports. To be more specific, Equidam (2014) offers to use five valuation methods (two of them are qualitative and three financial models), including scorecard method (based on benchmarking techniques), check-list method (rating approach), venture capital method (based on price/earnings ratio and applying discount), discounted cash flows with multiples and discounted cash flows with long-term growth (adapted by Equidam, includes survival rates and illiquidity discount). After all these methods are applied, a weighted average is determined. At this moment, the stage of development of a company gains importance – the latter the stage, the higher influence of analytical models (due to reliability issues), Equidam (2014) notes, that “users may however prefer one method over another in determining their valuation estimate”. According to Startup Juncture (2013), such report is suitable for companies from seed to expansion stage and comes up with a range estimate for the company. Entrepreneurs can use this when determining how many shares to give to investors whilst designing the crowdfunding campaign. Moreover, potential investors might be provided with valuation reports.

The issue of (4) valuation interfering with the later stage is of high importance for perspective companies. A suitable solution in this case would be pairing crowdfunding with venture capitalists, banks or angel investors (Manchanda and Muralidharan, 2014: 372; Dahl, 2014: 72; Cocheo, 2013: 38). In this case, venture capitalists, banks or angel investors would „look after” the start-up from the beginning, help to valuate it, observe the crowdfunding stage, but offer own funds only within the latter stage. This way, entrepreneurs would get reliable valuations and venture capitalists, banks or angel investors would get a chance to invest only after testing marketability.

Regarding the problem of (5) what part of equity should be offered in return for growth capital, an answer could be different. On one hand, according to Taylor (2014), a start-up or early stage business should ideally be offering between 10-20 % equity in return for growth capital. On the other hand, limits do not always function in such a vibrant industry. Venreport (2012) suggests, that it is only a question of how much of the equity “management is willing to let up in exchange for the investment from investor”.

The discussion reveals, that though various problems associated with valuation arise in the industry of crowdfunding, creative or strict ways to solve them are offered by legislators or society. Though, there is still a need for time to try those methods out and determine their reliability.

5. Conclusions

The crowdfunding industry is new, vibrant, and developing. Therefore both the industry evolution and the problems, resulting from the fast development, are interesting and worth investigation from a scientific perspective.
The article outlines the existence of several crowdfunding models - donation-based, rewards-based, lending-based, equity-based and royalty-based. Each of these models is unique because their targets, return for backers (investors), and provided value for entrepreneurs differ. This leads to diversification of the problems associated with crowdfunding – they are not absolute, they are usually only associated to one or a few models of crowdfunding, but not to all of them. So, when analysing problems, associated with crowdfunding, whether valuation or not, crowdfunding models need to be taken into account.

Most valuation problems are currently associated with equity-based crowdfunding model. Such situation probably emerged due to a few reasons: equity-based crowdfunding being the most complicated model, equity-based crowdfunding not yet working in the biggest part of the world, and the long time it is taking to prepare legal acts and rules for it. In case of donation-based and rewards-based crowdfunding models valuation issues are mainly associated with intangible value and thus crowdfunding platform becoming a tool to determine that value.

Further research could be carried out taking into account that valuation problems might differ from investors’ and entrepreneurs’ perspective. Also, more valuation issues arise when considering the effect crowdfunding has on economics and well-being.

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Creating Value With Social Entrepreneurship

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Abstract: Social ventures are a new type of organization that aim to create sustainable social value, such as promoting the well-being of communities, or developing solutions to tackle complex social problems. Through an in-depth case study, we aim to extend the understanding of social value creation, exploring its creation mechanisms, its management in social ventures and the role of stakeholder networks. The study findings indicate that value is created through a bidirectional flow between the pre-defined target audience and the stakeholder network, leading to the conclusion that the stakeholders are not only the instruments but also beneficiaries of value creation. It was also observed that the innovativeness of the venture, in terms of processes, can contribute significantly to the venture management, its resource mobilization and self-sustainability.

Keywords: social entrepreneurship, social ventures, value creation, social venture management

1. Introduction

The growing interest in working for the common good is manifested not only in corporate social responsibility initiatives, but also in the emergence of new organizations, social ventures specializing in running projects among less privileged groups of people and thus responding to social problems and injustices, and also projects that address environmental changes (Haynes 2012; Felicio et al. 2013; Sud et al. 2009). Social entrepreneurship is thus driven by the need for social change, and social entrepreneurs act as change agents in adopting a mission to create and sustain social value instead of value measured in economic terms only (Choi & Majumdar 2013; Dees 1998).

This evolving phenomenon has been acknowledged as a new type of entrepreneurship, drawing scholars to find a position for it in the entrepreneurship literature, which has traditionally focused on the wealth creating aspects of entrepreneurial activity (Haynes 2012). The elevation of the social dimension has even been interpreted as a paradigm change, but despite numerous attempts to achieve a consensus, the concept of social entrepreneurship and its theoretical underpinnings still remain relatively ungrounded (Choi 2013; Haynes 2012; Short et al. 2009). However, the various definitions do provide a multi-faceted description of what social entrepreneurship is, and how it has been approached. According to Oncer et al. (2010), the definitions include motivation and purpose (Thake & Zadek 1997), with social entrepreneurship being seen as innovation (Dees 1998) and as the accumulation of non-profit benefits and social value for various segments of the society (Austin et al. 2006; Zahra et al. 2009; Mair & Marti 2009).

Social value creation has played a central role in diverse research into social entrepreneurship (Mort et al., 2003; Thomson & Doherty 2006) and it has been defined as both a preconditional purpose and an outcome of the ventures involved (Mair & Marti 2009). However, to date research has focused on the social value created for the target groups, but has addressed to a lesser extent the role of other stakeholders and their role in value creation. Overall, there is still very little research or empirical study focused on the divergent value dimensions and their forms, and on the mechanisms directing the value creation.

Aimed at increasing the theoretical and practical knowledge of social ventures, this study explores and analyses social value creation and its manifestations, identifying the network of key stakeholders involved in a social venture and assessing their role in value creation. The study also examines the process of value creation, aiming to address key issues in sustainable venture management.

The following research questions have been formulated for the study:
- What forms does the social value created by the ventures take?
- How do key stakeholders contribute to the value creation process?
- How is the value creation process managed?
The study contributes to advancing an understanding of the elements and the dynamics that constitute social ventures. Social value forms the starting point for understanding the logic of a social venture (Choi & Majumdar 2013; Thomson & Doherty 2006), with an emphasis on its mission and sustainability, which, according to the extant literature, differs from the logic that is followed by organizations with a pure profit-orientation (Austin et al. 2006; Bornstein & Davis, 2010). Therefore, it is also to be expected that the way in which the value creation process of the social venture is managed will be different from that in other organizational settings (Renz 2010; Felício et al. 2013), yet it will still be relevant for analysis.

This paper is constructed in the following way: First, we define social entrepreneurship and review value creation in social ventures, and then look at their management, followed by the study methodology and the case description. Discussion and conclusions are provided in the last part of the study.

2. Defining social entrepreneurship

Social ventures can take many forms, from social organizations run by volunteer resources, to non-profit social organizations funded by governments or private donations, or they can include commercial ventures with social goals, generating social “side-products” (Felício et al. 2013). Social venturing can also be part of large corporations’ social responsibility activities, with an appointed person or group taking the role of social entrepreneur within the organization. To differentiate between social ventures and commercial ventures that focus on social outcomes as the main source of their profit, (e.g. health care services for the elderly), we need to look at the motivation of the key decision makers who get involved in the social activities, and the mission of the organization (Haynes 2012). The distinction can be drawn between organisations where the purpose of the venture is to create social value, as opposed to private wealth (Austin et al. 2006). Typical of non-commercial social ventures is also that they need alternative financing strategies and management models (Felício et al. 2013).

In this study we use the narrow definition of social entrepreneurship, focusing on ventures that are founded to fulfil a social mission, based on an observed opportunity and innovation, with the aim of creating sustainable social value for the target audiences.

However, in spite of an initial emphasis on the social ends, when social ventures start receiving increasing recognition or legitimacy, or both, the entrepreneurs may need to scale up their efforts and leverage their resources by adopting a more commercial approach (Austin et al. 2006). Non-profit activities can also be boosted by for-profit subsidiaries or by cross-sector partnerships with commercial corporations (Nicholls 2004).

It is typical of entrepreneurship that, after the initial opportunity recognition, resources are assembled in a novel way; and the same applies to social entrepreneurship, with the distinction that the context and content are socially oriented, and the resources are often people, relationships and skills. However, the innovation creation mechanisms are common to both: innovation takes place through social interaction within the organization, or with other actors beyond its boundaries (Håkansson & Olsen 2011). Social innovations imply creating novel approaches for tackling social issues, and they form an essential element in social entrepreneurship (Choi & Majumdar 2013).

2.1 Creating social value

Social value creation forms the primary objective and precondition for social venture establishment (Choi & Majumdar 2013; Mair & Martí 2006) and it refers to the production of such offerings and their outcomes that advance justice, fairness and welfare in a given human community (Austin et al. 2006; Peredo 2006). The value created can take tangible or intangible forms, expressed often in terms of social inclusion of less privileged groups through the following concepts: well-being, social responsibility, social recognition, proximity, human development, involvement and engagement (Felício et al. 2013; Omidvar & Richmond 2003). According to Omidvar and Richmond (2003) the overall aim of social inclusion is to close the physical, social and economic distances separating people, rather than only to remove the barriers existing between different groups.

In addition to the planned outcome, ventures often aim to achieve a wider society-related impact, which can be mediated by the target group, or, depending on the focus of the venture, the primary target group can be
the society as a whole, for example, software that is developed by volunteers to benefit citizens by providing information concerning society-related decisions (http://www.hasadna.org.il/en/our-projects/open-knesset/). Measuring social impact and value is challenging, and only in certain cases can the results be measured, for example, in the development of skills, reduced use of energy, etc. However, the primary objective in all social ventures is not just to achieve measurably high performance, in the way that this is the objective in commercial firms (Austin et al. 2006). According to Felicio et al. (2013), the entrepreneurial orientation of the venture managers has a positive effect on the creation of social value. Also, organizations with higher initiative and more innovation contribute to the achievement of greater value. These, in turn, create satisfaction and lead to the attainment of the organizational goals.

2.2 Managing the value creation

Social ventures often have to cope with the reality of limited resources, and this is also reflected in the venture management. While corporations running social programs benefit from the specialized skills and capabilities that they have in their business management (Hess et al. 2002), social ventures can rarely claim the same. Furthermore, in firms business model development takes usually place in a planned manner, with much thought given to the key elements of value offering, revenue logic and channels (Osterwalder 2004). We suggest that despite the special nature of social ventures it is necessary for them also to develop a functioning “business model” (Grassl 2012). However, they can also take a more experimental approach when doing so: the “products” are often projects making intangible contributions, the channels are based on voluntary work, and since the drive for monetary gain does not direct the activities, the revenue logic can therefore be replaced with “value creation logic”. This leaves them much flexibility in terms of planning and testing models with novel elements, but it does not change the fact that there has to be a match between the purpose of the venture and its resources. Configuration of these two can be continuously evolving because the economic, sociocultural and political context, and also the available resources, can be expected to change, requiring realignment and the awareness of the entrepreneur (Austin et al. 2006).

2.3 Network of participants in the value creation process

The importance of networks for any business organization is widely recognized (Håkansson & Ford 2002), and they are even more vital for social ventures, having an instrumental role in value creation. Networks of people and other organizations supporting the venture activities form a key resource, and compensate, in the form of their skills, knowledge and the active presence of the people involved, for the venture’s otherwise limited resources. These wide networks can include board members, donors, partners and volunteers, who are often out of the direct control of the social venture or beyond its boundaries, but because of their significance to the venture, close attention should be paid to managing these networks effectively (Austin et al. 2006). Social ventures include various actors who have different roles in creating value. Internally, the social entrepreneur, the initiator, the visionary and founder of the venture can thus act as a facilitator and network mobilizer in the value creation process. Depending on the legal status of the venture, in parallel, its managers may also be owners or co-owners, occupying a central position in realizing the mission of the venture. Employees, another category of internal actors, do not necessarily share the characteristics of social entrepreneurs, but assumingly identify with their goals, and if working as volunteers, they are usually not compensated for their work. Network partners support the social venture with modified conditions, but do not necessarily share the same mission. Each internal and external actor thus occupies a specific position for co-producing the input needed for value creation. The beneficiaries, or the target audiences of the social ventures, enjoy the social value created, as their needs have been the starting point for establishing the ventures. However, their role as value co-creators has also been recognized (Vargo 2008).

The following Figure 1 summarizes the value creation elements, social value, venture management and business logic, and also the network of stakeholders and innovation.
3. Methodology

This qualitative study, constructed as a case study (Yin 1984), follows an explorative and descriptive strategy, attempting to widen understanding of the complex, real-life concept of social entrepreneurship. Both primary and secondary data were collected from multiple sources (Alasuutari 1995) and these were analysed and compared to provide an in-depth picture of social entrepreneurship (Helkama, Myllyniemi & Liebkind 2010; Stake 2005). The focal case study was purposefully selected to match and to study the characteristics of a social venture (Choi & Majumdar 2013). The primary data was collected in Israel in 2011-2014 by interviewing the key informants, the social entrepreneurs. The interviews, which were conducted in English, were recorded and transcribed. Short follow-up questions and verifications were asked also of the family members of the entrepreneurs, because of their role in supporting the venture development. The secondary data includes video clips about the activities of the venture, interviews with the founders and key managers, newspaper articles and materials published by the company on their website. A longitudinal approach was adopted in data collection, as the social venture and its development were followed for three years. Aligned with the tradition of interpretative sense-making, the findings indicate implications that are idiographic and seek to understand the particular rather than to generate law-like explanations (Welch et al., 2011). The case produces theoretical implications that illustrate the multi-faceted nature of the actor roles and positions, beyond those of the entrepreneur-individual or the firm.

4. Case study - Zeze social projects

When a young Israeli man, on completing his national service in an elderly day-care centre, shared with his friend Daniel his concern that there was a lack of interesting activities for the elderly, or the funding required for them, they felt that they could do something about it. However, they also decided that the conventional approach of asking for donations would be very boring, and they would try to think of funding the activities in some other way. They came up with an idea of organizing parties for young people that would create the needed revenue for the day-care centre. The parties were organized by young volunteers, and they turned out to be successful. The activities started in 2008 and two years later, in 2010, Daniel and his twin brother Yehonatan founded the venture Zeze, dedicated to carrying out social projects with the aim of making a sustainable social impact. The venture is based on a platform that provides a basis for different types of social projects, run mainly by volunteers in their twenties. It looks for projects with creative elements, and thus offers an innovative way of getting young people involved. The idea is described by one of the founders in the following way: “These are the criteria for how we do projects: the projects have to be creative and they have to have a social aim of course. They also have to empower both sides, both the volunteer and also the social target.”
For these young volunteers, NGO’s with their hierarchical structures, heavy bureaucracy, and the traditional ways of helping people, would not necessarily be appealing. The founders realized that participation in the activities should be fun, and that the volunteers should be able to use their skills and talents. In addition, there are students who get involved through collaboration between Zeze and Tel Aviv University, and the Shenkar College of Engineering and Design. Through these academic organisations scholarships are made available for participants. One of the founders crystallizes the method in the following statement: “The project’s participants receive mentoring, funds and the connections needed from the community, in order to bring unique social projects to life.”

So far, there has been a project called Zotzot that helps former female prisoners by teaching them graphical design skills, with the purpose of preparing items for sale, and ultimately assisting women in rehabilitation to find their way back into normal life. Another successful project has been setting up a special orchestra, the Streets Philharmonics. This targets immigrants who are talented musicians, mainly from the former USSR, and who have found it difficult to penetrate Israel’s small music industry. The Zeze founders approached these musicians on the streets where they were playing, and proposed that they joined the orchestra. The performances have been a huge success, with audiences of up to a thousand at a concert, and firms commissioning the orchestra to play at their events. The musicians are paid from the concert revenues according to the standards of the music industry. In the past, Zeze also managed a project that organized summer camps for children from lower socio-economic neighbourhoods in Tel Aviv. For this project, Zeze provided opportunities for older school kids to participate as counsellors, to receive experience and a proper salary. These counsellors represented minorities from rough neighbourhoods: Arabs, African refugees and Ethiopians.

### 4.1 Social value from the projects

Zeze has succeeded in combining social ends with revenue generation while benefitting the network actors, thereby providing intelligently planned means to maintain their social activities. The skills and knowledge base of the volunteers has formed the basis for carrying out the projects, but the effect of value creation has been multi-directional: The venture has fulfilled the original purpose of creating sustainable social impact in the target audience by creating feelings of integration, support as a result of group activity, and satisfaction from the participation. In addition, there are other, unplanned positive impacts that have occurred: the volunteers have benefited from involvement as their skills and experience have accumulated in the areas of their expertise. One example of this is a young man who provided resources for developing the promos for the events, and was subsequently able to use the works as references when opening his own business; while another is a junior graphic designer, who was given the opportunity to design a one-page advertisement for a prominent newspaper: Building such a wide portfolio as the former was able to, and winning a place in a country-wide newspaper as the latter did, would hardly have been possible for these young professionals without their involvement with Zeze.

Value created in the form of inclusion, or by providing benefits for less privileged groups, such as school children, the elderly or immigrants, has been the main focus of Zeze. For the musicians their inclusion has provided an employment opportunity, an income and a stage to use their talents on a more appreciated platform and as a part of an orchestra rather than just playing alone on the street, although Zeze does also recognise street music as a significant form of the arts. However, from the musicians’ point of view, the importance of receiving a salary is sometimes of lesser importance than the pure social impact of their increased confidence derived from playing on the stage for a large audience. Importantly, commercial firms form a significant customer base for the Streets Philharmonics. The various backgrounds of the musicians add value to their activities, as reference to the world music they represent has been used in marketing the concerts.

Teaching graphic design to former prisoners has contributed to their inclusion, as the project has encouraged them both through learning new skills and through the results of their work. In the school children project, according to the founder, it was empowering for the counsellors to see that they could be a “part of the solution for others” and not only to be considered as those whose problems needed to be solved.
4.2 Managing the projects

As the activities have matured, a more professional approach has been required for managing the projects, including hiring of CEOs. Still, there is a difference relative to commercial ventures, since the salaries offered are lower than in the business sector. For this reason, the key people have to be motivated by the cause of the project. However, according to the founders, this should not necessarily be the case. They believe that a social venture should find a model that is fully self-sustainable and is comparable to commercial ventures, at least in terms of hiring key managers to ensure professional management. However, the overall assessment of the projects is that the young people volunteering are doing a very good job. The Zeze model of creating revenue from certain social projects and investing the income in other projects has turned out to be successful. In Zeze, the management of the projects takes place through different layers. The core team consists of the founders and the CEO of the venture, and beyond that there are 40 more permanent volunteers and other volunteers, with the number involved in their projects already up to one thousand.

It is also recognised that the social impact extends out to the whole society, as people come to see the concerts and become aware of ways in which they can create social impact. Companies are interested in concert as customers, as they can, in this way, demonstrate their social contribution and social responsibility to their own stakeholders. When events are offered to the wider public, the venture itself benefits from this, because awareness often turns into people’s willingness to get involved. The use of social media in marketing their activities and locating suitable volunteers is essential, but the events spread the word about Zeze activities, providing thereby not only a marketing channel for new customers, but also for new volunteers.

5. Discussion and conclusions

The study enriches the extant theoretical views on social ventures and social entrepreneurship, with the focus on value creation, bringing new insights to the understanding of how a network of stakeholders functions in the process, and how the organisation is managed. The earlier definitions of social ventures, which emphasized the role of the social entrepreneur, the social value creation, and innovativeness in the venture activities (Austin et al. 2006; Choi & Majumdar 2013; Felicio et al. 2013; Mair & Marti 2006) are clearly manifest in the Zeze projects, a social venture that provides a platform for multiple simultaneous social projects. As with other social ventures, social value creation for groups with special needs, and the creation of a sustainable social impact have been declared to be the main purpose and raison-d’être of the non-commercial venture since its foundation. However, the emphasis on the innovative element in terms of their creativity, and the novelty that the entrepreneurs have been striving for in this venture, has several theoretical and managerial implications.

Our findings show that underprivileged groups still are the main target audience benefitting from social inclusion in its various forms (Austin et al. 2006; Sud et al. 2009). Value creation, however, is not limited to these groups, but there are also other groups and individuals who can be pointed out as beneficiaries. Simultaneously, this finding also widens the extant view of what constitutes social value. For the pre-defined audiences of immigrants, children from low-socio-economic backgrounds, the elderly and former prisoners, the value created consists of the tangible and intangible elements of social inclusion: recognition, human development, involvement, proximity and material well-being (Omidvar & Richmond 2003). The social venture stakeholders who form the network of internal and external actors are generally viewed as assets that serve the purposes of the social venture (Austin et al. 2006; Felicio et al. 2013). This study reconsiders this standpoint and suggests that the stakeholders can be regarded as another group of beneficiaries, including both the non-business and the business actors. The value created for these actors does not take the form of social inclusion, as understood in a traditional sense, and it may not be economic per se. However, it can turn into measurable value in other contexts: for the volunteers, the development of skills was significant within the framework of the venture; and for the corporate or other institutional actors who buy concerts and concert tickets, and in this way show their involvement in socially responsible activities, value can manifest through an enhanced corporate reputation as perceived by their stakeholders. According to this observation, the value flows in the venture are thus bidirectional: toward the pre-defined target audiences and towards the other participating stakeholders. It is also notable that business organizations can be active parties in roles other than that of a donor.

For the social venture management, the findings of the case demonstrate how innovativeness can genuinely support the venture establishment and its activities in a sustainable way. In the case of Zeze, the
innovativeness lies in the processes of resource integration and mobilization, and in the venture model itself, more than in its outcomes. Firstly, their marketable products and services, with an expanding customer base that enables revenue generation and self-sustainability, place Zeze into the category of hybrids (Grassl 2012). The revenue invested back into the projects allows development of existing projects and the launching of new ones from the same platform. This represents the opposite of the model in which financing is based on donations or governmental support, often perceived as the traditional approach to social organizations (Felício et al. 2013). The commercial aspect assures independence for the venture and allows greater flexibility in relation to the contents of the projects and their target audiences. Secondly, the model has been designed in such a way that it supports the construction of a network of people, its key resource and an essential element in maintaining the activities in a smooth way. Through the creativity exercised in planning the activities, the venture has been able to reach out to a great number of young people and lead them to get engaged by allowing them to follow their passion in doing things that they would be doing otherwise anyway. In this way, the venturer has been able to compensate for otherwise scarce resources.

6. Managerial implications

The managerial implications based on the findings of the case study might be limited to similar cases, but we may derive a few implications concerning value creation and venture management in particular. The case indicates that as the social venture matures and advances, its managers are required to possess increasing levels of professionalism in managing the venture. While the mission and its ideological and even altruistic goals are good motivational factors, they do not necessarily contribute to the long-term survival of a venture.

Furthermore, particular attention must be paid to managing the network participating in value co-creation. The selection of volunteers and other partners, the allocation of their resources and responsibilities, the risks, and the respective “value shared” among these partners are key elements contributing to the venture and to the attaining of its goals, and therefore they should be analysed in detail. Applying the principles of stakeholder management can provide the venture with tools for ensuring the continuation of its activities, as the views of the different actors can be diverse, and even emotionally loaded. In spite of the imminent challenge for other social ventures to create projects with revenues, the case of our social venture demonstrates that with the right model and innovation this is possible. Therefore, we suggest that further empirical research on value creation is needed, particularly in the area of sustainable social venture business models and their development.

References


The Role of R&D Expenditures in People’s Innovative Potential

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Abstract: The role of investments in a knowledge-based economy, which is the only way to be competitive and innovative, especially in a time of economic crisis, is increasing. R&D expenditures are important indicators of innovative performance and the best countries in the European Union invest the most finance in the area of research and development. The relationship between financial support for innovation and people, as holders of creativity and new ideas, is obvious. This paper focuses on the importance of R&D investments and researchers in the most innovative countries of the European Union. The hypothesis is based on the fact that researchers represent the most educated people in the population and bring innovation into the economy and help economic growth. The aim of this paper is to analyse and compare the R&D expenditures of five of the most innovative countries of the European Union, measured by the number of patent applications ranked in 2012, and people’s innovation potential. The hypothesis of this article is based on the assumption that higher R&D expenditures in the government and business sector of selected countries should lead to a higher number of researchers in the monitored countries followed by an increasing number of patent applications as a result of innovation activities in companies. Using the Eurostat and World Intellectual Property Organization (WIPO) database for the period 2007–2011, the paper analyses and compares dependent variables, represented by the number of researchers, to R&D expenditures by a linear regression method. The main results of the analysis are compared among selected countries of the EU and show the dependency of these two factors and their importance in innovation.

Keywords: R&D expenditures, innovation, patent application, human capital

1. Introduction

Innovation generated by a complex innovation process is considered one of the main driving forces of the economy and economic growth (Romer, 1990). On the company level, the innovation process is usually divided into particular stages and R&D has been understood as one of the interdependent stages (Rothwell, 1994) since the development of the second-generation innovation process in the 1960s. This research and development phase focuses on the creation of new knowledge and influences an innovating organization, especially in terms of product or process innovation.

From a macroeconomic point of view, research and development is understood as a driving force for fostering innovation activities in European Union countries with the aim of achieving better results in competitiveness (Bilbao-Osorio and Rodríguez-Pose, 2004). European countries are encouraged to support innovation in 3% of their GDP, but this is just the unrealized innovation strategy. In the Union, huge differences have existed between countries in this indicator, and it is also one of the factors of successful innovation, measured by the number of patents applied for to patent offices. Innovation activities are mostly dependent on invested funds and people with the potential to be creative and the ability to generate new ideas. These are two of the most important factors that influence innovation activities.

This paper focuses on the role of R&D investments in the potential of humans as holders of creativity and new ideas in the five most innovative countries of the European Union, and explains the level of dependency tightness of these two variables.

The paper is structured as follows: following this introduction, Section 2 offers a theoretical background and literature review. Section 3 explains the hypothesis of this paper and the methodology and data sources used. The main results are presented in Section 4, and discussed in Section 5. Section 6 offers the main conclusions of the study and Section 7 explains the limitations of the analysis.

2. Theoretical background

2.1 Logical framework of analysed task

Over the past many years, European policy has been formed in the field of innovation and development, the outcomes have been defined and R&D funding has been developed in all countries of the European Union. One of the key objectives of the EU has been the increasing level of investments in research and development to stimulate European competitiveness. The Lisbon strategy (2000–2010) set a quantified target of 3% on R&D
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expenditures for 2010 (European Parliament, 2010) to improve the innovation performance of EU countries. Four years later it has to be stated that this goal has still not been met. In 2013, the European Commission suggest the increasing role of knowledge-based economies and innovation and supported all activities leading to competitiveness and high-tech production (European Commission, 2013). After the years of stagnation, this intensity target of at least 3% of GDP being spent on R&D by particular countries still remains. The EU economy has to be prepared for permanent global economic pressure and the rising position of countries outside the European Union area and Europe. According to WIPO patent statistics (2013), the most innovative countries of the world are outside the EU; this means China, the USA, Japan, the Republic of Korea and further developing countries of Asia where innovation activities play an increasing role.

The comparative study of Braunerhjelma and Thulin (2008) examines an increase in R&D expenditures and its impact on the competitiveness of selected OECD countries. The recent study of Gulmez and Yardimcioglu (2012) investigates the relationship between research and development expenditures and economic growth. Another study by Sassu and Lodde (2002) further estimates the effects of R&D expenditures on patent activity. Bobillo, Sanz and Gaite (2006) consider R&D expenditures as an essential instrument in competitiveness. These studies focus on R&D as a main factor of competitive ability and mostly explain the relationship between comparable indicators such as funding of innovation and achieved results in the form of applied patents.

2.2 Research, development and human capital in literature review

According to the Frascati Manual, the European Commission defines R&D as an intensive and systematic effort to achieve comparable and competitive world results and a knowledge-based culture and society, with the main target being to increase the number of applicable effects (OECD, 2002). This premise is based on the two pillars of innovation and competitiveness, namely innovation funding and human potential, respective people in the research and development phase of the innovation process in the business sector and in all types of R&D in the public sector. Romer (1990, 1994) explains, in his theory of endogenous technological change, economic growth as the result of knowledge and human capital accumulated and used within economies. The interaction between human capital, R&D expenditures and intellectual property rights is explored by Bravo-Ortega (2012), while the study of Galliè and Legros (2011) investigates the effects of human capital and technological capital (measured by R&D expenditures) on innovation. Piras and Postiglione (2011) focus on the labour productivity of European regions in their economic model and analyse the effect of R&D expenditures on labour productivity growth. This study uses Verdoorn’s specification for confirmation of significant R&D expenditures in manufacturing. This coefficient recognizes regional specialization and differences between countries.

Hottenrott and Peters (2012) describe, in their study, the importance of the role of funding and R&D expenditures in innovation potential and productivity and regard R&D expenditures as a key factor for innovation projects. The research and development phase has to be financially supported by companies and government (Burns and Stalker, 1961) and should lead to better results in innovation competitiveness. Afonso (2013) presents a dynamic model that includes R&D and human capital accumulation as two main resources for economic growth and competitiveness.

2.3 R&D expenditures in the European Union countries

As the data published by Eurostat show, European research has not accomplished the 3% target of R&D expenditures in relation to gross domestic product since the Lisbon strategy was defined in 2000 in Lisbon. The report of the European Parliament (2010) presents the intensity of R&D investments as a percentage of GDP in the EU at 1.90%, up 1.85 on 2007 but still below the target of 3% in 2010. This indicator has not changed since 2010. The present level of research and development investments is only 2.06% in the EU on average (Eurostat, 2013). According to the results published by Eurostat, only northern countries of the EU region have invested and exceeded the goal of devoting 3% of GDP to R&D and these are outperformed by Japan, the USA and the Republic of Korea, the most innovative countries in the world (WIPO, 2013).

2.4 People in research and development

For creativity and innovation, human potential in the research and development phase of the innovation process is extremely important. The summary index of the Innovation Union Scoreboard consists of eight dimensions containing 25 indicators. Human resources and people represent two of them (Innovation Union
Scoreboard, 2014). Human capital is one of the most important components in innovation systems (Dubickis and Gaile-Sarkane, 2013) and belongs to the pillar of competitiveness in countries. National innovation strategies include human resources as a part of the innovation system and usually define future support for their role in innovation strategies.

3. Hypotheses of the paper

The main goal of this paper is to analyse and confirm the relationship between expenditures in research and development and human potential, represented by a number of researchers, understood as people with the potential to create new ideas and innovation. These three hypotheses can be postulated:

First hypothesis: The five most innovative countries of the EU region achieved the highest level of R&D investments between 2007 and 2011. The innovative activities are measured by the number of patent applications published by the WIPO database (2013).

Second hypothesis: The countries in the first five positions in the patent application ranking have the highest number of researchers in the whole European Union.

Third hypothesis: It can be hypothesized that more educated people bring more innovation potential into companies and increase the chances of turning a product/process or service into a successful and patented result. This hypothesis is based on an increased level of R&D, which is reflected in a higher number of patent applications as a result of innovation activities in companies from a macroeconomic point of view.

This paper is based on these two main innovation factors and investigates the relationship between R&D expenditures and human potential. The analysed problem focuses on the correlation between two variables of the five most innovative countries of the EU and looks for an explanation for the final results. The results of the innovative leaders are compared to results in the Czech Republic. The Czech Republic is included in the group of member states whose innovation performance is below the EU average measured by 25 innovative indicators (European Union Innovation Scoreboard, 2014).

4. Data sources and methodology

The analysis is based on a data set covering the five most innovative countries of the European Union during the period 2007–2011. The data are taken from the World Intellectual Property Organization (WIPO) database with reference to the Czech Republic due to its ranking in 2011. The final innovative results of the most innovative countries of the European Union and the share of these countries in the innovation performance of the whole EU are shown in Tables 1 and 2.

<table>
<thead>
<tr>
<th>Table 1: Patent applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries 2007</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>1. Germany</td>
</tr>
<tr>
<td>2. France</td>
</tr>
<tr>
<td>3. United Kingdom</td>
</tr>
<tr>
<td>4. Netherlands</td>
</tr>
<tr>
<td>5. Italy</td>
</tr>
<tr>
<td>15. Czech Republic</td>
</tr>
<tr>
<td><strong>Total EU5</strong></td>
</tr>
</tbody>
</table>

Source: WIPO, 2013

<table>
<thead>
<tr>
<th>Table 2: Innovation performance of TOP 5 EU countries as a share of the EU 27 measured by % of patent applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Countries 2007</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>EU-5</td>
</tr>
<tr>
<td>EU-27</td>
</tr>
<tr>
<td>EU-5/EU-27</td>
</tr>
</tbody>
</table>

Source: Own calculations based on WIPO data, 2013
Note that we have a total of 457,237 patent applications for the year 2011 and over 400,000 patent applications during the whole period of 2007–2011. The selected sector of five countries represents almost 80% of the innovation performance of the European Union. The Czech Republic reached only 1% of Germany’s total patent applications in 2011. The role of the country in the innovation performance of the whole European Union is insignificant. For this research, the Eurostat database was also used to explore R&D expenditures (GERD) for the EU-5 countries and Czech Republic and the number of researchers (full-time equivalent) as two factors determining innovation in the period between 2007 and 2011, thus enabling us to use simple (pairwise) regression analysis to confirm the relationship between these variables and analyses of its tightness.

**Variables**

The dependent variable used is the number of researchers in the research and development of the EU-5 countries and the Czech Republic for comparison with the best countries of the EU. As independent variable, the level of R&D expenditures in the period 2007–2011 was selected. We can expect that in the area of research and development works, highly educated people and education in these countries have been supported with spending above the EU average. This fact is very difficult to verify because complete data for the year 2011 in this indicator are not available (Eurostat, 2013). The Innovation Union scoreboard (IUS, 2014) includes the total R&D expenditures of the public and business sector. The expenditures on education of particular countries are not included in the IUS summary index.

**Methodology**

After selecting a set of variables the analysis was performed to outline the hypothesis. The main purpose of this paper is to confirm a statistical dependence between two variables and check the idea that an increase in R&D expenditures leads to a higher number of researchers in the research and development area. The methodology used a linear regression model that consists of finding the relationship between two variables by fitting a linear equation to observed data. One variable (X) is explanatory; the variable on the Y axis is dependent. A linear regression line has an equation of the form \( Y = a + bX \). The slope of the line is \( b \), and \( a \) is the intercept (the value of \( Y \) when \( X = 0 \)).

**Table 3:** R&D expenditures of EU-5 and the Czech Republic (in mil EUR)

<table>
<thead>
<tr>
<th>R&amp;D expenditures</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>61 482</td>
<td>66 532</td>
<td>67 006</td>
<td>69 914</td>
<td>75 250</td>
</tr>
<tr>
<td>France</td>
<td>39 303</td>
<td>41 066</td>
<td>42 835</td>
<td>43 387</td>
<td>44 921</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>36 935</td>
<td>32 674</td>
<td>29 350</td>
<td>31 130</td>
<td>31 425</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10 342</td>
<td>10 502</td>
<td>10 408</td>
<td>10 856</td>
<td>10 856</td>
</tr>
<tr>
<td>Italy</td>
<td>18 231</td>
<td>18 993</td>
<td>19 209</td>
<td>19 625</td>
<td>19 755</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1 801</td>
<td>1 999</td>
<td>1 925</td>
<td>2 095</td>
<td>2 552</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2013

Table 3 presents the R&D expenditures of the monitored countries and Table 4 displays the number of researchers in these countries of the EU.

**Table 4:** Number of researchers of EU-5

<table>
<thead>
<tr>
<th>Researchers</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>290 853</td>
<td>302 467</td>
<td>317 226</td>
<td>327 953</td>
<td>338 608</td>
</tr>
<tr>
<td>France</td>
<td>221 851</td>
<td>227 679</td>
<td>234 366</td>
<td>243 533</td>
<td>249 086</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>252 651</td>
<td>251 932</td>
<td>256 124</td>
<td>256 585</td>
<td>251 358</td>
</tr>
<tr>
<td>Netherlands</td>
<td>51 057</td>
<td>50 727</td>
<td>46 958</td>
<td>53 703</td>
<td>58 447</td>
</tr>
<tr>
<td>Italy</td>
<td>93 000</td>
<td>95 766</td>
<td>101 840</td>
<td>103 424</td>
<td>106 151</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>27 878</td>
<td>29 785</td>
<td>28 759</td>
<td>29 228</td>
<td>30 682</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2013
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In this type of analysis we expect a linear relationship between dependences and this analysis shows how the dependency is close to these variables.

5. Main results

Fig. 1 presents the linear dependence of the variables. The mathematical function implies very close dependence of these two variables in the cases of Germany, France and Italy, at over 90%. We can state that the increasing R&D expenditures lead to a higher number of researchers in these countries. This fact also helps to explain the best ranking of these countries in the patent application statistics of the WIPO.

Source: Own calculations based on Eurostat data, 2013

**Figure 1:** Number of researchers versus R&D expenditures of EU-5 and the Czech Republic
Data calculated by linear regression analysis show very weak dependency of variables in the case of the Netherlands – only 21%. This means the number of researchers is derived from more factors, probably closer to R&D expenditures.

6. Discussion

The first postulated hypothesis was confirmed by the WIPO data analysis. The five countries ranked at the top in the number of patent applications in the WIPO statistics are confirmed leaders in the European Union region. These countries generate almost 80% of patent activities in the monitored area and define the direction of innovative policy in the EU. If the European Union became the most dynamic and competitive knowledge-based economy in the world (Lisbon strategy, 2010), the European countries would have to concentrate on innovation activities to build on research and development, human capital, finance and support. These indicators are reflected in the Innovation Summary Index (2013), which divides countries into four groups based on their innovation performance.

The statistics data based on Eurostat (2013) do not confirm the second hypothesis (see Table 5). Germany, France and the United Kingdom are the countries with the highest level of researchers, but Spain was ranked in fourth position on this indicator during the period 2007–2011. In fifth position was Poland with more than 60,000 researchers in 2011. But the number of researchers does not match the expectation for innovation performance of this country. Poland applied for only 4,901 patents (WIPO, 2013).

Table 5: Number of researchers in EU countries (10 best-ranked countries and the Czech Republic)

<table>
<thead>
<tr>
<th>Researchers</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Germany</td>
<td>290 853</td>
<td>302 467</td>
<td>317 226</td>
<td>327 953</td>
<td>338 608</td>
</tr>
<tr>
<td>2. United Kingdom</td>
<td>252 651</td>
<td>251 932</td>
<td>256 124</td>
<td>256 585</td>
<td>251 358</td>
</tr>
<tr>
<td>3. France</td>
<td>221 851</td>
<td>227 679</td>
<td>234 366</td>
<td>243 533</td>
<td>249 086</td>
</tr>
<tr>
<td>4. Spain</td>
<td>122 624</td>
<td>130 986</td>
<td>133 803</td>
<td>134 653</td>
<td>130 235</td>
</tr>
<tr>
<td>5. Italy</td>
<td>93 000</td>
<td>95 766</td>
<td>101 840</td>
<td>103 424</td>
<td>106 151</td>
</tr>
<tr>
<td>6. Poland</td>
<td>61 395</td>
<td>61 805</td>
<td>61 105</td>
<td>64 511</td>
<td>64 133</td>
</tr>
<tr>
<td>7. Netherlands</td>
<td>51 057</td>
<td>50 727</td>
<td>46 958</td>
<td>53 703</td>
<td>58 447</td>
</tr>
<tr>
<td>8. Portugal</td>
<td>28 176</td>
<td>40 408</td>
<td>44 084</td>
<td>46 256</td>
<td>50 061</td>
</tr>
<tr>
<td>9. Sweden</td>
<td>45 812</td>
<td>50 220</td>
<td>47 160</td>
<td>49 312</td>
<td>48 589</td>
</tr>
<tr>
<td>10. Finland</td>
<td>39 000</td>
<td>40 879</td>
<td>40 849</td>
<td>41 425</td>
<td>40 003</td>
</tr>
<tr>
<td>14. Czech Republic</td>
<td>27 878</td>
<td>29 785</td>
<td>28 759</td>
<td>29 228</td>
<td>30 682</td>
</tr>
</tbody>
</table>

Source: Eurostat, 2013

Regarding the results for Germany, France and the United Kingdom, the impact of research and development expenditures is very strong. These countries spend most in the area of research and development. Germany invested almost 3% of GDP in 2011 in R&D (Eurostat, 2013) and was the most productive country in innovative activities leading to patent applications. The number of researchers was the highest in the whole EU. In Germany there is a stable pro-innovation environment supported by the public and private sectors of the country and educated people. The number of researchers in France is comparable to the United Kingdom. France is one of the best European countries for patent applications and is ranked in second position in innovation performance compared to researchers as a key factor of innovative creativity. The R&D expenditure dependency of France is closer than in the case of Germany. These findings could help to increase patent activities that are very closely tied to financial support.

The linear dependency in the Netherlands is 66%. We can expect an influence of more factors on innovative activities and this fact needs to be analysed by a multiple regression model or by another type of statistical analysis. Other factors determining innovation can be defined as: population, average wage of research sector and human capital as the labour force of a country. All these indicators can influence innovation performance and researchers’ activity. The Netherlands spends over 2% of GDP on R&D and is ranked in fourth position in EU patent applications.
Analysis showed very interesting results in the United Kingdom. As we expected closer dependency of human potential and R&D researchers from the third highest position in patent applications, the weak dependency of this country in the linear regression model is surprising. The dependency of these two factors exists, but it is very weak compared to the other monitored countries. From the position in the R&D statistics of Eurostat we can assume more explanatory factors of the analysed question. The dependence of 25% in two numerical variables is low but exists. The main factors need to be found and analysed as a complex problem related to the innovation performance of this country.

As was hypothesized, more educated people bring more innovation potential into companies followed by an increasing number of patent applications. This fact was confirmed in particular countries with different levels of dependency based on more factors influencing the innovation performance.

The dependency of researchers on R&D expenditures was established at 80% in the Czech Republic. The variable is more sensitive to financial support of R&D and is based on more indicators. The Czech Republic has a problem with a stable innovative environment based on tradition and historical development, coordination and cooperation between the public and private sectors in this area, expenditures on education and a stable education system, and many other factors that influence people and innovative activities.

The final results also show the imbalance in indicators. The number of researchers in the Czech Republic is close to that of Italy, but the patent activities do not match this. This confirms the assumption of more important factors of this problem, which should be further analysed and searched in national innovation systems.

7. Conclusions

The role of R&D expenditures in innovation activities is increasing. According to all studies, innovation is dependent on two main factors: financial support and people understood as holders of innovation, creativity and new solutions.

This paper has focused on the confirmation of dependency of two main variables determining innovation activities, leading to the innovation performance of countries. The first dependent variable was defined as the number of researchers and the paper analysed the dependency of this variable on R&D expenditures in the most innovative countries of the European Union, measured by patents applied for to patent offices (WIPO, 2013).

The results of the linear analysis showed the close dependency of these two variables in France, Germany and Italy. The increasing level of investments in research and development will probably lead to a higher number of researchers in these countries. For the purpose of this paper, the researchers are understood as highly educated people with innovation potential and better results in patent activities. The obtained results in the Netherlands and the Czech Republic denote more indicators influencing human potential in their national innovation system. These facts need to be analysed by further statistical methods and use multicriteria variables for explaining details.

8. Limitations and future research

The main difficulty has been obtaining the data for analysis. The Eurostat database does not provide all data for the period 2007–2012, so the paper had to focus only on the period 2007–2011.

This paper has analysed and confirmed the dependency of researchers on R&D expenditures in the five most innovative countries of the EU. According to the results achieved, this simple analysis cannot explain all the factors influencing innovation, and data need to be more detailed and analysed by other statistical methods. For complex conclusions, larger data samples need to be analysed in more detail. In further research, the research will focus on more countries in the EU in an effort to find and define more factors that can influence an analysed task and that can explain other facts and achievements.

References

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Possibilities for Peer, Online Learning in Entrepreneurship: The Case of TeleCC Platform

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$^2$TeleCC.org – a non-profit initiative, Greece

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Abstract: Entrepreneurial learning is thought experiential. In addition, many scholars emphasise on the importance of reflection processes during the experiential learning cycles. Reflection is the key-process for meaning-making of experience adopted from practice. Entrepreneurial courses are usually driven by business plan tasks which emulate the way that entrepreneurs run their own firms. The impact of this pedagogical approach, especially in inspiring students to become entrepreneurs, is a subject for study and consideration. At the same time, fostering entrepreneurship has been associated with competencies able to support entrepreneurial initiatives. Hence, learning is inherent to venturing but there are still various aspects learning, and connections with competencies, to be considered for effective entrepreneurial teaching. The present paper examines possibilities for discussing entrepreneurship in career counselling contexts. We maintain that informal, peer-learning techniques in career counselling groups, can be a methodological tool to empower reflection on entrepreneurial principles and theoretical contingency approaches in connection with entrepreneurial skills and self-development. In the second part of the paper, we present an application: the online platform TeleCC.org – a non-profit initiative – designed to accommodate online career counselling groups in four-month seminars in Greece. The instructional design of the platform is discussed along with the pilot empirical tests with a Greek population interested in entrepreneurial career options.

Keywords: entrepreneurial learning, online learning, reflection, self-directed learning, career counselling

1. Introduction

From the origin of the entrepreneurial education, as a discipline, it has become evident that entrepreneurial learning is experiential (Gibb et al. 2013, Minniti and Bygrave 2001, Politis 2005). Teaching entrepreneurship cannot lean upon a coherent theoretical setting (Bygrave and Hofer 1991) but it merely adopts theoretical contingency approaches (Fiet 2001). Therefore, entrepreneurship education focuses on cultivation of entrepreneurial skills, i.e. the ‘about’ and ‘practice in’ forms of entrepreneurship education discussed by Gibb (2002), The entrepreneurial mindset (McGrath and MacMillan 2000) has been the core concept for educating entrepreneurs (cf. Rondstand 1987), irrelevantly to the foundation of their own new firms. According to various surveys (e.g. European Commission 2012), entrepreneurial courses have massively employed business plan (or planning) as the key tool to introduce business venturing to inexperienced (or sometimes experienced) populations of trainees (cf. Honig 2004, Pittaway and Cope 2007). Worldwide surveys on the impact of entrepreneurship education are underway (e.g. Kakouris 2011a, Winkel et al. 2013). Most of them concentrate on the empowerment of entrepreneurial self-efficacy of trainees who are considered potential entrepreneurs.

On the other hand, scholars who study entrepreneurial orientation and personal intentions to become entrepreneurs, acknowledge the role of underlying beliefs in the entrepreneurial decision making. Research utilising the Theory of Planned Behaviour (Ajzen 1991), clearly indicate the causal connection of behavioural, normative and control beliefs with the entrepreneurial intention and behaviour – i.e. establishment of a firm (e.g. Krueger and Carsrud 1993). However, the confrontation with beliefs ‘colours’ personal entrepreneurial decision making with elements and influences from the local entrepreneurial environment. Thus, local cultural traits have been found essential in entrepreneurial teaching and further personal career planning and entrepreneurial decision making (c.f. Anderson, Drakopoulou-Dodd and Jack 2009). Alteration of personal beliefs also emerges in ‘transformative’ learning theories of Mezirow (1978, 1991) or Kegan (2000). Kegan’s theory falls into the cognitive developmental psychology field where some ‘critical’ events or experiences may highly change the behaviour (e.g. Krueger 2007). Scholars as Cope (2003), Rae and Carswell (2000), Cope and Watts (2000), have also addressed the transformative trajectory of small firms’ evolution during critical events.

The key-mechanism for a critical consideration of beliefs is known to be reflection (Boud, Keogh and Walker 1985). The notion of a reflective-practitioner (Schön 1983) is also crucial for enterprising individuals or trainees (Jack and Anderson 1999). Even in simple Kolb’s (1984) experiential learning cycles, the mode of reflection is the
most essential in converting experience into knowledge. Hence, the learning-by-doing pedagogy followed in entrepreneurial courses includes reflection in order to accumulate entrepreneurial knowledge through practice. Critical reflection and reframing of ill-posed problems can emerge at any time of experiential pedagogies depend on the educational framework and the characteristics of the trainees (Kakouris 2011b). And such educational episodes can be crucial for the entrepreneurial orientation and decision making of trainees in given educational settings. Hence, the central question of the present article is “how reflection can be empowered during learning-by-doing, entrepreneurial pedagogies?” For a concise analysis, we restrict the adopted educational setting in informal, online learning connected to a previous ECIE paper (Kakouris 2009) about online teaching in entrepreneurship. We also refer to learning needs relative to career development as to follow the recent trend for entrepreneurial inspiration of youth populations. In the next section we present a theoretical framework on which an innovative online entrepreneurial teaching (TeleCC.org – a non-profit initiative) is based.

2. Informal, self-directed, entrepreneurial teaching

Allan Gibb (2002, 2007, et al. 2013) suggests a constructivist, hands-on approach is the most effective instruction ‘about entrepreneurship’. Following this suggestion, Kakouris (2009) discussed online learning platforms for entrepreneurship education which establish a perceptional learning environment in accordance with Kolb’s (1984) theory for experiential learning. In the present section, we extend the theoretical framework for online, problem-based, entrepreneurial learning. As far as we favour a student-centred teaching, we aim to facilitate learning towards conceptualising entrepreneurship and the idea generation phase of business venturing and start-ups. This primary phase of idea generation (Lumpkin and Lichtenstein 2005) focuses on creativity and innovation as a crucial business attribute for further deployment and success. In order to coherently accommodate creativity and divergent thinking (McCrae 1987), we employ bottom-up processes for our curriculum. Given the highly constructivist environment and the respective role of facilitator for the educators, we correspond the present approach to informal learning settings. The outcome of the learning process is unique for each individual who is asked to take responsibility of what he/she learnt and its meaning for his/her own career planning. Therefore, entrepreneurial learning becomes self-directed, joint to the needs of the individual (e.g. Rae 2005), his/her capacities and his/her own career development. In this way, entrepreneurial learning is not confined in establishment of start-ups but also includes intrapreneurship, empowerment of nascent entrepreneur and fostering of the entrepreneurial mindset in general.

2.1 An informal learning setting for entrepreneurship

Engaging adults in long-term entrepreneurial seminars close to their career needs and plans deviates from the formal entrepreneurship education offered by educational institutes. Despite the existence of a ‘typical’, general curriculum, much of the content emerges during the process while learners are able to interact and alter the curriculum content. Due to the flexibility on what is to be learnt, the so-called lack of structure, Marsick and Watkins (2001: 31) address some particularities of informal learning:

“Because informal and incidental learning are unstructured, it is easy to become trapped by blind spots about one’s own needs, assumptions, and values that influence the way people frame a situation, and by misperceptions about one’s own responsibility when errors occur.”

Therefore, an informal setting to discuss entrepreneurship allows effective confrontation with beliefs, most of them due to socio-cultural influences (Anderson et al. 2009), and empowerment of reflection on given experiences and points of view of individuals towards business venturing. Underlying beliefs are known to play a major role in the entrepreneurial process either seen from the cognitive developmental (Krueger 2007) or the behavioural (Ajzen 1991, Krueger and Carsrud 1993) perspective. Hence, informal learning in entrepreneurship can be considered a ‘vehicle’ to trigger higher-level learning (Cope 2003), to bridge entrepreneurship with career counselling, and to reach broader populations of learners of all ages.

2.2 Group construction and the role of peers

The online instructional environment can be based on asynchronous communication. Asynchronous learning is consistent with constructivist theory practices and learner-centred approaches which postulate tempo-spatial autonomy for the learners. It also supports reflection and self-directed learning (Garrison, Anderson and Archer 2001).
Gibb at al. (2013) discuss various pedagogies for effective entrepreneurship education. They suggest teaching in small groups is a very appropriate pedagogy to foster the entrepreneurial mindset. They argue (p. 22):

“Group work is a major component of ensuring ownership of learning; ‘learning by doing’; by inventing things, making things up, communicating orally, building teams, building confidence in a situation of low exposure and solving problems creatively. It also often simulates getting things done under pressure and making decisions without too much information.”

Thus, the online instructional environment should allow groupwork. Peers are very important in creating contextual meaning, share experiences, counsel with one another and generally collaborate on a task. The educator-facilitator should be able to coordinate and exploit the group discussion towards meaning making and integration of the various points of view. The peer-learning process is also important in reflection, and other meta-cognitive processes, as well as in revealing the different capacities needed in the origin of every entrepreneurial initiative. Ideally, the discussion within the learners’ group emulates the democratic dialogue (i.e. the discourse) where all points of view and opinions are examined in an equal and common base. In this way, learning exceeds mere comprehension of basic entrepreneurial tools and becomes more critical in order to examine beliefs, assumptions and values of the trainees. The expected result is learners to be more likely for deliberate action and for further envisagement about entrepreneurship – i.e. not just ‘venture’ but what to venture about.

### 2.3 Towards emancipatory and autonomous instruction

Following the previous framework of problem-based teaching within online groups of learners, critical pedagogy principles emerge. The discourse, as a learning process, has been addressed by Habermas (1996) and has also been adopted in perspective transformation theory of Mezirow (1978, 1991). Critical pedagogy is highly emancipatory without any predefined outcomes. Learners of different backgrounds are expected to participate in group processes and interact with one another in order to achieve entrepreneurial knowledge and/or competencies relevant to their personal needs and career plans with autonomy and awareness. The composite role of the educator (i.e. facilitator and counsellor) is to focus on each individual and the group as to be able to provide him/her with a final report and consultancy associated with his/her own needs, interests and plans.

### 3. The TeleCC.org – a non-profit initiative – online platform

TeleCC.org platform (Tele Career Counselling) is a recent non-profit initiative in Greece which aims to provide online career counselling to youth populations. The initiative offers three types of seminars: for secondary education pupils who want to enter the higher education, for students and alumni who want to enter the job market and for young people who are interested in entrepreneurship. Currently, the initiative runs its pilot phase with a group of about 30 participants per seminar. In the present description we focus on the entrepreneurship group.

#### 3.1 Methodology

TeleCC methodology is based on asynchronous, online learning. The communication takes place totally through the platform without any face to face interventions. Learners form a group which lasts four months. The group comprises up to 30 trainees and is administrated by two (or more) counsellors who act as educators/facilitators. The principal counsellor is responsible for the learning process and he/she is supported by one or more co-counsellors. Interested clients apply to join the discussion group by clearly stating their personal needs and expectations from it. When accepted, they are asked to participate in the group process (i.e. a series of activities) and also interact with the principal counsellor on their own subjects. The latter process is private and in accordance with the principles of the counselling relationship between counsellor and client. By the end of the process, the principal counsellor provides each individual with his/her own report. During the four-month process, each participant is able to evaluate each activity, or comment posted, providing feedback to the educators and the rest participants of the group (i.e. his/her peers). A final evaluation takes place by the end of the process. The former corresponds to a formative assessment while the latter to a summative one.

TeleCC methodology has been derived from the instructional framework presented in section 2. It allows a ‘tempo‐spatial free’ interaction with options for eponymous or anonymous participation. Each client uses a
nickname and forms a profile on the platform where he/she can reveal, if he/she wants, his/her real name. This choice relates to a previous study (Tzovaridou et al. 2008) which indicates that there are clients in Greece, especially males, who prefer tele-counselling career services with privacy and/or anonymity. Due to the combined learning/counselling process, TeleCC can be thought as an informal learning setting. There is a general curriculum, however, the kind, the number, the time and the content of the activities emerge through a ‘bottom-up’ process from the group’s discussion. In this way, learning of each individual is highly self-directive. Since there is a parallel interaction between the client and the group and the client and the counsellor, the whole learning process cannot be considered as purely organisational but rather a ‘mixed’ person-centric/situated approach. Depend on the counsellor, special focus can be given either to the contextual or the personal meaning making.

After the completion of the course, each participant gets access to the TeleCC.NET community. The second platform is not administrated and serves as a peer learning community (Kakouris 2009). It also facilitates a follow up communication between TeleCC and its clients.

3.2 The structure

The structure of the TeleCC platform processes is shown in Figure 1. The application phase leads to the formation of the discussion groups. Educators/counsellors are assigned to each group and the discussion starts: (a) in group and (b) between counsellor/client. At the final stage, the counsellor draws up a counselling report for each client based on both group and personal discussions. The group home page is shown in Figure 2.

![Figure 1: Structure of TeleCC platform process](image)

The core entity for the group discussion is the activity. Due to the activities the entrepreneurial learning becomes leaning-by-doing. Activities can include documents, videos, narratives, lectures, case studies etc. The table of activities is shown below the stars and the calendar at the group home page (Fig. 2). Every new activity, along with its duration, appears as a row in the bottom of the table. Above the activities table, the description of the group, the principal counsellor persona, terms of use, guidelines, group’s calendar and roles within the group appear. The clients can assess, at any time, how they find the discussion group through the five-stars-rating widget. Below the activities table, there is discussion beyond the activities, a shout-box and the last posted comment.
Each group is administrated by the principal counsellor supported by co-counsellors. In this way, ‘triangulation’ over the content reading aims to eliminate possible miscomprehension of the written communication (i.e. posts) often observed in message boards. Beyond counselling roles, there are also observers who attend the

### Ελεύθερη Συζήτηση (εκτός δραστηριοτήτων)

**Online συνεδρία JM & YE**

*Submitted by A. Kakouris on Thu, 2014-04-21 10:00*

**Vote posts**

* 1 - Πρώτη Σύγχρονη Συνεδρία Ομάδας JM_1_Pilot & YE_1_Pilot (Chat)

**ΧΡΟΝΙΚΗ ΔΙΑΡΚΕΙΑ**

Δευτέρα 14/4/2014, 10:00 μ.μ. με έως περ. 4 π.μ.

**ΣΚΟΠΟΣ**

Η συνεδρία έχει σκοπό την επικοινωνία μεταξύ των συμμετεχόντων για καλύτερη και χρησιμότερη διαδικασία και επιτυχία στην πρακτική της ομάδας.

**ΣΥΝΤΟΝΙΣΤΗΣ**

Ζωή Καμμαρίτη

*Read more* Add new comment

### Η πρόκληση της απόδειξης

*Submitted by A. Kakouris on Thu, 2014-04-27 17:21*

**Vote posts**

* 1 - Το TeleCC επιτρέπει την προβολή εικόνων από τις συζητήσεις, αν αναφέρεται σε τεχνικές αποδεικτικής της τεχνολογίας. Μέσω κινητών υπολογιστών, η εικόνα είναι ευφυής και η εικονογραφία είναι υψηλήςς ποιότητας. Επιθετική ιδέα για να πωληθεί η υπηρεσία σε πελάτες.

*Read more* Add new comment

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2. **Επικοινωνιακή Υπηρεσία:**

**Διάταξη**

1. Εφοπλαστική Διάταξη
2. Εφοπλαστική Συμμετοχή
3. Εφοπλαστική Θεώρηση

**Σημείωση**

1. Σημειώσεις και σημειώσεις στην συζήτηση

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**Σημειώσεις**

1. Σημειώσεις και σημειώσεις στην συζήτηση

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**Δήμος Μιλάνος**

1. Σημειώσεις και σημειώσεις στην συζήτηση

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Alexandros Kakouris, Sofia Tampouri and Violetta Moustakali
discussion with or without intervention. Observers are experienced educators or practitioners who want either to attend the methodological approach or act as mentors in the process. All members of the discussion group appear as ‘personas’ (or avatars). Each member creates a personal profile page where he/she presents him/herself to the group. However, counsellors and observers are eponymous unlike to clients who can keep their anonymity.

In sum, TeleCC has developed a platform with the structure shown in Figure 1 in order to accommodate informal learning groups based on discussions, peer learning and the counselling relationship between counsellors and clients. TeleCC platform aims to consistently follow the instructional framework presented in section 2.

3.3 Findings from the pilot phase

Apparently, TeleCC initiative needs time to engage youth Greek populations in its new, innovative, learning environment. Credible assessment will also be possible in the near future after the completion of the pilot phase and an adequate implementation period of TeleCC methods. However, the following remarks emerge from the ongoing pilot phase.

Firstly, the group engagement is low. Despite the initial willingness to participate there are clients who remain inactive. Peer communication has been poor so far and therefore, the discussion remains predominantly dialogic (between counsellor-clients). As a ‘reaction’ to increase peer communication, counsellors organised a few synchronous online events (i.e. chat) within groups but they did not significantly enhanced group interaction and dynamics. As a result, the learning process is more person-centric than organisational. Some future attempts to raise common achievements and engagement have been discussed, however, the expected result remains obscure at the moment.

Secondly, active participants enjoy the processes. They mostly acknowledge the option to participate from a distance (e.g. Greek countryside) and the opportunity to meet people with the same interests and concerns. They also find asynchronous communication more effective for them as it allows reflection and further thinking about their career and personal development. Participants of the pilot phase scored 4.2 out of 5 for their overall satisfaction with most desired processes: asynchronous communication (4.3/5), critical reflection through activities which utilise art (4.1/5), personal communication and counselling (4.0/5) and practical activities (3.8/5).

Thirdly, critical reflection on entrepreneurial issues occurs. We include the response of a female trainee on an activity dealing with the differences between merchants and entrepreneurs: “I admit that despite I thought about it, I considered that all entrepreneurs are merchants. I was rather influenced by the painting which refers to some centuries ago. But, how entrepreneurs look like today?”. The activity had employed a painting from a merchant to discuss differences between entrepreneurship and merchandising with a special focus on innovation and achievement motives of contemporary business venturing. This is an example how TeleCC environment can work in order to advance reflection and derive conceptualisations bottom-up.

4. Conclusions

Entrepreneurship education undergoes a ‘second’ phase after its initial expansion in 2000’s. In the present phase, the impact of the typical entrepreneurial courses is under evaluation, direct connection with lifelong learning is desired, entrepreneurship intrudes career counselling. According to various scholars, entrepreneurship education needs to exploit the whole spectrum of learning as to engage larger populations and to advance its content and methods. In this context, we discussed the possibility for an informal learning setting able to facilitate self-directive, autonomous learning ‘about entrepreneurship’ connected with career counselling and personal development of trainees. The key learning process of the present approach is reflection. Since learning from experience is based on reflection for meaning making, we maintain that discussing entrepreneurship in the previous environment facilitates opportunity discovery, idea generation and innovation as well as connects business venturing with personal competencies and career options of individuals.

As an implementation of the present instructional framework, we presented the TeleCC.org online platform which currently runs pilot career discussion groups. The platform accommodates four-month online discussion
groups in Greece administrated by educators/counsellors. Despite its newness, there is indication of active participation with participants declaring satisfied from the asynchronous communication with educators and peers able to facilitate reflective thinking on their own career plans and business venturing understanding. There is also evidence for enhanced critical reflection in entrepreneurial aspects from the participants.

References


Methodological Facilitation of Collaboration in Innovation Networks

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Abstract: Organizations in the start-up phase are facing scarce resources and lacking experience. The ‘valley of death’ describes this danger along the development of a new organization mainly focusing on the financial perspective. However, the danger of failure along the development of an organization is not only due to financial reasons. The financial status can easily be monitored by performance indicators and actions can be derived from these. Other important aspects that are crucial and need to be monitored and improved are the structural capital (e.g. organization/management), human capital (e.g. professional competence and soft-skills) and relational capital (e.g. relations to Venture Capitalists, universities). These aspects are intangible by nature and therefore more difficult to evaluate than the financial status, but the success of a company highly depends on these aspects. Furthermore interdisciplinary problem definitions are increasingly demanding professional expertise and technological applications from different research fields. As a solution an assessment and improvement of intellectual capital combined with the identification of collaboration potential with partners can support organizations to survive the ‘valley of death’. Therefore we developed an integrated methodology that assesses the intellectual capital and resources of an organization and evaluates the collaboration potential between different organizations to improve the success of each organization. As a result the combination of entrepreneurial knowledge in networks can lead to multiplying effects for all involved parties and lead to multiple-win situations. The bundled expertise of research organizations, universities, enterprises and start-ups improves the overall performance of the participating organizations concerning acquisition, problem solving and efficiency. The methodology puts a strong focus on practical application.

Keywords: start-up entrepreneurship; innovation networks; collaboration; structural capital, human capital and relational capital; business model creation

1. Introduction

This paper shows a practice oriented approach to bring together Innovation Organizations and elaborate collaboration. The paper starts with the definitions of Entrepreneurship and Innovation Networks, the Valley of Death, Intellectual Capital and Collaboration. In the next chapter Intellectual Capital Statement as a tool to identify internal needs for collaboration is being elaborated. The next chapter describes the Assessment and Evaluation of Collaboration Potential in Entrepreneurship and Innovation Networks which is followed by the Definition of collaboration activities within this network. The last Chapter gives a Summary, Conclusion & Outlook on the research activities.

The developed methodology first analyses the internal status of each single participating innovation organization through the assessment of structural, human and relational capital in the perspectives quantity, quality and systematics following the INCAS procedure (InCaS Consortium). This internal assessment is the basis to understand the own organization. The next step in the overall methodology is the analysis of the collaboration potential from the perspectives of resources (e.g. human resources, equipment), customers (e.g. potential clients, market segments, joint marketing) and research. This assessment is conducted by set of organizations in a self-assessment methodology. The identified collaboration potentials are visualized in a network graph and sub-networks are identified. Collaboration actions on the different investigated levels are developed in a workshop methodology with the participating organizations. Furthermore, the methodology enables organizations to define their focus area and business model. Defining the interfaces also enables the innovation network to define a network service portfolio with unique selling propositions (USPs) and joint marketing approaches. The overall result are working groups that jointly develop solutions for common problems, thereby saving resources, combining knowledge and building a network at the same time.
2. Definitions

2.1 Entrepreneurship and innovation networks

Risk taking entrepreneurs and innovation networks are two of the most important elements for economic growth. These two factors are mutually stimulating, since entrepreneurs can on the one hand be part of innovation networks, and on the other hand depend on the knowledge spill-overs from these networks. Knowledge spill-overs from innovation networks are not only important during the start-up phase, but keep their significance for entrepreneurs in mature enterprises, too (Karlsson and Warda, 2014). Ritter and Gemünden argue that in general a company’s success in product and process innovation is facilitated by the ability to manage and use inter-organizational relationships (Ritter and Gemünden, 2003). They call it network competence. Entrepreneurship and innovation are strongly related and can be accelerated through networks of individuals and organizations. In order for such an innovation network to be beneficial to growth, it should typically be constituted by the following elements as described by Koschatzky et. al (Koschatzky et al., 2001):

- Trust between the participants
- Relations usually designed in a long-term time perspective
- Redundancies within the network, i.e. options and absence of hierarchy
- Openness, dynamics and flexibility
- Competition between the network actors
- Independence and voluntary co-operation
- Scale economies through co-operation

Apart from the internal factors that make innovation networks successful, it is important to consider different network players that can generate an atmosphere of innovation. Some of the most important players are start-ups, universities, research institutes, venture capitalist, and business angels (herein referred to as Innovation Organizations). Koschatzky et al. stress especially the relationship between technology users (e.g. enterprises) and technology suppliers (e.g. universities or research institutes) (Koschatzky et al., 2001). Further, investors are essential for innovation networks to function. Ferrarya and Granovetter highlight for example the role of venture capitalist (VC) for the success of the Silicon Valley cluster (Ferrarya and Granovetter, 2009). Besides VCs there can be other forms of innovation funding like seed funds, business angels, or regional incentives (Kommnisos, 2008). Finally, risk taking entrepreneurs and start-ups are needed to commercialize any new technology or business idea and to drive innovation (Karlsson and Warda, 2014). These and other players may be considered the nodes of innovation networks.

A regional perspective can add additional aspects to the discussion. McKinsey names five success factors for local innovation networks and start-up hubs.

- Talents: highly qualified persons with start-up-affinity.
- Infrastructure: moderate location cost and availability of areas and office rooms in central locations.
- Availability of capital from private and public sources during all phases of the foundation phase.
- Networking between universities, students, start-ups, investors, politics, and established enterprises.

There are different forms of how players (organizations and individuals) can interact and form networks. Rosenfeld suggests as a basic classification the distinction between hard and soft networks (Rosenfeld, 1996). He defines hard networks as three or more firms that cooperate in a usually formal way on issues like co-production or co-marketing. Soft networks are defined as three or more firms that co-operate in a usually informal way on issues like solving common problems, sharing information or acquiring new skills.

2.2 The Valley of Death

“The Valley of Death is where start-ups go to die” (Cooper and Vlaskovits, 2013). A more explicit explanation is supplied by John Bradberry who defines the valley of death as the time when an entrepreneur already started spending money, but could not yet generate a source of revenue (Bradberry, 2011). J.G. Wissema goes further
into detail and includes three basic elements in his characterization of the valley of death: “(1) more capital is needed than founders, friends and family can provide; (2) the performance is too uncertain and too small to attract venture capital firms or investment funds; (3) banks cannot be used, as there is no collateral” (Wissema, 2009). In conclusion, the valley of death describes the problem of an enterprise, which already incurred costs but may not be able to generate profits or further funding, which could result in the bankruptcy of the enterprise. A start-up undergoes different phases on its way to a profitable firm (Wissema, 2009). It all starts in the design phase when mostly friends, family and the founders themselves provide funding. It becomes much tougher in the development and start-up phase. More capital is needed but investors are reluctant to provide funds, since they have no reason yet to be highly optimistic about the firm’s future performance. These phases constitute the valley of death. Only if the enterprise manages to survive here, it enters the growth phase and prospectively the mature phase, where accumulating financial capital becomes easier. Figure 1 illustrates the problem graphically.

![Graph showing the valley of death](image)

**Figure 1:** The Valley of Death in the context of phase of the start-up and available capital

The valley of death is an image which describes the struggle of survival from a financial perspective. Some authors argue that this view is too limited. Financial problems have antecedent causes which can be related to poor planning and management or other shortcomings. Money is not the only resource that requires management and planning in the valley of death as Bob Walsh reminds us (Walsh, 2009). Hart argues that human capital and time may be even more crucial to survival than financial capital (Hart, 2003). Instead of the valley of death, he suggests the metaphor of a “Darwinian Sea”, where small and big fish fight for survival, and skills like creativity, agility, and persistence are the key to success.

### 2.3 Intellectual capital

As stated by Mertins et al. (Mertins et al., 2006), it is the management of the intangible assets, the so called “Intelectual Capital” (IC), that makes the difference in a company’s future-oriented perspective, while financial indicators, such as balance sheets or income statements, fail to evaluate how worth these intangible assets really are. The very first efforts aiming at giving significance to the IC are dated back to the early ’60s, as Schultz (Schultz, 1961) investigated on the effects of investing in human capital on the growth of national economies and Becker (Becker, 1964) hypothesized “[f]or if education were economically important, I reasoned, money rates of return on education ought to be significant”, as findings showed that “a substantial growth in income in the United States remains after the growth in physical capital and labor has been accounted for” (Becker, 1964). After these early attempts to shed some light on this topic, numerous contributions followed later on trying to define an efficient method to measure the IC’s components and their real value. Edvinsson and Malone (Edvinsson and Malone, 1997) created a common framework later frequently adopted. Following the Structural Model suggested by Mertins et al. (Mertins et al., 2009), based on the intangible assets subdivision of Edvinsson and Malone (Edvinsson and Malone, 1997)) and Sveiby (Sveiby, 1997), which was also confirmed by Alwert (Alwert, 2006), the Intellectual Capital Statement (ICS) framework is composed of three dimensions: Human Capital (HC), Structural Capital (SC) and Relational Capital (RC). The former includes every intangible asset that an employee owns and thus can be taken home or over onto her next employer, e.g., skills, competences, motivation and commitment. The second, according to a definition given by Edvinsson and Malone (Edvinsson and Malone, 1997), “consists of those intangible structures which remain with the organization when the employee leaves”. Finally, the latter is the result of every connection and relationship to the firm’s external environment and stakeholders, such as customers, supplier, the public,
or even the firm’s own growth in market share. The de facto standard concerning implementing the aforementioned aspects is ‘INCAS – Intelectual Capital Statement’ (InCaS Consortium).

2.4 Collaboration

Having named the players and categorized the types of innovation networks, the question remains what leads organizations to collaborate with one another and what the collaboration process looks like. Camarinha-Matos argues that cooperation usually happens for efficiency reasons (Camarinha-Matos, 2004). Levermore and Hsu state as an objective for enterprise collaboration the reduction of societal transaction costs and cycle time (Levermore and Hsu, 2006), which may of course lead to more efficiency as suggested by Camarinha-Matos. Hansen identifies three benefits that firms may obtain through collaboration: better innovation, better sales, better operations (Hansen, 2009).

Still, there are different causes for collaboration and levels on which collaboration may take place. Gleister et al. (Glaister et al., 2004) follow Gomes-Casseres (Gomes-Casseres, 1996) and suggest three motives of collaboration:
- Supply based alliances along the supply chain which involve resource transfer or exchange
- Inter-firm corporate learning including knowledge transfer
- Collaboration on how to target customers up to the establishment of cartel building or reducing the speed to market

Andrés and Poler address the question of how collaboration evolves. They distinguish between hierarchical manufacturing networks (HN) and non-hierarchical manufacturing networks (NHN) (Andrés and Poler, 2013). Further they argue that especially small and medium enterprises’ competitiveness and growth relies on the creation and consolidation of the latter (Andres and Poler). They developed a roadmap consisting of ten phases which describes each step of a SME’s path towards collaboration within a NHN:

- Defining the Scope of Collaboration
- Assess the current SMEs status
- Definition of objectives and economic activity
- SMEs needs identification
- Preparing for collaboration
- Solutions Identification
- Solution Implementation
- Collaboration Implementation
- Results Assessment
- Improvements Identification and Implementation

The ‘Cross-Organizational Assessment and Development of Intellectual Capital’ (CADC) combines the ICS approach with collaboration aspects. Therefore a 3-stage-model was developed. The first stage gives a simplified assessment of intangible resources and their strengths and weaknesses and to compare these results on a quantitative basis though benchmarking with other companies and implement actions and best-practice transfers. In the second stage the cluster companies create a consensus about the most important intangible success factors (IC factors) from a single company’s point of view that is suitable for all cluster companies, then the IC within each cluster company is assessed to the aforementioned INCAS procedure. As in the first stage, the results are compared on a quantitative basis though benchmarking with other companies. In the third stage the IC factors are defined from a cluster perspective instead of the perspective of a single company. Then the ICS assessment is being conducted from the cluster perspective to then derive measures. The IC factors for company clusters were identified as:

**Human Capital**

- Innovation and Strategy oriented management
- Qualified personnel at the regional labor market
- Professional Competence of Employees in the cluster
Holger Kohl et al.

- Committed ‘key actors’

Structural Capital
- Regional technology emphasis
- Cluster management
- Culture: trust and conventions
- Innovation related structure of innovation
- Supporting institutions for knowledge transfer
- Local proximity of organizations
- Adaption to change
- Direct R&D funding
- Research & technical infrastructure
- Transport infrastructure and the infrastructural development of the region

Relational Capital
- Cooperation with universities and other R&D institutions within a cluster
- Openness of the cluster towards external stakeholders
- Cooperation of business partners within a cluster
- New technologies in the cluster
- Communities of practice (CoP)
- Demand situation
- Internationalization and competitive pressure
- Promotion through instruments of taxation
- Economic fluctuations and economic development (CADIC Final Project Report).

The CADIC Approach also follows a Cluster Management Cycle for Collaboration that contains the following steps:
- Define Topic
- Define Members
- Define Strategy
- Define Activities
- Evaluation (CADIC Guideline)

Following Hansen (Hansen, 2009) and Glaister et al. (Glaister et al., 2004) we suggest the differentiation of collaboration for Innovation Networks into the three collaboration subjects as seen in Table 1.

**Table 1**: Definition of collaboration potential and collaboration subjects (resource, customer, research collaboration)

<table>
<thead>
<tr>
<th>Terms</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration Potential</td>
<td>Specific opportunities for collaboration between two or more Innovation Organizations regarding resource sharing, joint market/customer activities and/or transversal research topics.</td>
</tr>
<tr>
<td>Resource Collaboration</td>
<td>Resource Collaboration is defined by two or more Innovation Organizations that share the same resource without any or very little additional effort. Levels: Collaboration in terms of purchasing or using equipment and software as well as sharing external services (e.g. training, consulting) and human resources and transferring existing knowledge Benefit: Increase efficiency, optimize costs and access broader resource base.</td>
</tr>
<tr>
<td>Terms</td>
<td>Definitions</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Customer Collaboration</td>
<td>A Customer Collaboration is defined by two or more Innovation Organizations that target same customers through joint activities and/or jointly deliver projects to the same customer. Levels: Collaboration in terms of market analysis, marketing and sales activities, based on current demand of the industry (Market Pull). Benefit: Increase Revenues, master broader project scopes and deliver complex solutions.</td>
</tr>
<tr>
<td>Research Collaboration</td>
<td>A Research Collaboration is defined by two or more Innovation Organizations that combine their knowledge and technologies to work together on a research, development and innovation (R&amp;D&amp;I) topic. A single Innovation Organization could not master on its own. Levels: Building up competence-fields for future technologies and current transversal research topics (Technology Push). Benefit: Drive innovation activities and develop new technologies.</td>
</tr>
</tbody>
</table>

3. **Intellectual capital statement as a tool to identify internal needs for collaboration**

Using the aforementioned IC categories as a starting point, the Intellectual Capital Statement (ICS) ‘can be seen as an internal strategic management instrument as well as an external communication instrument’ (Mertins et al., 2006) for companies. Against this background, the project ‘Wissensbilanz – Made in Germany’ and the pilot project ‘InCaS: Intellectual Capital Statement – Made in Europe’ aimed at supporting German and European SMEs, respectively, in their choice of identifying, evaluating and developing a knowledge-based strategy. With the purpose of harmonizing the ICS content, the surveyed SMEs mentioned relevant indicators for business success. A common set, valid for 80-90% of the sample enterprises, was identified. According to Alwert, Bornemann and Will (Alwert et al., 2008), the set contains Professional Competence, Social Competence, Employee Motivation, Leadership Ability (Human Capital), Internal Co-operation and Knowledge Transfer, Management Instruments, IT and Explicit Knowledge, Product Innovation, Process Optimization and Innovation, Corporate Culture (Structural Capital), Customer Relationships, Supplier Relationships, Public Relationships, Investor Relationships, Relationships to Co-operation Partners (Relational Capital). The Quantity, Quality and Systematic (QQS) Assessment is a tool that allows to visualize the assessed values of the three evaluation dimensions by means of diagrams. An Overview is given in the QQS-Portfolio as it can be seen in Figure 2 where the Quantity is the x-dimension, Quality is the y-dimension and the diameter reflects the systematic. Based on this analysis Strengths and Weaknesses can be analyzed and demand for collaboration can be identified (Mertins and Will, 2008).

![Figure 2: Example for QQS-Portfolio (ICS Toolbox, Fraunhofer IPK)](image-url)

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4. Assessment and evaluation of collaboration potential in entrepreneurship and innovation networks

The first step in the assessment of the collaboration potential is the definition of the participating Entrepreneurship and Innovation Network. This definition depends on the demand of the participants which either already have organized a network or want to create one. After the definition of the network each innovation organization prepares a short presentation covering

- Service Areas
- Customers and Market Segments
- ICS QQS-Assessment pointing out the need for collaboration potential

The overall assessment and evaluation procedure follows a 3-step approach of an assessment of the collaboration potential with each innovation organization of the network based on the short presentation. Then the network is arranged in a network graph to identify the communities that can define collaboration activities (see Chapter 5) through intensive discussion in these sub-networks. Figure 3 shows the Assessment and Evaluation Process.

![Network assessment and evaluation process](Image)

**Figure 3**: Network assessment and evaluation process

In the first step each innovation organization assesses the collaboration potential with each member of the network based on the short presentation. The assessment is based on the differentiation of the three collaboration subjects resource, customer and Research collaboration. For the quantitative measurement a scale from “0” to “10” is defined:

**10: Very high collaboration potential:**
- Collaboration creates great benefits
- Collaboration is possible on many different levels

**5: Medium collaboration potential:**
- Collaboration creates some benefits
- Collaboration is possible on some levels

**0: No collaboration potential:**
- Collaboration creates no benefits
- Collaboration is not possible on any level

In the second step the assessment is visualized in three network graphs, each of which representing one of the collaboration subjects (resource, customer, research). The basic method that we chose is a force-directed graph as it is intuitive and simple and the current method of choice for relational data sets (Tamassia, 2013). The graph consists of nodes (in this case innovation organizations) and weighted edges (in this case the collaboration potential on a scale from 1 to 10). A force-directed graph layout “simulates a physical system in order to spatialize a network. Nodes repulse each other like magnets, while edges attract their nodes, like springs. These forces create a movement that converges to a balanced state. This final configuration is expected to help the interpretation of the data” (Jacomy et al.). This method allows and easy understanding...
for the user, however magnets and springs are only used as a metaphor as there are different energy models that define the relation between energy respectively force and distance. The metaphor of magnets and springs only represents one possibility whereby the spring presents a linear proportionality and electromagnetic repulsion a square proportionally between distance and force (Jacomy et al.). More specifically we used the graph visualization Software Gephi (Gephi Consortium, 2013). Gephi uses the ForceAtlas2 algorithm (linear-linear energy model) which is “good enough to deal with very small graphs (10 nodes) and fast enough to spatialize 10,000 nodes graphs in few minutes, with the same quality” (Gephi). Each of the edges is weighted with the according collaboration potential. The user should be aware that the result depends on the initial state of the network, so that a different initial layout leads to a different visualization, furthermore there are some more tweaks, e.g. poorly connected nodes and very connected nodes repulse less so that they are closer in the balanced state (Jacomy et al.). However this is not of a major interest in this practical use case as the visualization is a help to understand the structure of the network and not the primary outcome.

In the third step we identify communities (sub-networks) on each of the three collaboration subjects; this will allow us in the latter workshop phase to define manageable groups. The understanding is that the automatically identified communities are a basis for discussion to define the sub-networks for the workshop phase, the technology shall support the human in the process and not dictate the solution. More specifically we used the Louvain method to identify communities as it ‘allows to detect communities quickly and efficiently with enlightening results.’ (Aynaud and Guillaume, 2011). This simple algorithm has several advantages as for example it is intuitive and easy to implement, has unsupervised outcome, is extremely fast and circumvents the resolution limit problem of modularity (Vincent D. Blondel et al., 2008).

The Louvain Algorithm has 2 phases that are repeated iteratively: In the first phase the modularity in the network is being maximized, which leads to a network of communities. In step 2 the communities are set as nodes in a new network and phase 1 is iterated (Vincent D. Blondel et al., 2008). In this context ‘the modularity is a widely used quality function which compares, for each community, the proportion of links inside the community with a null model claiming that meaningful communities are more densely connected than a null model would expect. The classical null model is a random graph with the same degree sequence as the graph under study. Since the modularity is null when all nodes are grouped in a single community, interesting modularities are always positive and the higher the modularity, the better the partition’ (Aynaud and Guillaume, 2011). Figure 4 shows exemplary visualizations of an innovation network.

Figure 4: Visualization of a network with 23 nodes, undirected (left) and directed (right) (Gephi Consortium, 2013)
5. Definition of collaboration activities

The definition of collaboration activities follows a methodological workshop approach to foster the collaboration between the innovation organizations. The identified communities (sub-networks) discuss specific collaboration on the collaboration subjects. Therefore three workshop sessions (one for each collaboration subject) with each defined sub-network are being conducted.

5.1 Workshop session on resource collaboration

The Resource Collaboration Session identifies collaboration potential concerning resources which include equipment, software and human resources. Each of the groups maps the existing and planned equipment, software or special human resources on cards on a metaplan. Then potential collaboration is discussed and connections between the Innovation Organizations and the resources are drawn on the metaplan. Potential outcomes are the establishment and reoccuring update of equipment / software maps, joint acquisition of resources, sharing of resources, competence maps and profiles (yellow pages).

5.2 Workshop session on customer collaboration

The Customer Collaboration Session identifies collaboration potential concerning the aspect of Market Pull. Depending on the business areas of the (sub-) network, the procedure for the customer collaboration can vary. The sub-networks can map their market segments to then discuss the special demands from the market. Another possibility is to map current and planned marketing activities to then assess collaboration potential. A mapping of services with the aim of creation of a joint service portfolio is as well a suitable approach. However, the creation of pilot projects should be an overall outcome of the session. The definite results depend strongly on the constellation of the network.

5.3 Workshop session on research collaboration

The Research collaboration Session identifies collaboration potential concerning the aspect of technology push. One possibility is to map current & future transversal R&D&I Topics (network internal perspective), another possibility is the identification and grouping of megatrends (external perspective). However, the main idea is to identify and prioritize actions for joint research activities. Potential results include the set-up of common research programs, joint application for (public) funding, joint seminars / workshops, publications, exhibitions or “internship” programs to exchange personnel.

6. Summary, conclusion and outlook

Collaboration can help Innovation Organizations to get through the ‘valley of death’. An assessment of the intellectual capital of each organization is being conducted to successfully identify the strengths and weaknesses of an innovation organization and to derive offer and need for collaboration. Then the collaboration potential is mapped in a network graph which supports the definition of sub-networks that discuss the different collaboration actions concerning resources, customers and research. The used software programs (ICS-Toolbox, Gephi) are visualization tools. The structures given (strategic success factors and collaboration subjects) guide the participants through their discussions and enable a structured approach. The main aspect is the flexibility during the analysis, the technologies and structures shall support the discussion, not determine it.

6.1 Outlook on adaption of IC-analysis

In the presented methodology the intellectual capital is assessed on the institutional level. To understand the network as a whole, the assessment of the IC could be conducted on a network level, with participation of all members of the innovation network. Therefor a redefinition of the IC factors might become necessary.

6.2 Outlook on extension of the scope

Through the identification of strategic success factors for other networks (e.g. governmental networks) the scope of application can be increased. The presented methodology analyses future collaboration potential of networks, the scope could also be increased by the analysis of existing collaboration in innovation networks and a comparison to collaboration potential to derive gaps.
6.3 Outlook on extension of the methodologies to define collaboration

A Visualization of the defined collaboration actions and the conception of the implementation planning could be a useful tool to ensure the successful application of the results (e.g. in a collaboration roadmap). The workshop sessions could be extended to include methods to identify and transfer of best-practices among the innovation network.

References

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Venture Creation Programmes: Causation or Effectuation?

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Abstract: According to Edelman and Yli-Renko (2010) “creating a new firm is a complex, idiosyncratic process that starts with an aspiration by the entrepreneur and involves bringing together resources that the entrepreneur does not necessarily control to pursue an opportunity” (ibid:833/4). Drawing on Sarasvathy (2001) and Stevenson & Jarillo (1990), they go on to argue that, “the entrepreneur needs to garner support, obtain the required resources and generate enough commitment from organisational stakeholders to take the idea from vision to reality” (Edelman and Yli-Renko, 2010: 834). Firms take time to establish and emerge through a series of actions. The route may be causally driven or the result of effectuation (Sarasvathy, 2001a, 2001b); one being the inverse of the other (ibid: 2001a:2). From a causal perspective there is a predetermined goal and a set of means; the aim being to seek the most efficient way possible to achieve the goal. Effectual reasoning begins with the means and allows the goals to emerge over time (ibid). Sarasvathy argues that entrepreneurs prefer effectual reasoning over causal reasoning in the early stages of venture creation. As the venture becomes established, the transition from causal to effectual must be managed and this poses a problem for some entrepreneurs. Causal thinking, (aligned with traditional managerialist thinking), is based on the extent to which it is believed that we can predict the future and control it (ibid: 6). Predictive tools and business management models support and encourage this logic. Effectual thinking on the other hand, is emergent and can accommodate multiple potential outcomes for a given range of means; this approach is more associated with entrepreneurial thinking. Reality, however, is often more complex than predictive tools are able to deal with (Obloensky, 2010). Managers, leaders and entrepreneurs have to be reactive or adaptive and responsive to complexity. Entrepreneurship, if effectively managed, should be able to reconcile the need for a vision and expectation of the future, whilst at the same time being able to adapt to the deeper uncertainty manifest in a changing dynamic environment. While rule based systems, such as universities, like the certainty of causal thinking, they also understand that effectual thinking, with its inbuilt serendipity, has the potential to create more impactful entrepreneurial outcomes. Drawing upon two case studies, this paper will explore the challenges and opportunities faced by effectual and causal thinking in the design of Venture Creation Programmes (VCPs) for undergraduate students. In both cases the programmes were intended to be effectual in spirit, but one is unintentionally causal by design. Interest in VCP development is likely to follow a similar trajectory to the growing interest in enterprise and entrepreneurship education. This paper could help to inform thinking about the nature of VCP development and where such programmes should be sited (or positioned) within universities.

Keywords: enterprise education; causal; effectuation; venture creation programmes; action-based learning

1. Background

Entrepreneurship is at the heart of the strategy for economic recovery for Europe (and for that matter the rest of the world, see Kwiek and Kurkiewicz, 2012). The Entrepreneurship 2020 Action Plan (COM(2012)795Final) (henceforth referred to as the Action Plan), states emphatically that “Europe needs more entrepreneurs” (ibid: 3). The Action Plan sets out a wide ranging strategy to support entrepreneurship across Europe, based upon three pillars: developing entrepreneurial education and training; creating the right business environment; role models and reaching out to specific groups. Our focus is on the implications implicitly and explicitly enshrined in the first of these pillars and its potential impact on VCP development.

The concept of the VCP is relatively recent (2012) emerging from a research project undertaken at Chalmers School of Entrepreneurship, Chalmers University of Technology in Sweden (Chalmers). The term itself was coined by Martin Lackeus who aimed to explore action-based entrepreneurship education. The term VCP was developed to allow the purposeful sampling of higher education programmes which have real-life venture as their primary learning vessel and thus part of the formal curriculum (Lackeus, 2013:17).

VCPs are the epitome of entrepreneurship education in that they are designed to support business start-up as part of the core aims of the programme; their express intention being that students should complement their studies (undergraduate or postgraduate) with a viable business to work in and grow.
Throughout the world, various approaches are adopted to the establishment of higher education programmes that support venture creation. However, it is only in the UK that VCPs exist at bachelor degree level (www.chalmers.se/vcplist). Globally, many of the VCPs are run by specialist enterprise centres, which are not part of a university business school. The deliberate decision to remove enterprise and entrepreneurship activities from business schools is based on the belief that entrepreneurship is essentially experiential (Morris et al, 2011: 11). Business school models are more traditionally aligned with managerialist (or causal) thinking based on the extent to which it is believed the future can be predicted and controlled (Sarathvasy, 2001a, 2001b: 6).

This paper will start by defining enterprise and entrepreneurship. As confirmed by Coiffait et al (2012:8/9), the terms are frequently interchanged and/or conflated and this has the potential to muddy the water when it comes to discussing the purpose, intention and outcomes of enterprise and/or entrepreneurship activities. Next we will explore in more depth the concept of the VCP and consider its design and purpose. Effectual learning is ‘learning by doing’ and is a key attribute of VCP design; we compare it to causal approaches, which are more in the business school tradition. Using case studies from two UK based VCPs, we aim to demonstrate that VCPs, although effectual in intention and action based, by mandating business start-up as a key outcome of the programme could be unintentionally causal in their methodology and outcomes.

2. Enterprise and entrepreneurship in higher education – defined

The Quality Assurance Agency for Higher Education (QAA) published a guide for UK higher education providers in 2012 intended to help them to foster skills in enterprise and entrepreneurship. The guide targets a wide audience but with a specific focus on curricular (as opposed to extra-curricular) learning. Whilst these definitions are by no means universally agreed, by stating them at the outset we aim to clarify for the purpose of this publication, how enterprise and entrepreneurship have been interpreted here.

"Enterprise is defined here as the application of creative ideas and innovations to practical situations. Enterprise education aims to produce graduates with the mindset and skills to come up with original ideas in response to identified needs and shortfalls and the ability to act on them.

Entrepreneurship is defined as the application of enterprise skills specifically to creating and growing organisations in order to identify and build on opportunities. Entrepreneurship education focuses on the development and application of an enterprising mindset and skills in the specific contexts of setting up a new venture, developing and growing an existing business, or designing an entrepreneurial organisation".

3. Venture creation programmes (VCP)

The concept of the VCP, defined in the introduction, emerged from an Entrepreneurial Learning Forum (ELF) that took place at Chalmers in 2012, where the founders or current leaders of VCPs came together to share their knowledge, learning and experience of setting up and running such programmes. Of the 14 higher education institutions (HEIs) represented at the ELF, only 3 offered programmes to undergraduate students and they were all from the UK.

Lackeus argues that “venture creation programmes could be regarded as a bridge between a knowledge producing academic and value creation processes in society at large” (2012: 2). He goes on to say that the approaches, (variously described as action-based, effectual, experiential), adopted blur the boundaries between the formal and non-formal learning environment (ibid). One reason for this may be that the process of venture creation is ‘messy’, that is, it is non-linear and draws upon knowledge, skills, competencies and emotion. Schindehutte et al (2006) in particular draw upon the last component, that of emotion, as being one of the main characteristics of the experiential base. They argue that although rational decision making is important, in some situations reliance on affect or emotion is a quicker and easier way to navigate uncertainty (ibid, 350).

Schindetutte, Morris and Alan (2006) also describe entrepreneurship as a temporal experience, [which is] largely unscripted, unpredictable and uncontrollable; the richness of entrepreneurship lies in how it is personally experienced. The complexity of creating or accommodating the experience ‘in the moment’ as the venture takes shape is fundamental to the challenge of VCP development and delivery. The point being that a
focus purely on formal learning could not accommodate the ebbs and flow of enterprise development in a real time way (Morris et al, 2011: 11).

Morris et al (drawing on Sarasvathy, 2004 and Shepherd, 2003) comments that it is only relatively recently that researchers have begun to recognise how ongoing experience is core to our understanding of the nature of venture creation (ibid, 15). While the experiential nature of entrepreneurship is acknowledged, the implications for evaluation and support of VCPs in an academic context are underdeveloped. Morris et al argue that “what is ignored are the realities and abnormalities of the ongoing experience, which can be far removed from the more recognisable patterns, norms and averages upon which …researcher’s dwell (ibid: 16). They argue that the development or creation of the entrepreneurs occurs while he/she constructs reality in the form of their business venture. According to Morris et al, these “event streams” produce the ongoing highs and lows, and the intensity and passivity that are the essence of venture creation (ibid: 16).

The aim of VCPs therefore is to provide students with the opportunity to experience the reality of business start-up through the practical application of knowledge. Williams-Middleton argues that the nomenclature ‘entrepreneur’ is often only perceived as legitimate once the actions associated with the role have been completed (2013:404). That is, to be able call oneself an entrepreneur requires behaviour like one. Those creating a new venture often have little experience to fall back on to prepare them to be entrepreneurs (Morris et al, 2011: 28). This is especially true for the young looking to create their first new venture. Within the supported and stable environment of a university, students on VCPs are able to explore their entrepreneurial capabilities and the actions associated with the role.

In terms of the structure of VCPs, entrepreneurship education is frequently categorised as being one of three approaches. There is teaching ‘about’ entrepreneurship, which is predominantly theory driven and aimed at placing the subject in a relevant academic context. There is teaching ‘for’ entrepreneurship which is frequently occupationally oriented and aims to develop enterprise skills and knowledge. There is teaching ‘through’ entrepreneurship (O’Connor, 2012: 548; Kyro, 2005, cited in Lackeus, 2013:4). The concept of learning by doing is fundamental to VCPs, but action-based approaches are time consuming to both prepare and deliver. Therefore, even when the approach is advocated, its practical application is less frequent due to what Mwasalwiba, (2010) refers to as cost based and systemic challenges.

As a consequence of the cost and systemic challenges, a more widespread alternative approach to the VCP model is to embed enterprise skills development into discipline specific education or training. While this might include elements of the ‘for’ entrepreneurship and ‘about’ entrepreneurship, few in-curricular enterprise programmes have the scope to teach ‘through’ entrepreneurship. It must be acknowledged that the majority of entrepreneurship education takes place outside of VCPs. Frequently the focus on in-curricular programmes is on business plan creation. As Jones and Penaluna (2013) comment, most business plans are primarily desk-based guesswork, which generally demonstrates to the teacher a grasp of the process of idea evaluation, rather than any real attempt to start a venture. VCPs also make some use of business plans and business model development, but not as static outputs, rather as works in progress.

4. Causation and effectuation

Understanding what motivates entrepreneurial behaviour is a critical component of creating programmes of study specifically intended to elicit a type of behaviour. The perceived behavioural attributes of student entrepreneurs will influence what is taught, how and when. It will also influence what other ‘wrap around’ support needs to be provided (business coaches, mentors, finance etc). Baumol (1968) described a behavioural approach to the study of entrepreneurship, which views all entrepreneurship as essentially the same activity (cited in Griffiths et al, 2012:612). Viewed from this perspective, entrepreneurship becomes a matter of replication, (where entrepreneurs create new business like those they see around them), and not innovation. Similarly, Sarasvathy (2001: 245); used the terms causation and effectuation to explore the dichotomy between approaches that might loosely be characterised as highly deliberate, verses highly emergent. Whilst it is recognise that there are other perspectives which sit along the continuum between these points, exploring the dichotomy between approaches enables a clearer theoretical exposition of the issues.

The causal perspective on entrepreneurial behaviour, first posited by Sarasvathy in 2001, tends to be associated with a business school mentality, in which predictive tools and business management models are
used to discover, evaluate and exploit opportunities (Shane and Venkataraman, 2000: 218). The approach adopted favours a managerialist / functionalist methodology, built on scientific management principles, which leads the entrepreneur in a linear and systematic way through the process of opportunity recognition, evaluation and exploitation. This is a process of searching for opportunities, rather than discovering them (Edelman and Yli-Renko, 2010: 835). In a causal view, markets are rarely created, rather they are assumed to pre-exist and the role of the entrepreneur is to grab them (Fisher, 2012: 1023). From this perspective, entrepreneurs are rational and calculating. The underlying rationale behind the decision is the belief that future events can be predicted from past events and by examining heuristics to inform decision-making. The causal process needs the market for the product or service to exist in order for its future potential to be evaluated. This is described as creating a boundary condition for the opportunity (Fisher, 2012; 1023; Sarasvathy, 2001: 252). The approach decided upon through a causal methodology is likely to be concretised in a formal plan, with operationalised steps intended to secure the future direction and success of the venture.

Effectuation is seen as the inverse of causation (Sarasvathy, 2001: 2). The entrepreneur and his/her skill is the source of the opportunity; it may well arise as a consequence of their action (Edelman and Yli-Renko: 2010: 835). Edelman and Yli-Renko go on to say that decision-making is uncertain and the entrepreneurs cannot predict the outcome as necessary knowledge has not yet been created (ibid). The approach starts with the means (the resources under the control of or available to the entrepreneur) and through a range of activities, potential outcomes might emerge. This process does not involve elaborate planning or prediction, but is highly uncertain and therefore has an enhanced risk of failure. Fisher argues that this approach entails making decisions on the level of affordability, loss, leveraging strategic relationships, (who can I work with as opposed to compete against), and the ability to exploit contingencies (potentially profitable but unanticipated opportunities) (2012: 1025). Sarasvathy comments that effectuation focuses on the controllable aspects of an unpredictable future (2001: 252). The boundary conditions with this approach are weak. The theory assumes that as the entrepreneurs create the opportunity it is subjective and socially constructed (Fisher, 2012: 1026), it is therefore subject to change and internally re-negotiated.

5. Case studies

5.1 Institute of Applied Entrepreneurship, Coventry University

A BA (Hons) in Business Enterprise (BABE) was established at Coventry University in 2007 in recognition that a growing number of students were starting businesses during their studies or intended to start a business on graduation. The University recognised the potential of creating a programme that both enabled students to get a degree, whilst also starting a business. At that time, no specialist academic unit existed to develop and deliver the programme, so one was created. Although independent, this unit had a Faculty home in the Business School. The ongoing momentum in enterprise and entrepreneurship education, led to the launch of the Institute of Applied Entrepreneurship (IAE) in 2009. The IAE was intended to be the focus of all entrepreneurship activity across the University. The Faculty home for the IAE moved from the Business School to the School of Lifelong Learning as it was seen as a better ‘fit’ for the approach to teaching and assessment that was emerging from the IAE. Around this time the BABE became the BA (Hons) Enterprise and Entrepreneurship (BAEE). Tensions between the IAE and business school approach resulted from the perception in some quarters that the action learning approach favoured by the IAE was less robust than the more formal teaching style of lectures and workshops favoured by the business school.

However, although intended as entrepreneurship focused programme, the BAEE was actually a hybrid programme being comprised of business school and IAE modules, broadly on a 50/50 ratio. The reason for this was largely pragmatic as the number of students was initially low and the programme was only viable on this basis; this is no longer the case. Students exposed to the differences in approaches to module delivery (some overtly effectual, some overly causal) found the difference too jarring. In addition, the IAE modules were distinctly SME focused and the business school modules were predominantly corporate facing; apply the knowledge from one environment of the other was problematic for some students. In addition, the students themselves did not follow the traditional trajectory of business management education, having to balance the ‘messy’ aspects of business start-up with the ‘conventions’ of academic learning was also problematic for some students.
Although a number of incremental revisions were made to the BAEE, it remained largely a hybrid programme until 2011 at which point all business school modules were removed. The aim of the revision was to make the programme truly entrepreneurial and to focus students from the outset on thinking, acting and practicing entrepreneurial skills. The aim was to immerse them in entrepreneurship. The programme was restructured to remove subjects from their discipline silo and rather aimed to teach students what small business creators needed to know at a relevant stage of the evolution of the businesses. The enterprise became the focus around which theory was built and not vice versa. The BAEE has modules ‘for’ entrepreneurship and ‘about’ entrepreneurship, but students are required to evidence learning ‘through’ entrepreneurship. The programme also has a strong focus on Personal Entrepreneurial Development (PED). These modules are more individualistic and bespoke, allowing staff to respond to students needs. The programme is run over six semesters and is comprised of 10, 20 and 30 credit modules. An overview of the programme structure is available here https://www.dropbox.com/sh/ayceleddxts2o2i/f9MtC2eWlB

The programme has never mandated business start-up as part of its approach; consequently it does not strictly comply with the definition of a VCP provided by Lackeus. However, it is felt that the approach taken to the design and delivery of the programme is a more veridical interpretation of effectuated learning than one which mandates business start-up as part of its approach. A potential outcome of the programme is that students emerge with a viable business. All students will have experienced business start-up during the programme. However, they will do so at different stages of the programme and in different ways. There is no cut-off point whereby student must have started a business and students will not fail the programme as a consequence of not starting a business or not having a viable business when they complete the programme. The BAEE tries to balance enterprise skills development with entrepreneurship. Opportunities are presented or arise at different stages in an individual’s life and our intention is to provide the skills to enable the opportunity to be realised if and when the time is right.

5.2 University of Buckingham

The University of Buckingham was the UK’s first independent university, opened in February 1978, as the University College at Buckingham. It was incorporated as the University of Buckingham with Degree awarding rights in March 1983. The majority of students at Buckingham study for 8 terms during two years, starting in January each year. This is the same contact time as students at UK state universities.

The BSc in Business Enterprise (BBE) programme was launched by the University’s Business School in January 2006. It was modelled on the Freshman Management Experience at Babson College in USA where undergraduate students start and manage their own business in their first year at college. It was based around the philosophy of ETA (Entrepreneurial Thought and Action) where students are just given enough very basic knowledge about the functions required to run a company so that creativity rather than analysis is the major initial driving force.

The BBE programme is an honours degree programme, during which undergraduate students undertake academic study whilst at the same time they must formulate a business idea, prepare a business plan, pitch for up to GBP5000 venture capital and then launch and develop the business. Research by Lackeus (2012) found that this was the first complete undergraduate VCP to be launched by a university.

The original educational aims of the BBE Programme in 2006 were based on enterprise and innovation and were to:

- Provide an understanding of the core business functions
- Develop the skills, attitude and knowledge to be successful entrepreneurs
- Analyse the complexities of business and the business environment
- Translate conceptual knowledge into real-world application through the creation and running of a business.
- Develop knowledge and skills to translate innovative new ideas into a new business venture
- Present change as a natural phenomenon and to encourage a positive and critical attitude to it
All programme documentation was drawn up in line with Subject Benchmark Statement for General Business and Management, as the QAA Benchmark Statement for Enterprise and Entrepreneurship had not been developed at that time.

Students on this programme spend the first five months studying core preliminary business subjects, as well as preparing their business plan and their venture capital pitch. Many of the modules are worth 7.5 units, unlike to 15 and 30 unit modules on the other undergraduate programmes in the Business School. This enables students to blend the academic and conceptual with the practical, so they build the appropriate business knowledge as they establish and build their business.

To ensure an appropriate balance between the academic and the practical, the programme structure was quite complex. Based on feedback from students, staff and external examiners, the programme has been through several iterations, in 2007, 2008 and more substantial revision in 2009 when a new Programme Director was appointed. As the programme had a small number of students, the Programme Director was asked to ensure that Business Enterprise students joined other modules being taught in the Business School, to reduce double teaching costs and encourage integration of students.

Following the changes in structure an additional Educational Aim was added to the Programme:

- Provide the knowledge, skills and “can-do attitude” gained to continue developing their business, start another business or return to and develop a family business or to obtain employment.

The BBE is a “niche” programme, attracting a small number of entrepreneurial students. At the time of writing (April 2014), 7 cohorts (42 students) had completed the programme. The 9th Cohort (12 students) had started in January 2014, joining the 18 second (final) year BBE students. An overview of the programme structure is available here https://www.dropbox.com/sh/ayceleddxts2o2i/f9MtC2eWlB

6. Discussion

This paper came about as a result of a discussion between the authors on the progress of our respective VCPs. Even within entrepreneurially minded institutions the true nature of VCPs is not always understood. It is evident that the niche nature of VCPs has implication for their development and delivery; from a university perspective they are resource heavy. This has in itself compromised the essence of the approach in that both programmes have been, and one still is, dependent on business school modules to support delivery.

While the concept of a VCP is relatively new, it distinguishing characteristic is the creation of a new business as the result of a programme of study. The assumption being that this outcome is more likely if a more effectual process is followed than a causal one. Yet paradoxically, by definition they also follow a causal path that requires a business to be started - some at a scheduled time in the programme (i.e. on demand). This requirement introduces a ‘boundary condition’ that excludes other potential outcomes and in doing so undermines effectual learning by imposing a causal outcome. This expectation may impose limits on the potential for other, more entrepreneurial outcomes that might have emerged over time.

The conflict faced by academics running VCPs is that those who judge the value of such programmes expect certainty of outcome; that being a venture created by a student in addition to the successful completion of their degree. A question frequently asked is ‘how many businesses have resulted from your programme?’ The true answer being, many businesses are started by each cohort and many fail during the programme. That is the nature of the venture creation. The emphasis is both on knowledge and value creation, both from an academic and students’ perspective. The aim of these programmes is to provide students with an authentic opportunity to experience entrepreneurship, but also the knowledge needed to function as an employee/manager in a small or medium size or larger businesses.

As Morris et al comment, the event stream which results in the creation of a new venture is at times volatile and challenging. An effectual approach is necessary in order to accommodate the products of that process, which can be emotionally turbulent. However, the programmes also have to be planned and lectures delivered in a timetabled way, with the inevitable structure and form of any academic programme.

The IAE approach has so far resisted the temptation to force all students to start a business; the reason being that most BAEE students do so naturally at some stage in the programme. There is pressure on them to
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behave entrepreneurially and this comes from many sources, including directly and indirectly from their peers. Students are competitive and to be on an entrepreneurship degree programme is seen as requiring entrepreneurial behaviour. Students are motivated by those around them who are working on their own business (or business idea). The experiential approach adopted in VCPs tests students in a wide range of ways and draws them out of their comfort zones. There is no passive learning option and so students are compelled into activity which might expose them to opportunity or to failure. For undergraduates in particular, doing this within the confines of an academic programme, affords some protection, but does not shield students entirely from the emotional and financial risk associate with the failure of their business venture.

The Buckingham programme was started by the Business School and still remains within it. The programme blends traditional business management with additional non-traditional business subjects, such as “Selling Yourself and Your Products” and “Risks in Business”; these are not taught in the Business School. Through this blend of knowledge creation and value creation, the programme achieves business start-up and is therefore a true VCP.

7. Conclusion

By re-evaluating the concept of the VCPs with its focus on action based, effectual learning, it is evident that the two approaches are not entirely harmonious. One of the undergraduate programmes has a predetermined pathway and a clear expectation of outcome. The fully fledged VCP at Buckingham considered its approach to be effectual and action based. However, the imperative to start a business drives students down a route that reflects a more causally driven approach in the programme. Also the increased dependency on Business School modules enhances the likelihood that students will learn to evaluate their business opportunities in a timely way so as to pitch for the venture fund available to support their business start-up. The IAE approach is perhaps marginally more effectual, but only to the extent that it does not mandate business start-up; it nevertheless expects it. Although not part of the Business School, the IAE Faculty home is the Business School and it is subject to its scrutiny. Operating an academic programme within a university environment which aims to operate in a highly effectual way has many challenges, compounding these with a VCP increases the complexity. However, as Sarasvathy argues “both causation and effectuation are integral parts of human reasoning that can occur simultaneously, overlap and intertwine over different contexts of decisions and actions” (2001: 245). This seems to be the case at this stage in the development of curriculum design and teaching in the VCPs referenced above. Sometimes for cost reason, other times for systemic reasons, both effectual and causal approaches do need to be combined. This approach does ensure that students are helped to develop effectuation through creative ideas and innovations that lead to practical solutions and successful new enterprises. However, at the same time causal activities must not be forgotten, so that the quantitative, planning, organisation and technical skills that are needed for any business to develop successfully are instilled in the students’ approaches and methodologies. However, the tensions that arise between the approach and the aspirations of VCP needs to be considered further.

As a final thought on VCP delivery, these programmes demand adaptability and innovation in their approach to teaching and assessment. Innovative approaches to teaching entrepreneurship emerge from the experimentation that is more possible in VCP design more so than in many other programmes. To slightly paraphrase Baumol, “it’s about time, in this crucial area [of entrepreneurship], that we began to learn the effectiveness of what we are doing and [through experimentation learn] how we should change our approaches [for the better]” (cited in Griffiths et al, 2012: 617).

References


Creating a Framework for Collaboration: An Exploration of Knowledge Alliances

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Abstract: Delivering on Europe’s Modernisation Agenda for universities has been a work in progress since at least 2006 (COM, (2006) 208 Final). It has recently taken on a new impetus, with the current Erasmus+ Call for Proposals likely to inject a further 1,507,3 million Euros (14.7 billion over 7 years) into education, training, youth and sport in the years to come. In terms of higher education, priority will be given to projects contributing to the Modernisation Agenda. What this means in reality is building, “...new, innovative and multidisciplinary approaches to teaching and learning; stimulating entrepreneurial skills and [the] entrepreneurial staff and facilitating the exchange, flow and co-creation of knowledge” (Erasmus+ Programme Guide, 2014). This is the role of Knowledge Alliances, to foster closer collaboration between higher education, business and the wider socio-economic community. The aim is to create structured dialogues that will result in transnational, results-driven projects, based on common goals and mutual benefits and outcomes. By being an active partner in the education process, it is argued, business can more effectively deliver graduates as business/industry ready. The approach is premised on not just the co-development, but co-delivery of enterprise and entrepreneurship education, with what is envisaged as being, “a truly two way process, with higher education and business joining forces to design innovative, sustainable ways to increase human capital” (ibid). Facilitating the dialogue requires new approaches to governance, funding and staffing within higher education institutions and this is characterised as resulting from a cultural shift, which is seen as being necessary if the disjuncture between the needs and expectations of business and universities is to be overcome. But how might it work in reality? In 2011 three pilot projects were established to explore various models and frameworks for collaboration, as a precursor to the Erasmus+ Call. The aim was to ‘test the water’ and see what complexities might arise and how they could be resolved. This paper explores one of three pilot Knowledge Alliance projects which ran between 2011 and 2013. After setting the context, this empirically based paper will provide details of the various approaches and challenges faced by higher education institutions (HEIs) and business partners; what was tried; what worked and what did not. The findings will be of interest to university leaders and staff; business leaders looking to engage more closely with HEIs, also to students and their advisors who are interested in what the education system has to deliver. Knowledge Alliances are a key aspect of Europe’s strategy for the future of enterprise and entrepreneurship education, through collaboration with business and the wider community. The approach has far reaching implications that stretch beyond building successful university/business collaborations and starts to impact on governance, control and delivery in the classroom.

Keywords: enterprise and entrepreneurship education; innovation, collaboration; knowledge alliances; new pact; modernisation agenda; Europe of knowledge

1. Background

Over the past decade there has been intensification in thinking about the future role of public universities across Europe (Kurkiewicz and Kwiek, 2012). While the belief that universities should serve a wider public good predates the current economic crisis, the later has been both the impetus and catalyst for deep change and restructuring (COM (2012) 795 final:3). Before the economic crisis, the European economy faced “structural challenges to its competitiveness and growth, and obstacles to its entrepreneurship” (ibid). The Europe 2020 strategy aimed to address these societal challenges and to set the foundation for growth and competitiveness through the shared responsibility of its Member State and EU Institutions. The “closely intertwined” (ibid) nature of the Member State’s economies needed to be reshaped through models of economic governance that ensured better policy responses to current and future challenges. A part of this reshaping was the need to de-link education policy from the traditional needs of the nation state and to establish closer links to a more integrated Europe wide strategy. This approach it is argued has “given rise to substantially new ways of thinking about universities at the level of the European Commission” (ibid: 19).

Dale (2010) argues that the transformation of higher education will emerge from the relationship between the European Higher Education Area (EHEA) and the European Research Area (ERA) and their role in the Europe of Knowledge (EoK). He argues that the EoK is a project aimed at increasing Europe’s competitiveness, (indeed there are many projects in Europe with this aspiration), by bringing about a “qualitative shift in the relationship between the EU and Member States in ways that radically challenge some deep assumptions about the nature of Higher Education as a sector (ibid: 3). He goes on to quote Gornitzka et al (2007) discussion of the ‘new pact’ between universities, political authorities and society at large (ibid: 7). They argue
that the new pact is not the same as the “strategic calculation of expected values” (ibid) by the public (sic), all monitoring and regularly assessing the university on the basis of its usefulness, it is more a search for a legitimate position for the university in the political and social order of a Europe in search of a new order (ibid). They argue that this raises the fundamental question, “What kind of University for what type of society? What do the University and society expect from each other?” The root of this transformation is seen as being the Lisbon Strategy.

2. The Lisbon Strategy and its impact

EU education policy is both informing and shaping university reform agendas not just as part of the Lisbon Strategy but also the more recent Europe 2020 Policy strategy and its supporting programmes like Erasmus+. Kurkiewicz and Kwiek (2012) argue that this has resulted in EU member states not only adopting the Lisbon Strategy but also the wider social and economic concept of the university implied within in (ibid: 10). They argue that this approach required for the first time in the history of the EU the need for Member States to balance education policies between those which reflected local needs and those seen as critical to the wider economic future of the EU (and therefore requiring EU intervention). The Modernisation Agenda for Universities: Education, Research and Innovation (COM (2006)208 final) set out a strategy which aimed to “reinforce the societal roles of universities in a culturally linguistic diverse Europe” (ibid:2). The need for modernisation is premised on the belief that European universities have enormous potential that is not fully harnessed and that they need to be put to work to effectively underpin the drive for growth and jobs (ibid: 3). The root of the problem is seen as a homogenous education system, in which excellence and diversity has given way to uniformity and mediocrity (ibid). If the intention is for a differentiated structure for the education system, how is this to be brought about? Gornitzka et al (2007) argue that there is not a straight causal line from European integration to performance and development (ibid: 16). University developments are strongly rooted and embedded in individual institutional arrangement and traditions (ibid). The strength of the institutional tradition and its origins and history may counteract attempts to transform it. The relationship between the institution and the state may have close links with national policy and aspiration and the state may have a particular understanding of how to control its domestic institutions (ibid: 17). In this respect, “less variation between university systems and more variations within the university system of a single country (amongst other things) can be seen as an indicator of European integration” (Egeberg, 2006c, cited in Gornitzka et al, 2007: 18). Research (Gornitzka et al, 2007: Dale, 2010; Maassen, 2008) suggests that tensions arise between those who see the need to reform the HE system and those who see reform as a threat to institutional identity. Again, Gornitzka et al describe this as the difference between an institutional and an instrumental perspective (ibid, 22).

Universities have an institutional identity which reform challenges. Those who oppose reform as presented here, argue that the university, if left to its own devices, will cope with the shifting framework and yet keep its foundational identity. From the instrumental perspective, the argument would be that universities need to be reformed in order to realise their full potential and live up to society’s expectations (ibid).

The massification of education, as a worldwide phenomenon (Johnston and Marcucci, 2007 refer to it as one of educations megatrends), combined with the higher cost of education, has led to a resource gap for both research and educational activities (ibid, 2; EC, 2006 (208): 4). The argument here favours a more differentiate role for universities, one in which they build on their own strengths. The argument being that not all universities are good at all tasks, both education and research for example. Whilst education and research are key parts of the whole process of education, they may not be necessary for all institutions (EC, 2006 (208:4)). The Commission argues that differentiating research and education would enable the renowned research institutions to flourish and make space for the provision of excellent national and regional universities who would be able to provide shorter technical education. Research may fall to a few universities in each country. The increased throughput of students in higher education also needs to be managed, with calls for the education system to increase its productivity by being, for example, less selective, more vocationally oriented, having shorter cycles and employ faculty staff oriented to teaching rather than research (Johnston and Marcucci, 2007: 14).

The higher education system as it currently stands is seen as having a limited range of courses (too little diversity) which are open to the academically best-qualified, leaving those from socially disadvantaged groups and non-traditional learners out on a limb (COM (2006) 208final). The level of graduate unemployment
continues to rise and this rationale for this is linked in part at least to the failure of universities to provide the labour market with appropriately skilled graduates. Curricula development and teaching styles are seen as failing to be sufficiently innovative or reflective of the skills and competencies needed in the workforce. It is argued that administrative regulations are a barrier to mobility within education for both students and staff (academics and researchers), preventing them from working, studying or researching in other countries. The complexity of cross border recognition of qualifications and restrictions on the portability of national loans or grants, it is argued, also prevent students and staff from fully appreciating the opportunities available in other Member States (COM (2006) 208 final; Dale, 2010; Kwiek, 2012; Kurkiewicz and Kwiek (2012). The Commission argues that in order “overcome the persistent mismatch between graduate qualifications and the needs of the labour market, university programmes should be structured to enhance directly the employability of graduates and to offer broad support to the workforce more generally’’ (COM (2006) 208 final: 6). A key element of this approach is that universities “should develop structured partnerships with the world of enterprise in order to become significant players in the economy” (SEC (2009) 423: 9). It is argued that this can be achieved without in any way calling into question the social and cultural remit of HEIs (ibid) and Knowledge Alliances (KA) are part of the solution.

3. Knowledge alliances

The report Delivering on the Modernisation Agenda for Universities: Education, Research and Innovation (COM (2006) 208 Final) and previous work on University Business Collaboration (UBC) led directly to the creation of KAs. For KAs to flourish, education and business need to have the desire, (culture and structure) to engage in structured dialogue that will lead to action. Whilst it is recognised that many businesses have constructive and reciprocal relationships with universities, it is argued that they are still too few in number and seen as exceptional rather than the rule (SEC (2009) 423:9). The KAs provided a mechanism for the development of structure dialogues, which would “...bring opportunities for universities to improve the sharing of research results, intellectual property rights, patents and licenses” (ibid: 6). In the wider context, KAs aim to:

- develop new, innovative multidisciplinary approaches to learning and teaching;
- stimulate entrepreneurship and the entrepreneurial skills of higher education teaching staff and enterprise staff;
- facilitate the exchange, flow and co-creation of knowledge.

The EU Forum for University Business Dialogue (2009) (COM(2009)158 final) further reinforced the critical role that UBC is seen as playing in the Modernisation Agenda. Teaching staff and trainers are regarded as being particularly important in the development of an entrepreneurial mindset in students. To be able this, staff must have “a positive attitude and openness towards business as a source of progress, jobs and welfare” (ibid: 5).

In support of this objective, the following actions are recommended:

- The development of an entrepreneurial culture at universities – this requires profound changes in university governance and leadership.
- Entrepreneurship education has to be comprehensive and open to all interested students, all academic disciplines, with due regard to the gender perspective.
- Universities should involve entrepreneurs and business people in teaching.
- Equally, professors and teachers should have access to training in teaching entrepreneurship and exposure to the business world.

The Commission sees Knowledge Alliances as ‘a recent and ambitious action’ and comments that projects run under the KA banner will be closely monitored (Erasmus + Knowledge Alliance Call, 2014). In 2011 three pilot projects were run to test the concept and processes outlined in the KA strategy. One of those projects is the subject of the case study below.

4. The European University Enterprise Network

The European University Enterprise Network (EÜEN) was a pilot project under the DG Education and Culture: Knowledge Alliances, which ran between November 2011 and July 2013. Its aim was to explore the mechanism, barriers and potential for greater levels of engagement between universities and the business community and to initiate the type of institutional change enshrined in the Bologna Process, which led to the
Lisbon Strategy. At a very practical level, the project tried to capture the processes used at individual (HEI) partner institutions to develop and deliver a more entrepreneurship-friendly culture and closer cooperation with their business partners. The cooperation was intended to operate at all levels, from the development of strategy at an institutional level, to the development and delivery of programmes in the classroom. To this end the project has four main stages:

- Leaders Forums
- Transnational exchanges
- Academic staff capacity building
- Joint projects (staff, students and business).

These stages will be discussed in more detail below.

The academic partners in this project might already be described as ‘entrepreneurial’, even if during the project one of our main challenges was to define what exactly that meant. Business partners were identified, some where the result of new collaboration; some were existing partners (at a School or Faculty level), and others were strategic partners (at an institutional level). The project aims were ambitious and would have been impossible to achieve had the partners not already been committed to the idea of the entrepreneurial university. In this respect, the cultural shift perceived as needed to create the climate for structured dialogue to take place, was already embedded in those parts of the university engaged in the project.

The EUEN project aimed to enhance the innovative and entrepreneurial potential of staff and students from across a broad range of disciplines, particularly from non-business disciplines. Clearly, the playing field across Europe for entrepreneurship in education is not even. In fact there was a high degree of variability between partners in terms of their understanding, experiences and skills. However, regardless of prior experience, the project aimed, through a partnership approach with business, to:

- influence institutional leadership to create better conditions for entrepreneurship;
- build teaching capacity to deliver better entrepreneurial learning opportunities through different ways of teaching;
- engage learners and staff in entrepreneurial learning opportunities through innovative approaches to curricula design and delivery;
- embed learning opportunities across diverse disciplines;
- support entrepreneurial action that leads to the creation of new enterprises and innovation.

This was to be achieved through:

- collaborative leadership workshops that implement enterprise/entrepreneurship-friendly structures, policies and cultures in education;
- collaborative cross-disciplinary faculty development programme and workshops to co-create and deliver innovative curricula that enhanced entrepreneurial learning outcomes;
- designing and testing innovative approaches to the development of entrepreneurial mindsets and attitudes through collaborative co-teaching models;
- embedding partner tools and resources to increase the engagement of staff and students in knowledge exchange partnerships;
- targeting the engagement of students and staff from non-business disciplines;
- piloting collaborative partnerships for supporting new venture creation through the provision of online workshops, tools and mentoring programmes.

The main stages of the project were as follows:

- **Leaders Forums (Forums)** – Seven Leaders Forums to be run across academic partner institutions. These would be development workshops run for the management of the university and their business partner to explore the nature of the leadership challenge, focusing on personal, relational and institutional development.
Transnational Exchanges – Given the nature of the EUEN, the aim was to allow the leaders from the partner institutions to participate in tailored international visits to partner universities, to explore in more detail areas of good practice. Four transnational exchanges were anticipated.

Action Planning – Individual organisational strategies to be developed, to provide an opportunity to agree actions arising from the Forums. A key objective was to embed innovation and entrepreneurship expertise in academic faculties through their teaching and learning provision.

Staff Development – Short programmes to be developed and delivered to build capacity (knowledge and capability) of academic staff to support the entrepreneurial skills of students and strengthen linkages between HE and business.

Collaborative Projects – The aim was to test approaches to UBC through a series of collaborative projects between staff, business and students. To prepare students for this engagement, new and/or enhanced academic programmes were developed using more entrepreneurial pedagogies.

Major Findings and Lessons Learned

In summary, despite the short timescale (18 months), the project was largely successful in achieving its objective, that being to bring university and business partners together for the purpose of structured dialogue. The dialogue was structured around the following: the ways in which the business could influence the structure and strategy of the HEI to enable a more effective and mutually beneficial relationship to be fostered; building on that relationship, the aim was to engage business in the development and delivery of academic programmes that would result in more enterprise friendly staff and more labour ready graduates, and finally testing the process through a series of collaborative projects between staff, students and business.

The lessons learned are outlined below:

At the core of the project is the principle of university-business cooperation and partnership. The initial aim was for each university to nominate a dedicated business partner and in this context the university and the business would be the direct beneficiaries of the project. However, in reality, universities and businesses work widely with a range of partners in quite a focused and deliberate way. To have a general business wide engagement with a single partner, covering all disciplines, was in some respects artificial and therefore did not lead in all cases to the depth of relationship that was anticipated. The HEIs who worked closely with a dedicated business partner, on a focused project, produced the highest level of mutual benefit.

It has been suggested that businesses seem reluctant to engage with universities and that academics have a poorly developed sense of enterprise and entrepreneurship. Whilst both might be true to some extent, our results show that businesses are willing to engage, but they need a good justification for doing so. The same might be said of academics. The key to successful collaboration is a perception of mutual benefit and a willingness to strive to achieve it.

The discussion on what activities an entrepreneurial university might engage in resulted in some of the partners going back to first principles to re-examining whether the range of activities they undertook (teaching, research, UBC, innovation, third sector activities) were consistent with the needs of their stakeholders. This was seen as a necessary precursor to wider UBC. The lesson learned here is that progress was not always linear, but more iterative. As one of the partner’s comments, “Sometimes you have to go backwards before you can move forwards”.

Implementing cultural change in any organisation generally flow from the top down. Arguably entrepreneurial organisations need entrepreneurial leaders. The aim of the Leaders’ Forums was to generate ‘high level’ discussion on what it meant to be an entrepreneurial university and consequently to create the strategy and
structure to operationalise it. As the EUEN HEI partners had already committed to the concept of the entrepreneurial university, there was a great deal of buy-in from senior people in the HEIs anyway and consequently in the business partners they chose to work with. The range of activities that resulted from the Forums supported staff development, curricula development and the development of better mechanisms to support UBC. Had the EUEN project been longer it would have been beneficial to bring leaders and staff together to discuss the process of implementation. Whilst both groups (staff and leaders) were engaged in the discussions, they were often separate as the opportunity to bring them together did not always arise. As a consequence of this, the approach at times seems to be a little top-down. In some cases this was reflected in the choice of business partner. Where mutual benefit was determined and agreed at a lower level (Faculty or Department), the level of buy-in on both sides was much higher. When UBC was determined top-down the partners sometimes struggled to find a common cause; this was a positive deterrent to collaboration.

5. Conclusion

A glance over almost any European Commission publication will evidence the significant role it is anticipated that education, specifically higher education, will play in Europe’s strategy for the future. The answer to the treat of globalisation has been a strengthening of European integration. A part of that strategy is the redefinition of the role of higher educational institutions. In terms of European integration, this might more accurately be considered a transnational education strategy, rather than a strategy devised and implemented within the Member State. The reform agenda for HE is part of the Lisbon Strategy and, more recently the Europe 2020 strategy, which brings into focus the ‘pact’ between higher education and the state. The argument being that the pact is currently being renegotiated and, as part of that process, the capability of universities to satisfy the needs of society now and in the future being challenged. In reality, the debate on this has probably been concluded, with the outcome already decided, that being that the education system is failing to live up to its promise or potential. The argument now is not ‘if’ the system is in need of reform, but how quickly reform can be brought about and what the reformed structure will look like.

The Modernisation Agenda argues that too few universities in Europe are recognised as world class. The current system of higher education results in competition which creates a homogeneous offer. In essence, universities should focus on their key strengths and not try to compete in too many areas. Universities might be seen as serving local (community needs), but also wider global needs in specialised fields of study or research. The preference is for autonomous universities with a focus on third stream income, generated through niche activities. Staff are encouraged to think more entrepreneurially about their teaching and research and their role and contribution to the institution. By bringing business and industry into the arena, the belief is that the university will be reshaped in a way that better utilised the resources it has (knowledge, innovation, people) to serve societies needs more effectively. Knowledge Alliances are part of that reshaping process.

The EUEN aimed to support, (or at least initiate), the transition from university to entrepreneurial university by influencing the leadership and governance structures at partner institutions to create opportunities for change. Institutionally, the changes were on the whole micro in scale. Institutional wide change was not possible in the time allowed for this pilot project. However, discrete pockets of change did result in new approaches being implemented and some of the developments that were initiated might develop into (or support) institutional wide change in the longer term. Staff training did raise enterprise and entrepreneurial capacity and resulted in a range of collaborative projects with business partners. These opened up peoples’ minds to the potential for future collaboration and gave contributors more confidence to ‘have a go’. Trial collaborative approaches were undertaken in areas that had hitherto resisted change. None of the partner universities had institutional wide strategies for collaboration, although all had viable UBC in place. The most effective collaborative ventures were small scale and based on relationships between active partners with shared interests, as opposed to institutional level relationships.

Based on the experience of this project, the Knowledge Alliance framework developed by the EUEN project did provide a basis for better UBC. It highlighted the benefit of working with smaller more dedicated and focus partners (SME) rather than larger strategic (corporate) partners. However, leaders need to create the space for meaningful partnerships to be developed and to provide the infrastructure and reward system to support them. There are many good reasons to collaborate; the focus in this project was on graduate employment and business start-up. The students who engaged with the collaborative projects welcomed the opportunity to do
so. Embedding enterprise and entrepreneurship skills into academic programmes was on the whole well received by both students and staff. There are many obstacles to overcome in the agenda to modernise the HE system in Europe. New Knowledge Alliance projects (currently being considered for funding) will push the agenda further in the years to come. Part of the problem will be balancing the desire for mass higher education, (and its associated funding), with the aspiration for universities to generate more revenue through third income strategies and the drive for research excellence. Research knowledge is of course also of commercial value and a core element of competitiveness. Where a university position itself through its teaching, research and innovation will be a significant factor in its ability to attract business and industry partners for collaboration, which will in turn impact on staff and student recruitment. Knowledge Alliances seem to be here to stay.

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Performance and Innovation Insights: Empirical Evidence From Portuguese and Spanish Listed Companies

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Abstract: Knowledge creation inside companies stems from the systematic and dynamic combination of individuals and activities towards the best fit of innovation and performance. It results from the merger of knowledge creation activities and organizational capabilities which determine the firm’s potential for innovation and potential returns. Those organizational skills embody the corporate knowledge assets, which include intellectual property and other intangible assets, recognized in the company’s balance sheet or immediately expensed. In this dynamic process, marketable innovations are usually generated by human capital, strongly tacit knowledge based, and converted into legally protected intellectual resources. Thus, those resources translate the firm’s innovative side and act as business drivers towards its current performance and future sustainability. Fostering the innovation processes inside the organization or within the entire network in which the company is integrated, it is the structure of sustainability and commitment with stakeholders’ expectations. The value chains of innovation are responsible for ensuring the quality of products and processes, time based to markets and catalysts of reliable invested capital returns. In a purely logic of sustained value creation, innovation activities and decisions should emerge as key insights to business performance and sustainable return. Based on the companies integrating the stock exchange indexes PSI (Portugal) or IBEX (Spain), and through a regression estimation model, this paper aims to evidence whether and to what extent explanatory variables have a significant impact in the overall performance. We found a suggestive lag time between intangibles capitalization and its impact on turnover. It can suggest that returns deriving from intangibles are deferred according the IAS 38 scope and framework. This can also be a warning signal towards the identification of intangibles’ useful lives and their potential impairment recognition.

Keywords: innovation, performance, intangibles, Portuguese Stock Index, IBEX

1. Introduction

1.1 Scope

Intangible assets appear, nowadays, as an important issue in the accounting rules frontier – the tension between those responsible for accounting standards establishment and those who use the information, are really critical. Intangibles resources have a value but due to their volatile nature and difficulties in their measurement, they are normally excluded from the financial statements. However, according their linkage and contribution for certain businesses, it is irrefutable their importance for stakeholders. Traditional financial reports, based on traditional accounting rules that exclude the potential return, seem to be irrelevant for decision making. Thus, intangibles identification and measurement approaches can contribute for a better decision making.

Innovation cycle or the innovation value chain claims for a deep analysis on the intangibles identification, measurement and reporting. Radical changes have been occurred in the last two decades of the twentieth century. New business models have also emerged in which knowledge creation, capture, re(use) and diffusion constitute the way ahead to value creation. Companies need to identify the drivers that best contribute for a higher value level and intensity. Invest in intangibles is probably the first step to innovation and consequently for wealth creation. Intellectual capital management and reporting can, in a feasible basis, support the gap of perception between accounting and market value.

1.2 Aims and objectives

Intangibles expenditures, according the main international accounting standards, must be capitalized and recognized as intangibles assets in the companies’ financial statements if control exists by the owner, if it is identifiable and if expected future returns are expected. Thus, it is expected that the accounting treatment of intangible expenditures affect the companies’ future returns, in particular their performance indicators. This paper aims to evidence whether intangible assets recognition affects, or not, the forthcoming companies’ performance indicators, namely their turnover, their return on assets, and their return on equity ratios. According international accounting standards, intangibles can generate future returns within an expected
useful life period. Complementarily, it is intended to identify the gap of time between intangibles capitalization and its effective financial return.

2. Innovation as a source of predictive value

2.1 Intangibles as source of future returns

It has been widely assumed that intangibles resources, most of them not included in the traditional financial statements, act as key drivers in the strategic and financial positioning of a company. Social sciences deal with these resources as knowledge resources (Nonaka and Takeuchi, 2009; Millar and Choi, 2010; Tsai et al., 2013), intellectual capital (Edvinsson et al. 1997; Chang and Hsieh, 2011), or as intangible assets (Lev, 2001; Lopes and Rodrigues, 2007; Ittner, 2008; Tanfous, 2013). Dependent from accounting rules and measures, authors like Brockington (1996), Lev (2001), Andriessen (2004) and Cohen (2005) argue about their impact on businesses and on company’s value creation. Thus, intangibles have been historically treated as an aggregated amount (goodwill), which represents, in nature, a residual, incorporating all intangibles that cannot be identified nor separately measured. However, this residual can be an important source of potential future returns (Zhang, 2013).

According to Blair and Wallman (2003:451) “intangibles are non-physical factors that contribute to, or are used in, the production of goods or the provision of services or that are expected to generate future productive benefits to the individuals or firms that control their use”. Lev (2001:5) defines those resources as “a claim to future benefits that does not have a physical or financial (a stock or a bond) embodiment. From a pure accounting perspective, and as stated in International Accounting Standard 38 (IFRF, 2014), an intangible is a “nonfinancial assets without physical substance that are held for use in the production or supply of goods or services or for rental to others, or for administrative purposes, which are identifiable and are controlled by the enterprise as a result of past events, and from which future benefits are expected to flow”. A patent, a brand, and a unique organizational structure (for example an Internet based supply chain) that generate cost savings are intangible assets. Broadly, a typical intangible asset cannot be bough or sold in an organized market, the verification of its existence may be impossible, it may not have a finite life, its value can fluctuate (which means that it should be submitted to the impairment analysis) and sometimes it is strongly interlinked with a specific activity, product/service or business. Hence, intangible assets are commonly development expenditures, patents and trademarks, brand names, databases, human know-how, strategic alliances and processes. Despite that, individuals and companies have an expected future return and benefits based on the intangibles management. Nevertheless, accounting systems defined by FASB has a very conservative nature. Expenditures in research and development, advertising and other similar ones, should be immediately expensed even tough they traduce expected future returns. However, according Lev and Sougiannis (2003), Wang (2011), Serrano-Bedia (2012), and Besharati et al. (2012), firms’ innovation capital (e.g. R&D expenditures) is associated with subsequent returns.

It is, nowadays, irrefutable that intangibles identification, management, measurement (income, cost or market based) and reporting is a key burner on the value creation process. Intangible assets measures and risks such as research and development capitalization, organizational innovation processes and intellectual capital approaches, acting as key drivers in the value creation process. Knowledge arises as the main way to the wisdom achievement and wealth creation. Although intangibles have non-physical nature that contributes to the production of goods and services, companies expect for their future benefits and returns. Individuals and companies responsible to manage them look for the market and adjust their business processes through customization approaches. Broadly, strategies followed by companies such as alliances, mergers and acquisitions, internal and external diversification or disinvestments, even driven by integrated and innovative market approaches, are based on intangibles, in particular research and developments programs. Thus, knowledge based assets are responsible for the major business changes occurred in those decades.

From the perspective of Daum (2003), an intangible asset is anything that has no physical existence or is investment but has value to the organization. They are typically long-term assets that cannot be measured accurately unless the time that the organization is traded (fully or partially) the majority of them are referenced under the name of goodwill (IFRF, 2014). These assets have no physical substance, possess a high degree of uncertainty in relation to future benefits achievements, only have value for a given entity, sometimes its economic duration is unknown, and they are usually subject to wide fluctuations in value.
because those benefits are also associated to competitive advantages. Broadly, intangibles are also associated to identifiability, to the existence of expected economic benefits within their useful lives.

Authors as Relly and Schweilhs (1999) underline a broader view of intangible assets, criticizing the pure legal, accounting and taxation approaches. Thus, from the perspective of its economic and financial measurement, an intangible asset should have a set of features or descriptors indispensable to its classification as such. These resources should be capitalized and included in the companies’ financial statements if comply with a set of characteristics, such as:

- Must be subject to specific identification and a recognized descriptor to guarantee their unique property;
- Possess existence and legal protection;
- Associated with the legal right to private property, and the same must be legally transferable and can therefore be legally claimed;
- A tangible manifestation or evidence of its existence is required;
- Its existence should be manifested in a certain identifiable point or result from a particular phenomenon or event;
- Those assets must have associated the possibility of being destroyed or terminated in a particular time or as a result of a phenomenon or identifiable event.

On the concept of intangible asset, Brockington (1996) already has incorporated some of the ideas previously expressed by stating that the value is created and maintained in most cases by expectations about the future and about the impact that those elements have in the organization’s positioning. Thus, this expectation management consolidates the existence of intangible assets as a whole. Ignore them or treat them in an idiosyncratic way would undermine the basis of a true and fair view of the financial reporting basis of the accounting systems. Broadly, it is an asset without physical substance or monetary nature, however complies with the following descriptors:

- Cannot generally be bought or sold on an organized market. Its realization will depend on the continued operation of the business or organizational ability to find a qualified buyer;
- Assumes specific to its proprietary nature, sometimes not having any value for others except for those who actually owns it;
- The availability of the asset or assumes affects business continuity or substantial part of the activities of the organization;
- The direct verification of its existence may prove impossible. Thus, there may be a mere manifestation that will translate into advantages even for one who is not her real owner;
- It can have a finite economic life but in no case shall be subject to abrupt disappearance;
- Its value may fluctuate unpredictably over time.

The boundary between tangible and intangible assets is clearly not always enlightening. Hence, we assume in this paper the definition stated out in the IAS 38 (IFRF, 2014), expressing that an intangible asset is a nonfinancial asset without physical substance, held for use, supply or rental, or even for administrative purposes, which comply with some financial and economic assumptions: it is identifiable, it is controlled by its owner, it can be measured on a feasible basis, and it incorporates expected future benefits and returns. Otherwise, those expenditures should be expensed in the period when they have occurred, affecting negatively the current period income. Thus, expenditures in resources or liabilities that the company has incurred as a result of the acquisition, development, maintenance or enhancement of intangible resources, such as scientific or technical knowledge, design and implementation of new processes or systems, licenses, intellectual property internally developed, market knowledge, and trademarks, should be recognized in the financial statements as expenses in the period, as illustrated in the figure 1.

According IFRS’s standard (IFRF, 2014), internally generated intangible assets should be classified in two phases: the research phase and a further advanced development phase. Expenditures occurred in the first phase should be expensed in the period because the organization cannot demonstrate whether an intangible exists and that will generate probable net cash inflows. The same procedure applies for other items such as internally generated brands, internally generated goodwill (IFRF, 2014), and other similar items. However, in
this scope, we consider that those expenditures, although affecting the period net income, can positively affect the organization’s turnover. Expenditures occurred during the development phase can be capitalized, having a deferred impact on future performance indicators (Wang, 2011; Besharati et al., 2012; Kommenic et al., 2013; Al-Matari et al., 2014). Those expenditures are associated to the production of new or substantially improved material, devices, products, processes, systems, or services, prior the commencement of commercial production or use. In both cases, organization’s performance embodies influxes, arising from capitalized or expensed expenditures.

![Diagram of Intangible Resources and Performance](image)

**Figure 1:** Intangible resources expenditures

### 2.2 Innovation as a performance driver

Innovation, *latu sensu*, is not only related to products and processes. The new combinations enunciated by Shumpeter (1952) allow us to conclude that innovation may be observed from the waves of creative destruction, able to restructure the entire market. The *OSLO Manual* (OECD, 2005) defines innovation as "(...) the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations". It introduces four different types of innovation, namely product innovation, process innovation, marketing innovation, and organizational innovation.

- **Product innovation** relates to the introduction of new goods or services or significant increases in their functional characteristics (technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics) regarding the intended use of existing goods and services improvements;

- **Process innovation** is the implementation of a new or significantly improved method of production or delivery. It includes significant changes in techniques, equipment and/or software. This type of innovation is based in efficiency and intended to increase product quality, define new production methods or new kinds of delivery relating with new product or with significant improvements;

- **Marketing innovation** relates to the implementation of new marketing method able to promote significant changes in product design or packaging, product placement, product promotion or pricing;

- **Organizational innovations** are based on the implementation of new methods in order to organize routines and new procedures for the guidance of work. This type of innovation proposes the implementation of new organizational methods from the introduction of new business practices, workplace organization, external relationship of the companies, since they have not been used previously and which result from strategic decisions.

As mentioned in the previous section, intangibles capitalized and reported in the organizations’ balance sheets are associated with expected future returns, affecting the companies’ performance indicators such as turnover, return on equity or return on assets. Hence, we assume that intangible assets can act as a proxy of organization’s innovation, affecting positively their performance indicators (Chen et al., 2005; Ittner, 2008; Clarke et al., 2011; Chang and Hsieh, 2011; Besharati et al., 2012; Serrano-Bedia et al., 2012; Tanfous, 2013; Al-Matari et al., 2014) and have a deferred effect on performance (Wang, 2011; Besharati et al., 2012). According Tanfous (2013), the relation between intangible expenses and market capitalization is non-linear while the
integration of different immaterial assets contributes more effectively to value creation. Indeed, Serrano-Bedia et al. (2012) has also evidenced that the use of external cooperative innovation has a significant effect on companies’ innovation performance indicators. Concerning the effectiveness of R&D intensity, and at a macroeconomic level, Lopes (2011) did not achieve a significant correlation between those expenditures and turnover from innovation. This result is consistent with similar evidences previously achieved by Chan et al. (2003) and later on by Chang and Hsieh (2011), relating to companies’ operating, financial and market performance. Thus, evidences do not support a direct link between R&D expenditure (and even with other intangibles such as patents, licences, software, etc.) and future returns. Opposite evidences were obtained by Lev and Sougiannis (1996) relating insider gains. These gains in R&D intensive companies are significantly higher than insider gains obtained in firms not strongly engaged in innovation expenditures.

3. Methodology

3.1 Data source

This research is based on 73 non-finance companies, 43 (58.9%) listed in the Portuguese exchange regulated market and 30 (41.1%) in the Spanish one, all of them with reference to fiscal years 2008-2012. Some data was collected from the DataStream database and complimentary information was collected through a content analysis (Abraham and Cox, 2007; Sekaran and Bougie, 2013), based on companies’ annual consolidated accounts. Those companies are integrated in the Portuguese stock index (PSI) or in the Spanish indexes IBEXTOP and/or IBEX35.

3.2 Variables

Economic and financial performance can be measured through multiple indicators such as turnover, return on equity, return on assets, and earnings before or after interests, taxes, depreciation and amortization (EBITDA/EBIT). All of them are traditional accounting performance measures of operational and financial performance. All of them are commonly used as key performance indicators of profitability of companies and included in their annual reports. Thus, it has been widely used as a measure of financial performance in earlier research (Chen et al., 2005; Gan and Saleh, 2008; Chang and Hsieh, 2011; Clarke et al., 2011; Wang, 2011; Besharati et al., 2012; Tanfous, 2013) as indicators of integrated returns. Intangible assets rates and corresponding predicted economic signals are supported by IFRF (2014). Intangible assets rate is defined as the quotient between the addition/reduction of intangible assets during the period N, divided by total assets. Other independent variables, in particular company size, and sector, are widely supported by literature, namely in Lev and Sougiannis (2003), Nguyen et al. (2004), Diaz et al. (2005), Ozgulbas et al. (2006), Serrano-Bedia (2012), Al-Matari et al. (2014), and Crema and Nosella (2014). These references also support their predicted economic signals as evidenced in table 1. Ordinary Least Squares (OLS) multiple regressions were used to test the relationships between those dependent and independent variables. Outliers were removed from the analysis.

Table 1: Variables description and framework

<table>
<thead>
<tr>
<th>Variable Typology</th>
<th>Var.</th>
<th>Description</th>
<th>predicted Economic Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent</td>
<td>TURN</td>
<td>Natural logarithm of total turnover (YN)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>ROA</td>
<td>Return on assets (YN)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>ROE</td>
<td>Return on equity (YN)</td>
<td>+</td>
</tr>
<tr>
<td>Independent</td>
<td>INT1</td>
<td>Intangible assets rate YN</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>INT2</td>
<td>Intangible assets rate Y(N-1)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>INT3</td>
<td>Intangible assets rate Y(N-2)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>INT4</td>
<td>Intangible assets rate Y(N-3)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>INT5</td>
<td>Intangible assets rate Y(N-4)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>DMI</td>
<td>Natural logarithm of total assets (YN)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>IND</td>
<td>Exchange stock index (YN)</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>SEC</td>
<td>Activity sector</td>
<td>+</td>
</tr>
</tbody>
</table>
Companies were aggregated in seven activity sectors (SEC) as follows: 1. Consumer services and transportation; 2. Equipments and industry; 3. Construction and infrastructures; 4. Technologies and communications; 5. Consumer materials; 6. Petrol and energy; and 7. Media and advertising.

3.3 Association measures

Association measures have the objective to quantify the strength and direction between two variables towards the diagnosis of potential causal links. Pearson’s correlation (PC) coefficient measures the strength and direction of the linear association between two quantitative variables while the Spearman coefficient measures the strength and direction of that association, albeit non-parametric, between two variables at least classified as nominal. In our analysis we will run the Person’s coefficient because it is the one that best fits the main variables introduced in the theoretical model. Cramer’s V coefficient is also a non-parametric and asymmetric coefficient, used as an association measure between two nominal variables which will be used, whenever appropriate, only as corroborative validation purposes.

3.4 The regression model

In order to identify which variables (X_i; i=1,...k) best contribute to explain the variance of dependent variable, the model stated below has been regressed for the performance indicators. The equation stated below illustrates the path used for key performance indicators used in this research.

\[ \hat{\text{TURN}} = \beta_0 + \beta_1 \text{INT1}_{ij} + \beta_2 \text{INT2}_{ij} + \beta_3 \text{INT3}_{ij} + \beta_4 \text{INT4}_{ij} + \beta_5 \text{INT5}_{ij} + \beta_6 \text{DIM}_{ij} + \]
\[ + \beta_7 \text{IND}_{ij} + \beta_8 \text{SEC}_{ij} + \epsilon \quad (j = 1, ..., n) \]

Thus, all variables were simultaneously introduced in the model in order to identify which ones can predict (rejection of H_0: \beta_1=\beta_2=...=\beta_k=0; \ p<\alpha) the companies’ performance and the deferred horizon between intangibles capitalization and effective return, as predicted in the IAS 38 and IFRS 3.

4. Results and discussion

4.1 Descriptive measures

As stated in Figure 2, all companies were aggregated in seven activity sectors. Construction and infrastructures represent 23,3% of total companies, 8 (47,1%) of them integrating the Portuguese Stock Index and 9 (52,9%) negotiated in the IBEX indexes. Media and advertising sector is represented by four companies, three included in PSI and one included in IBEX.

![Figure 2: Activity sectors (2008-2012)](image-url)
In the following table we evidence the main descriptive measures, including Skewness and Kurtosis.

**Table 2:** Descriptive measures

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>TURN</td>
<td>6,22193</td>
<td>10,79488</td>
<td>8,94565</td>
<td>0,94581</td>
<td>-0,301</td>
<td>0,016</td>
</tr>
<tr>
<td>ROE</td>
<td>-190,87</td>
<td>99,14</td>
<td>-0,1326</td>
<td>35,67308</td>
<td>-2,334</td>
<td>11,551</td>
</tr>
<tr>
<td>ROA</td>
<td>-78,16</td>
<td>18,36</td>
<td>0,2541</td>
<td>11,10379</td>
<td>-5,068</td>
<td>34,959</td>
</tr>
<tr>
<td>INT1</td>
<td>-12,83</td>
<td>74,58</td>
<td>3,7467</td>
<td>5,3421</td>
<td>-2,334</td>
<td>11,551</td>
</tr>
<tr>
<td>INT2</td>
<td>-17,16</td>
<td>61,18</td>
<td>2,9238</td>
<td>10,07648</td>
<td>3,596</td>
<td>17,252</td>
</tr>
<tr>
<td>INT3</td>
<td>-20,13</td>
<td>13,73</td>
<td>-0,6566</td>
<td>4,16411</td>
<td>-1,097</td>
<td>8,948</td>
</tr>
<tr>
<td>INT4</td>
<td>-48,76</td>
<td>37,31</td>
<td>1,0411</td>
<td>9,63422</td>
<td>-1,281</td>
<td>12,733</td>
</tr>
<tr>
<td>INT5</td>
<td>-6,77</td>
<td>16,11</td>
<td>0,1358</td>
<td>3,31471</td>
<td>2,146</td>
<td>9,361</td>
</tr>
<tr>
<td>DIM</td>
<td>7,14328</td>
<td>11,11318</td>
<td>9,11771</td>
<td>0,90295</td>
<td>0,137</td>
<td>-0,583</td>
</tr>
</tbody>
</table>

Relating association measures, we didn’t find a wide range of statistically significant results, except between dependent variable (TURN) and company size (PC=0,678; p=0,000), intangibles rate in 2010 (PC=0,234; p=0,046), intangible rate in 2011 (PC=0,219; p=0,063), and stock index (PC=0,483; p=0,000). Broadly, the intangible assets rates fit the predicted economic signals (IFRF, 2014), except for the year 2012 (INT5). Intangibles capitalization seems to impact positively on turnover, not in the current period but deferred in time (Wang, 2011; Besharati et al., 2012). This evidence can suggest a lag time (up to two or three years) between capitalization and expected returns, corroborating the recognition criteria stated in the international accounting standards. According IAS 38, future economic benefits relates to net cash inflows and may include increased revenues and/or cost savings. Thus, there is a degree of overlap between the asset definition criteria and recognition criteria. Those future economic benefits must be expected in the former and probable in the latter. Surprisingly, we achieved a negative signal between intangibles rate observed in 2012 and turnover level in the same period, albeit not statistically significant ($\chi^2=5183,00; df=5112; p=0,240$). This evidence can eventually be associated to the lag time between intangibles recognition and their effective returns. This evidence requires however further research, namely concerning the typology of intangibles recognized in the companies’ balance sheets.

The variable size (DIM) has a positive and significant correlation with turnover, with a Person’s correlation of 0,678 (p=000), which corroborates the evidences achieved by Lev and Sougiannis (2003), Nguyen et al. (2004), Diaz et al. (2005), Ozgulbas et al. (2006), and Serrano-Bedia (2012). We didn’t find any significant correlation between intangibles rates and ROE or ROA. As argued by Al-Matari et al. (2014:38): “The accounting-based measure can reflect the past performance of the company while the market-based indicators help to anticipate the future performance”. It can be associated with their integrative nature, as evidenced by Zhang (2013): results indicate that there are significant differences between firms with positive and negative goodwill and its impact on liquidity, profitability, and leverage ratios. Thus, in our model we assume Turnover (TURN) observed in the year 2012, as the dependent performance indicator (dependent variable).

**Table 3:** Regression models summary

<table>
<thead>
<tr>
<th></th>
<th>β (Unst)</th>
<th>β (Std)</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>2,795</td>
<td></td>
<td>2,929</td>
<td>0,005</td>
</tr>
<tr>
<td>INT1</td>
<td>0,005</td>
<td>0,106</td>
<td>0,515</td>
<td>0,608</td>
</tr>
<tr>
<td>INT2</td>
<td>0,009</td>
<td>0,207</td>
<td>0,332</td>
<td>0,741</td>
</tr>
<tr>
<td>INT3</td>
<td>0,024</td>
<td>0,550</td>
<td>4,931</td>
<td>0,023*</td>
</tr>
<tr>
<td>INT4</td>
<td>0,029</td>
<td>0,709</td>
<td>2,817</td>
<td>0,056**</td>
</tr>
<tr>
<td>INT5</td>
<td>-0,021</td>
<td>-0,518</td>
<td>-0,799</td>
<td>0,427</td>
</tr>
<tr>
<td>DIM</td>
<td>0,628</td>
<td>0,600</td>
<td>5,079</td>
<td>0,000*</td>
</tr>
<tr>
<td>IND</td>
<td>0,197</td>
<td>0,103</td>
<td>0,845</td>
<td>0,401</td>
</tr>
<tr>
<td>SEC</td>
<td>0,050</td>
<td>0,096</td>
<td>0,981</td>
<td>0,330</td>
</tr>
</tbody>
</table>

$R^2=0,490$

F=7,698
The regression model is statistically significant for a 1% significance level ($R^2=0.490$; $F=7,698$; Sig.$0,000$). Although several variables are not statistically significant, the regression equation is evidenced towards an integrated predictive outlook. The variable INT3 (intangibles rate for 2010) is statistically significant ($t=4.931; p=0.023$) which corroborates the deferral between intangibles recognition and effective impact in operational returns (Wang, 2011; Besharati et al., 2012). This can also suggest a basis for the intangibles’ period of life during which they should be amortized or expensed.

$$TURN=2.795+0.005TN1+0.009TN2+0.024TN3+0.029TN4-0.021NT5+0.628DIM+0.197IND+0.05SEC$$

As mentioned in the literature review (IFRF, 2014), intangible assets should be recognized if the relevant recognition criteria are fully observed. These assets are initially measured at cost, subsequently measured at cost or using the revaluation model, and amortised on a systematic basis over their useful lives, unless the asset has an indefinite useful life. Linking the period of time in which those assets were recognized and their impact in turnover could be a basis for the impairments identification and recognition.

5. Lessons learned and directions

Capitalizing intangibles is dependent from the recognition criteria stated in accounting standards, namely intangibles owner’s control, their identifiability, their feasible measurement, and their expected future returns within a certain useful life (except if an indefinite useful lives were fixed). Furthermore, from a pure economic approach, those resources should positively impact in the companies’ operational and financial performance indicators, such as turnover, ROA, ROE, or others suggested by Al-Matari et al. (2014) and Kommenic et al. (2013).

Based on listed companies in the Portuguese and Spanish stock regulated markets, we signalized a minimum of two years lag time between the intangibles capitalization and its impact on turnover. This evidence can be a signal that returns deriving from intangibles are effectively deferred as suggested by IAS 38 content. This can be a principal towards the identification of their useful lives and potential impairments recognition. No significant correlation was obtained between intangibles rates and ROA or ROE. As performance indicators of integrated returns, certainly those indicators are driven by other variables, more intensive than intangible assets, in particular different types of innovation (OECD, 2005). In volatile markets, finite useful lives tend to be shorter than the effective useful lives used in traditional sectors or economies. Economically, the fair value fluctuations tend to be higher in intensive knowledge based economies.

As further research, the search for impacts between intangibles rates and performance indicators should be computed for a large range of time, in order to evaluate the trend in the intensity of future returns. Thus, acting the year as a control variable, some economic effects could be observed and economically interpreted. Additionally, new proxy for intangible rates and performance could be computed towards the best fitness between intangible assets and performance (Al-Matari et al., 2014). Furthermore, specific detractors and enablers associated to intangibles returns (Crema and Nosella, 2014) can also be found if the analysis could be carried out at a sector level.

References


Innovation and Strategy: Linking Management Practices to Achieve Superior Performance

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Abstract: Strategic thinking is not a core managerial competency in most organisations and few established organisations innovate successfully. Strategy and innovation are critical management practices. Excellence in strategy formulation and execution is essential for superior performance and if innovation is pursued then excellence in it is also critical. Research contends superior performance results from the use of four primary management practices: strategy, execution, culture and structure. Additionally, the use of two of four secondary management practices: talent, innovation, leadership and mergers & partnerships are also required. This is referred to as the “4 + 2 Formula for Sustained Business Success”. Strategy and innovation are driven by an organisation’s vision. An organisation’s context determines if innovation is necessary and what form of innovation is best within that context. Pursuit of innovation as a management practice is a strategic decision. This paper distinguishes among three levels of strategy: Corporate, Competitive and Functional. Innovation is distinctly different at each level and most pronounced at the functional level. Strategic skills needed at each level are significantly different, as are the skills required along the continuum of innovation. The continuum of innovation begins at stability and predictability and progresses to a point of chance and chaos. At different points along the continuum different strategic, management and innovation skills are required. This paper discusses the difference between management practices and management tools and techniques. For example, some label performance tracking as a management practice (this paper considers performance tracking a management tool). Various tools and techniques can be used within the primary and secondary management practices to track inputs and outputs. Most management tools and techniques have no causal relationship to superior performance and should not be confused with management practice. Organisations using the management practice of innovation require new processes and values and will require people with different skill sets. The decision to use innovation as a management practice requires new capabilities and thus is linked directly to strategy. Scant literature examines the link between the management practice of strategy and the management practice of innovation. The literature does suggest there is a lack of strategic and innovation skills within most organisations and this lack of skills have contributed to the failure for many established organisations to innovate successfully.

Keywords: strategy, innovation, management practice, management tools and techniques, continuum of innovation

1. Introduction

More than 90 percent of large organisations are committed to innovation (Hamel, 2003). There is a greater need to innovate than ever and value creation through profitable growth can only come from innovation (Prahalad and Ramaswamy, 2003). Strategic thinking is not a core managerial competency in most organisations and few established organisations innovate successfully (Christensen, 1997). If strategic thinking is not a core competency, an organisation’s strategy and resulting strategic decisions will be flawed and the strategic decision to pursue innovation will be less than optimal.

However, Loughnane (2007) and Joyce, Norria, Roberson (2003) suggest that innovation is a management practice and to pursue innovation as a management practice is a strategic decision.

A discussion of the relationship between strategy and innovation cannot be examined solely in relation to each other. They must be examined first with relation to what management is and the management practices in an organisation’s particular context.

The continuing responsibility of the Manager is to strive for the best possible economic results from resources currently employed or available. Managers spend most of their time on the problems of short-run economic performance and most tools and techniques available to the manger deal to a great extent with current business (Drucker 1963). Good managers chose to practice management for the long-run as well as the short. With respect to innovation the manager must decide if it really determines economic performance in the particular business for which he or she works.
Chance

There is no one ‘best way’ to manage: it all depends on the situation, i.e., the context. Knowledge about context is not as portable as many think. Business context is not the same as engineering or medical context.
Lawrence Loughnane

Management is a craft just as cabinet making is a craft. One can learn the science of cabinet making or management in the classroom but to develop the capability one has to apply it in context. As cabinet makers do, managers as they practice develop specialist skills, for example, operations management, logistics management, and marketing management. Specialists use tools and techniques within their practices to perform specific tasks.

Organisational capability is an indicator of what an organisation does. What an organisation does is a result of the collective knowledge, skills and resources available. Capacity and capability limit organisational performance. Organisational performance is a direct function of management ability and is seen in patterns of organisational behaviour. Positive changes in patterns of organisational behaviour can lead to improved organisational performance.

2. Management practices

What management capability is needed and where should it be applied? The research of Joyce, Norria, Roberson (2003) maintains superior performance results from excellence in four primary management practices: strategy, execution, culture and structure and excellence in two of four secondary management practices: talent, innovation, leadership and mergers & partnerships. This is referred to as the “4 + 2 Formula for Sustained Business Success”.

3. Understanding the concept of strategy

Strategy results from a vision of the future and a translation of the vision into specific goals. Strategy is the ‘how’ to successfully achieve the goals. Simply put a strategy is the development and institutionalizing of a new organisational capability.

Formulation and implementing a strategy requires strategic skills. Strategic skills are different than operational skills. For example, a specific set of skills are required to install and test a new project management software package on a computer. The skills to use the software package for a large construction project are completely different. The former provides technology; the latter uses the technology to create capability.

One definition of strategy is:

- The determination of the basic long term goals of an enterprise, and
- The adaptation of a course of action and the allocation of resources necessary for achieving these goals and objectives (Chandler, 1962).

A second definition of strategy includes:

- A concept of how to advance one’s own interest in an environment, usually a competitive environment
- A set of specific goals, such as a rate of growth or return on assets, against which progress in the desired direction may be measured and
- A timed sequence of conditional moves for deploying skills and resources with a view to attaining one’s goals (McArthur and Scott, 1969).

Strategy is an elusive and somewhat abstract concept. Its formulation typically produces no immediate concrete productive action in the firm (An off, 1987).

Porter (1996) argues that competitive strategy is about being different. It means deliberately choosing a different set of activities to deliver a unique mix of values. The essence of strategy in operational terms is in the value activities - choosing to perform value activities differently or to perform different value activities than rivals.

Planned strategies are intended or deliberate (Mintzberg, and Walters, 1989). Emergent strategies are those which evolve from patterns of organisational behaviour. The combination of planned and emergent strategies results in realised strategies. Effective strategies mix the characteristics of deliberate and emergent strategies in ways that reflect the conditions at hand, notably the ability to predict as well as the need to react to unexpected events.
Strategy also has two additional components; the component of position namely the determination of industries, products and markets and the component of perspective (Porter, 1980, 1985). Strategic management and organisational behaviour literature stress that strategic decisions are based on an accurate assessment of the environment. The perspective of the environment by the individuals within the organisation will influence strategic decisions. As the degree of change or volatility and complexity or number and diversity of factors interacting with an organisation increase, perspective plays a larger role in strategy (Bourgeois, 1985).

4. The levels of strategy

There are three levels of strategy; corporate, competitive, and functional (Digman, 1990, Porter, 1985). Corporate strategy is concerned with diversification, new ventures, acquisitions and divestments. Corporate strategy addresses two different questions:

- In what businesses should the corporation invest its resources and why?
- What organisational structure, management processes and philosophy will foster superior performance from the businesses (Campbell, Goold, and Alexander, 1995)

Competitive strategy deals with the nature of competition facing a firm’s products in market or industry terms. Functional strategy emphasizes resource productivity (Moore, 1992).

4.1 Corporate strategy

Competition in multi-business corporations occurs at the business unit level. Corporations place emphasis on the success of diversified business units. Porter (1985) identifies four concepts of corporate strategy:

- Portfolio management,
- Restructuring,
- Transferring of skills, and
- Sharing activities.

5. Corporate influence

Corporations have limited ability to directly control its subsidiaries. It can only use various influences (McArthur and Scott, 1969). Influence plays an important role in the implementation of corporate strategy. Influence is the process through which the corporation uses its power to cause it subsidiaries to make decisions that would not be made in the absence of the influence. Kim and Mauborgne (1997) noted the use of influences of allocation of resources, the establishment of organisational structures, the measurement and reward of performance and dictating the rules of the game are rooted in traditional management science and are conventional and important management tools. However, McArthur and Scott found the relationship between the headquarters unit and its subsidiaries is the most important determinate of the headquarters influence.

6. The headquarters-subsidiary relationship

There is little in the extant literature that addresses the headquarters – subsidiary relationship itself. The most current research focuses on the multinational Corporation (MNC) and specific management tasks performed by the MNC headquarters unit and its subsidiary, (e.g.), the management of marketing channels (Rajdeep Grewal, Alok Kumar, Girish Maliapragada, Amit Saini (2013). The management of relations between a headquarters organisation and its subsidiaries (the companies in which they invest) continues to be one of the key challenges for managers of multi-business enterprises (Roth and Nigh, 1992), Campbell et al (1995), Porter (1985). Roth and Nigh observed that previous work has not addressed the effectiveness of the relationship itself as the basis for normative managerial practices. The effectiveness of the relationship can be evaluated based on the following criteria (Loughnane 1998)

- Openness and Subjectivity of Performance Assessment in the Headquarters-Subsidiary Relationship Gupta (1987)
- Co-ordination, Personal Integrating Mechanisms and the Headquarters-Subsidiary Relationship Roth and Nigh (1992)
Lawrence Loughnane

- Strategic Context and the Headquarters-Subsidiary Relationship (Porter, 1985; Grant, 1995)

7. Competitive strategy

Competitive strategy is concerned with how a firm competes in a particular industry and market (Grant, 1995). Companies compete in markets against other companies with their products and services. Thus, companies must develop strategies for competing in each product market area, in light of evolving market and environmental conditions. The strategies are called competitive strategies or strategic business unit strategies (Gluth, 1985). Strategic Business Unit (SBU) strategy is the search for a favourable competitive position in an industry and market (Porter, 1980).

8. Industry structure

Competitive strategy grows out of a firm’s understanding of the rules of competition within a particular industry. The ultimate aim of competitive strategy is to cope with and to change those rules in the firm’s favour. In any industry, whether it is domestic or international, that produces a product or service; the rules of competition are embedded in five competitive forces (Porter, 1980):

- The entry of new competitors
- The threat of substitutes
- The bargaining power of buyers
- The bargaining power of suppliers, and
- The rivalry among existing competitors

Porter’s theory behind the model is that the strongest competitive force or forces determine the profitability of an industry and so are of greatest importance in strategy formulation. Every industry has an underlying structure or set of fundamental economic and technical characteristics, that gives rise to these competitive forces. Firms, through their strategies, can influence the five forces.

9. Internal capabilities

Industry factors have been thought to be the primary determinants of firm performance (Porter, 1985). In the pursuit of innovation an organisation’s attempt to change the industry in which it competes is dependent on its internal capability and capacity. Industry factors, on average, matter little to firm performance among industry leaders. Industry leaders, rather than focusing on external forces focus on developing internal capabilities (Hawawini, Subramanian, Verdin, 2002).

10. Generic strategies

There are three potentially successful generic strategic approaches to outperforming other firms in an industry (Porter, 1980):

- Overall cost leadership
- Differentiation
- Focus (cost or differentiation)

The first strategy, cost leadership, requires aggressive construction of efficient-scale facilities, vigorous pursuit of cost reductions from experience, tight cost and overhead control, avoidance of marginal customer accounts, and cost minimization.

The second generic strategy is one of differentiating the product or service offering of a firm, creating something that is perceived industry wide as being unique.

The third generic strategy is focused on a particular buyer group, segment of the product line, or geographic market. As with differentiation, focus may take many forms. Although the low cost and differentiation strategies are aimed at achieving their objectives industry wide, the focus strategy is built around serving a particular target very well (Porter, 1980).
11. Functional strategy and the value chain

Porter (1985) proposed an elaborate classification of activities he distinguished as primary and support activities. The primary activities are; input logistics, operations, output logistics, marketing and sales and service.

The support activities are; firm infrastructure, human resource management, technology development and procurement. Porter (1996) identified the essence of strategy as either performing value activities that are different than competitors or performing value activities that are similar to competitors but, performing the value activities in different ways. Innovation most often occurs within the value activities of an organisation.

12. The management practice of innovation

To develop an organisational capability in innovation requires a strategic decision. Innovation is one way an organisation will create competitive advantage (value for which a customer will pay). Innovation to be implemented requires a significant investment for which there must be a significant return. Investment in creating innovation capability is about making a trade-off regarding how a company will compete. A company must evaluate trade-offs to determine the greatest return on investment.

Determining what innovative capabilities a particular company needs is the result of analysis of the company and its environment. Every business is different - a business exists in a unique context. As context changes – internal and external – companies must adapt. They must adapt by changing the content of innovation. For example, content may shift from product innovation to process innovation. However, the process of innovation (identifying opportunities and applying these ideas to the creation of customer value) is a constant.

An organisation must choose to develop the capabilities that best reflect those required by the context in which it operates. Innovation, not defined in context, can negatively influence other practices such as strategy.

Innovation is typically understood as the introduction of something new and useful, for example introducing new methods, techniques, or practices or new or altered products and services. To take a creation of an idea to innovation and customer value requires a high level of management skill.

To be considered innovative an organisation needs to change its industry in some way (Joyce, Nohria and Roberson, 2003). Innovators are focused on finding altogether new product ideas or technological breakthroughs that have the potential to transform industries.

It is problematic that few companies are capable of excelling at innovation – it is a very difficult management practice (Hamel, 2003). Without other complimentary management practice skills innovation rarely, if ever, results in the creation of value.

Companies that exhibit superior performance excel at all of the primary management practices. But, it is not necessary for a superior performer to be innovative. Innovation is not a primary management practice. Innovation is a secondary management practice. (Secondary in this sense means that there is a decision about in which two of the four secondary practices a company will decide to excel). It might be expected that all companies should invest in the creation of an innovative culture. The truth is few companies really make this investment. Those companies that do make the investment often fail to achieve intended objectives because it is a very difficult management practice. And, it is not always the best investment an organisation can make.

13. The innovation dilemma

Deciding that innovation is an essential management practice is not a decision to be taken without a great deal of reflection. Few senior leaders have a clear, well-developed model of what innovation looks like as an organisational capability. And since they don't know what it looks like, they don't know how to build it (Hamel, 2003).

Hamel (2003) found two core challenges must be overcome if innovation is to be developed into a deep capability in any organisation. The first challenge is that most companies have a very narrow idea of innovation, usually focusing just on products and services. Second, most companies devote much more energy to optimizing what is there (current products, services capabilities) than to imagining what could be.
Managers should think holistically in terms of all possible dimensions through which their organisations can innovate and define innovation as the creation of substantial new value for customers that has the following characteristics (Sawhney, Wolcott and Arronis suggest (2006):  

- Is about new value, not new things  
- Can take place on any dimension of a business  
- Requires the careful consideration of all aspects of a business  

There is not a shortage of creative people in most modern business organisations. The problem is the shortage of management skills necessary to follow-through. By its very nature the creative process often is not structured nor are the creative people. Many creative people do not know how an organisation gets things done. Many creative people do not know how the organisation makes money. Theodore Levit (2002) informs us that creativity is not enough:  

“All too often there is a peculiar underlying assumption that creativity automatically leads to actual innovation.”  

Creativity and the innovation that follows often require organisational change. Most organisational-change programs do not achieve their intended results. Why? Consider a simple example. The creative person has lots of ideas but no implementation skills. The next in command person has a high degree of capability to manage the status quo but has a low acceptance of new ideas, a low capability to consider change and a low level of skill to manage change. Perhaps creativity will occur, but not innovation. Few companies with a history of stability can change to innovative companies simply because of the good ideas of creative people and the good intentions of top management.  

In organisations, creativity and innovation do not make for a happy marriage. Creativity requires ‘permissiveness’. Organisations require order and conformity to get things done. Creativity and innovation can wreak havoc within an organisation.  

14. The solution  

Suppose an organisation decides that it needs to be innovative. How can the circle created by the problems between the organisation and the need to be innovative be squared, i.e., what is the solution?  

One starting point is to define innovation differently. Amar Bhide (2006) discusses two types of innovation: upstream as the development of new inventions and technologies; and downstream as a system of turning inventions and processes into economic value. Upstream and downstream innovations require different knowledge skills and resources and thus different strategies.  

Figure 4 illustrates innovation as a system that lies on a continuum. Innovation is a complex and usually gradual process that involves many players (companies) making incremental advances over time – the continuities. Scientists and engineers work at ideas and creativity at the upstream point. At the downstream point, big ideas are adapted to create economic value at a local level. Along the continuum there are proliferations of species (different firms responding to different customer needs). The species exist in different local competitive environments with different business systems (dimensions).  

First, an organisation must determine where it exists along the Innovation System continuum and how it creates value within the system. Second, the organisation must assess its competitive environment to determine what level of innovation is needed.  

15. Management practice and the right tools and techniques  

Most tools and techniques themselves have no direct impact on superior business performance. What does matter is having a strong grasp of the management practices. Whatever tools and techniques, for example, The Balanced Scorecard, are used it is important to execute flawlessly. (Joyce, Nohria and Roberson, 2003)
Figure 3: The innovation system (Loughnane 2007)

16. Aligning the primary and secondary management practices

A continual program to deepen the capability to perform both the primary and secondary management processes is essential. Accomplished athletes make competing look easy, but their skill is not just the result of being born with certain attributes. Their skill comes from practice and discipline over time. Athletic superior performance is the result of a balance of the physical, mental and emotional system. Organisations are systems and the parts of the systems interact. In organisations the alignment of the primary and secondary management practices requires a systems approach. None of the practices are stand-alone. The practices must be aligned and accomplished at the same time.

17. Strategy and innovation – the relationship

The most important relationship between strategy and innovation is customer value creation and therefore a source of competitive advantage. Customers are the ones who decide the worth of an innovation by voting with their wallets. It makes no difference how innovative a company is, or thinks it is, what matters is, will customers pay (Sawney, Wolcott and Arroniz, 2006).

18. Conclusions

Excellent management is not as abundant in organisations as many senior managers think it is. Poor management is the reason it is so difficult for established companies to innovate. It is management’s responsibility to staff an organisation with capable people and then develop the organisation’s capability in the essential management practices.

This lack of management skill leads to degradation in the primary management practice areas such as strategy, execution, structural and culture development. The lack of primary management practice skills leads to poor strategic decisions and strategy execution. It is understandable that if there is a lack strategic thinking within an organisation a poor innovation strategy will result. If there is a lack of organisational management capability strategic goals will not be achieved and it follows that innovation goals will not be met.

Even though there is a constant theme in the business press and respected business publications for companies to be innovative, it is not necessary for an organisation to be innovative to be highly successful. In fact it is problematic that few companies are capable of excelling at innovation – it is a very difficult management practice. Management practice has content, context and process. It is contextual simply because what works in one situation (context) can easily fail in another.

There is not a shortage of creative people in most modern business organisations. The problem is the shortage of management skills necessary to follow-through. Companies must invest in the development of management skills to take ideas through to value creation. It is important that a company, first decide where it exists within the Innovation System and how it creates value within the system.

There are abundant tools and techniques available to management to improve performance in all areas of a business. The ability to use these tools and techniques are based on the assumption that the management capability of the organisation (not individuals) exists to use these tools. There is evidence that many companies
fail to innovate, in spite of the fact that these same companies know that innovation is critical, because they do not have the organisational capabilities.

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Higher Education, Stakeholders and Collaborative Work for Entrepreneurial Learning

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Abstract: Institutions of Higher Education can provide, in their internal environment, entrepreneurial learning opportunities for students stimulating new attitudes and behaviours towards entrepreneurship. The Portuguese universities have diversified their strategies to promote formal, informal and non-formal entrepreneurial learning that can be encouraged in various strategies. The participation of key actors and stakeholders involved in awareness, mentoring and project implementation of the entrepreneurial learning process is crucial for collaborating work in a competitive world. Moreover, obtaining employment is increasingly dependent on not only the potentials of individuals, but also, and even more, the ability to build solid networks of partnerships in science and innovation and employment. Within the scope of the ongoing project “Entrepreneurial Learning, Cooperation and the Labour Market: Good Practice in Higher Education” this paper aims to highlight the importance of non-formal and informal learning and to contribute to the reflection regarding added value of inter-organizational cooperation and collaborative work.

Keywords: higher education; non-formal and informal entrepreneurial learning; stakeholders; collaborative work

1. Introduction

This paper intends to stress both the relevance of entrepreneurship programmes and experiences related to non-formal and informal learning processes place in higher education in order to develop entrepreneurial skills among (under/post) graduates. Besides this, the direct participation of the main academic stakeholders will be taken into account in the analysis of the collaborative work in entrepreneurial learning. Specifically, we intend to study to what extent they are involved in the process of design, implementation, monitoring and evaluation of those entrepreneurial experiences and programmes. It is well-known that the success or failure of entrepreneurial learning and obtaining employment are increasingly dependent on not only the potential of individuals, but also, and even more, the ability to build solid networks of partnerships in science and innovation and employment.

The recognition of this societal and cultural level underlining entrepreneurship education has been visible in the Europe 2020 strategy and in the European Entrepreneurship Action Plan 2020 (EC 2006; EC 2012a), which highlights the importance of entrepreneurship education. Additionally, major results of an important study among alumni of Higher Education Institutions (HEI) in Europe (EC 2012b), related to the effects and impact of entrepreneurship programmes in higher education, have stated that entrepreneurship education has a positive impact on the entrepreneurial mind-set of young people, their intentions towards entrepreneurship, their employability and on their role in society and the economy.

Hence, entrepreneurship has been assumed as one of the possible, and alternative, ways of accessing the labour market, both visible by Community directives, as well as national policies, and program guidelines by training institutions, including HEI (Marques & Moreira 2013; Amaral & Magalhães 2002). Therefore, the institutions of higher education have been developing creative and entrepreneurial attitudes and skills in their students in order to promote their employability. Thus, they must adopt new models and methodologies to teach entrepreneurship that encourage suitable attitudes and behaviours in young entrepreneurs and new life skills (e.g., flexibility, creativity, problem solving, and dealing with uncertainty) regardless of their scientific area of study.

Although entrepreneurship education is relatively new and under-developed in many national contexts in the training of teaching professionals, some countries such as Belgium, Finland and Sweden have already recognised its importance and integrated this dimension into their school systems. This means that the acquisition of knowledge, skills and entrepreneurial attitudes can be developed in the context of educational institutions and articulated in various curricula. On the other hand, these attitudes, skills and values can be also encouraged in many other ways in terms of informal and non-formal strategies. This includes internships
and mobility experiences, participation in various civic associations and initiatives (e.g. workshops, “ideas competitions” and awards programmes), as well as other scientific, cultural and social events. These strategies can be important to enhance chances of success in the transition to the labour market: finding a job, pursuing a long-term career and realizing future professional potential. In this way, institutions of higher education can provide, in their internal environment, entrepreneurial learning opportunities for students stimulating new attitudes and behaviours towards entrepreneurship (Matlay 2009), with the involvement of various stakeholders (e.g. students, academics, researchers, technical staff and policy-makers).

Within the scope of the ongoing project “Entrepreneurial Learning, Cooperation and the Labour Market: Good Practice in Higher Education” financed by POAT – ESF, this paper aims to pursue the following objectives: 1) to systematize the main stakeholders and key actors responsible for entrepreneurship and support existing infrastructures in HEIs in recent years; 2) to characterize their modes of organization, operation and scope of collaboration/partnership network activities in order to examine their dominant modus operandi; 3) to assess the level of their involvement in all stages of design, implementation, monitoring and evaluation of entrepreneurial programs in order to identify the main constraining factors and potential for inter-organizational collaboration. Therefore, we intend to contribute to the reflection regarding the added value of inter-organizational cooperation in the development of public policies in education and training, networks of circulation and transfer of knowledge, support and, supporting the transition to the labour market.

This paper is structured into three main topics of discussion. As for the first topic, the differences between formal, non-formal and informal entrepreneurial learning are briefly presented. This discussion emphasizes the importance of assuming a comprehensive meaning of “entrepreneurial spirit” in order to build an academic entrepreneurial ecosystem. In the second topic, we emphasize the collaborative work between the key actors and the various stakeholders, their forms of organization and scope of collaboration. The third topic, we present the ongoing research project and its objectives (main and specific ones). Some considerations regarding the methodological design will be also pointed out. Finally, in the fourth topic, some preliminary findings of collaborative work performed by main academic stakeholders are discussed.

2. Formal, non-formal and informal learning

This paper focuses only on non-formal and informal learning in an academic context and we assume that learning, acquired through previous work experience, participation in social networks and mentoring schemes can have positive implications for the development of the entrepreneurial potential of students and graduates (EC 2012b). This perspective is based on the concepts of “Learning Society” and “Lifelong Education” and it is closely linked with the development of a new educational paradigm aiming to enhance learning opportunities and new applications of knowledge in organizations of all types and in all spheres of life (Gibb 2005).

The recent literature highlights a range of programmes/ experiences as well as infrastructures and services related to entrepreneurial learning yet involving formal, informal and non-formal strategies (Marques et al. 2014; Werquin 2007; Werquin 2012; Ferreira 2011; Gibb 2002; Gibb 2005; Greene & Rice 2002). However, it is important to point out the differences between these expressions because their meaning and applications are diverse and, in a certain way, controversial.

On the one hand, there is a variation between countries in defining goals and outcomes for these types of learning which has contributed to some controversies on this subject as well as conferring great complexity regarding its implementation in the educational context. On the other hand, the prevailing explanations are closely related to theoretical debates about the nature of formal, non-formal and informal learning which, despite sharing common aspects, reveal many differences regarding the conceptualization, limitation and use of these terms. For instance, formal learning is organized by the school or university. It is intentional from the learner’s point of view; provides a certificate. Usually, this kind of learning is organized into curricula content and linked to an academic degree. In contrast, informal learning is not organized, has no learning objectives and is not intentional. According to Werquin (2012) informal learning results from daily activities of individuals at work, in the family or in the community, usually unintended, and therefore called “experiments”.

Non-formal learning is located somewhere in a continuum between formal and informal learning. In other words, non-formal learning takes place alongside the education and training systems and does not necessarily lead to formalized certificates (EC 2000). Therefore, we might include a wide range of personal and
professional development that occurs through participation in internships or work experience, extracurricular activities, youth associations, mobility programs, organizing events, volunteering, among others. Therefore, a comprehensive meaning of entrepreneurial learning of “entrepreneurial spirit” is assumed throughout this paper, namely: i) by highlighting skills, attitudes and behaviour of creativity, innovation, and risk taking which are applied in all areas of professional and private life; ii) by underlining social and cultural dimensions of entrepreneurial learning in order to transcend both economic/ managerial and psychological/ individual perspectives only focused on business opportunities/ business creation; iii) and by fostering entrepreneurial education in the broadest sense. Furthermore, the recognition of non-formal and informal entrepreneurial learning of (under/ post) graduates has been observed in various projects and good practices developed in the context of European higher education. Initiatives such as Education Unlimited! Youth and Unemployment, Young Enterprise project and the Junior Achievement young Enterprise, among others, have contributed to providing visibility to the positive impact of non-formal learning as a useful strategy for transition to the labour market.

In the case of higher education, the Bologna process places particular emphasis on non-formal learning by encouraging the validation and recognition of skills (Erasmus); the flexibility of the curricula (e.g., internship, studying in part-time, training courses); and the academic mobility (Erasmus). Also, it is important to draw attention to the increasing involvement of universities in innovation activities and knowledge transfer. Indeed, recent developments in the entrepreneurial education have demonstrated that the involvement of various stakeholders has created a positive dynamic in the context of HEI. This dynamic may be observed at two levels: firstly, by strengthening entrepreneurship linked to innovation, technology transfer and entrepreneurship which implied the creation of new academic structures and entrepreneurship/ employment interfaces (e.g., offices of entrepreneurship/ integration into active life; centres of entrepreneurship, innovation centres transferring knowledge of entrepreneurship, entrepreneurship clubs), in close coordination with various stakeholders to support entrepreneurial learning (e.g. business, trade and industry associations, local communities, NGOs). Secondly, by increasing supply of extracurricular activities providing support and knowledge resulting from practical experience and networking skills of different key actors.

3. Collaborative work in higher education

In the last decades the OECD (2000) have referred to the significant and vital role of the collaborative work between the market and HEI, in stimulating the creation of new industries, as well as retention of skilled human/ social capital. In addition, Pinho and Sá (2013) corroborate these strategies and argue that entrepreneurship has been seen by the EU, and by the national and local governments as one of the key factors to promote employment, growth and competitiveness. According to these authors, these concerns are related to their financial sustainability; thereby, they have implemented various plans and strategies directed to the production of scientific knowledge through inter-institutional cooperation in three dimensions: institutions of higher education, government and private entities.

Although HEI and market dynamics are at different stages and with different management models, government policies have supported and backed the potentials of HEI in the transformation and growth of knowledgeable societies (Etzkowitz et al. 2000). In order to explain the dynamics between these three key factors, these authors have developed the triple helix model - university, industry and government - that overcomes the above institutional dynamics, trying to reconfigure their relationship and inherent forces. These three helixes interlink increasingly their practices and actions in different stages of innovation, entrepreneurship and knowledge production. The increasing transformation of the role of HEI is based on two trends: 1) the production of knowledge as an engine that promotes growth and socio-economic progress; 2) the ability to predict and project future trends and their consequent implications for society. As Marques, Caraça and Diz (2006) state the triple helix is founded on a new configuration model which consists in the integration of several forces at the heart of innovative systems. These authors assume the triple helix as a spiral model, characterized by close and meaningful relationships between three inter-institutional key actors, giving relevance also to the role that HEI play in the current societal progress. Etzkowitz et al. (2000) stress the important role of each entity, on filling gaps and/ or other deviations and vice versa. It is important to have an integrated view of this triple alliance, and especially recognize the inherent cooperation, the community impact and the stimulation of social and economic capital, which in turn also facilitates the process of entrepreneurship (Carvalho et al. 2010).
The HEI have adopted an entrepreneurial and business mind set, reformulating goals for the creation and commercialization of knowledge and intellectual properties (Etzkowitz et al. 2000). Therefore, for these authors, HEI also encompass a third mission related to economic development in addition to teaching and research. The redefinition of the role of HEI stems not only from the internal needs but also from external influences, such as the surrounding socio-economic movements and reinstatement of a knowledge-based society. These authors argue that the entrepreneurial activities of HEI promote regional and national development and, more specifically, improve the performance of the institution and its members. It is also important to point out that the emergence of entrepreneurial HEI arises both as a response to social and economic challenges, as well as the growing importance of knowledge and regional / national development through innovative systems. HEI present themselves effectively as a profitable value grounded in innovation and the transfer of knowledge and technology.

In this context, the HEI fulfil an important role in contemporary societies by creating strategies to confront the constant socioeconomic changes and the expectations of its citizens. In order to improve the quality of HEI, the institutions seek to satisfy three stages: 1) teach and educate; 2) research and innovate; 3) knowledge transfer and serving the needs of the community. The last topic includes knowledge management, cooperation with different community entities and questions the position that HEI hold in societal development. Therefore, the mission of HEI goes further than just teaching and researching, to reinforce their position in knowledge transfer to the labour market and in the service to the community. These new functions can simply be introduced and conducted through the establishment of a partnership and a network (Maric 2013).

For Carvalho et al. (2010), HEI should identically promote in their internal environment, the establishment and maintenance of an entrepreneurial ecosystem between the different stakeholders involved. HEI should therefore consider three essential dimensions to promote entrepreneurship: 1) curriculum units presented in formal courses and educational backgrounds; 2) extracurricular activities at regional, national and international levels, involving various stakeholders and, seek to enhance entrepreneurial culture; 3) structures to support entrepreneurs, to transfer knowledge to the market and promote local/ national development initiatives. In this way, the collaborative dynamics of HEI may be observed at two levels: firstly, by strengthening entrepreneurship linked to innovation, technology transfer and entrepreneurship which implies the creation of new academic structures and entrepreneurship/ employment interfaces (e.g., offices of entrepreneurship/ integration into active life; centres of entrepreneurship, innovation centres transferring knowledge of entrepreneurship, entrepreneurship clubs), in close coordination with various stakeholders to support entrepreneurial learning (e.g. business, trade and industry associations, local communities, NGOs); secondly, increasing the supply of extracurricular activities which provide support and knowledge resulting from practical experience and also, the networking skills of different key actors.

4. Presentation of project Link.EES: Objectives and methodological design

4.1 Objectives

The ongoing project “Link.EES - Entrepreneurial Learning, Cooperation and the Labour Market: Good Practice in Higher Education” is funded by The Operational Programme of Technical Assistance and by the European Social Fund (OPTA – ESF). This project has been developed in the Research Centre for the Social Sciences (CICS/UM) and the academic spin-off, MeIntegra Lab (cf. site www.meintegra.uminho.pt), whose main mission is to provide scientific research on professional transition and entrepreneurship policy related to students and graduates from HEI. Besides this, some services related to specific training, consulting and mentoring/coaching are also provided.

This ongoing research project is based on a dual focus. On the one hand, the extensive mapping of programmes and experiences of entrepreneurial learning carried out in the academic context aims to support the identification of a set of good practices and a repertoire of entrepreneurial skills that will be the subject of more detailed studies with the direct participation of key stakeholders. On the other hand, we intend to assess collaborative work of the direct participation of key stakeholders in entrepreneurial learning. Specifically, we intend to analyse to what extent they are involved in the process of design, implementation, monitoring and evaluation of those entrepreneurial experiences and programmes.
The main goal of this project is to set out the importance of non-formal/ informal entrepreneurial learning in the academic context. The specific objectives are: 1) to map the experiences of non-formal/ informal entrepreneurial learning undertaken from 2007 to 2013 in public higher education in Portugal; 2) to characterize the graduates’ profile (e.g. gender, age, social backgrounds, scientific area of study) who have participated in these experiences; 3) to identify a set of best practices in higher education; 4) to present a repertoire of entrepreneurial skills; 5) to reflect on the added value of cooperation and collaborative work of key stakeholders (e.g. transfer and knowledge circulation, network mentoring, supporting the transition to the labour market).

4.2 Methodology design

In the first phase, the methodology used in the present study focused on the exhaustive search of experiments and entrepreneurial initiatives of non-formal and informal learning of Portuguese HEI, through the information available on the Internet. This preliminary step is of particular importance in this study, firstly because so far there has not been a systematization of the major stakeholders involved in the academic context, regarding, for example, the number of entities, the statute assumed, the continuous mission, the focus of intervention regarding non-formal learning for entrepreneurship, existing partnerships, among others. Then, using this mapping it is possible to prepare the subsequent phase of analysis of operating modes and organization of these stakeholders in the field of entrepreneurial learning. Finally, it will be possible to deepen our knowledge of the main privileged areas of intervention with regard to programs and entrepreneurial experiences that contribute to non-formal and informal learning in academic context.

Hence, having already identified the eligible entities, a telephone contact was made in order to deepen and obtain complementary information, create links and involve actively stakeholders in the construction and development of the project. These collaborative dynamics enabled also the identification of other entities that had not been mapped through the first online review and assess the level of involvement of the various key actors.

Thus, the universe of study so far comprises 57 entities, referring both to higher university education and Portuguese polytechnic institutes, from the public sector.

The subsequent study methodology will be divided in three fundamental steps:

Step 1 – application of an online survey that will allow the collection of detailed and consistent information on the universe of stakeholders;

Step 2 - selecting 12 case studies of good practices in the institutions of higher education and, consequently, analyse them by conducting in-depth interviews;

Step 3 - building a repertoire of best practices in entrepreneurial skills and their subsequent validation by key actors and academic stakeholders.

5. Entrepreneurial ecosystem of the Portuguese higher education: Preliminary results

5.1 Location of academic stakeholders

The database has been divided by regions according to the Nomenclature of Territorial Units for Statistical Purposes – NUTS II, allowing a first viewing of their location and most significant presence of academic stakeholders.

We can assess that the Lisbon region holds the largest number of stakeholders, being followed by the North and the Centre of Portugal, with 17 and 13, respectively. There is a relationship between these data and the location of the largest number of universities and polytechnics in the country, as well as the dimensions of each structure. This information is supported by a study of (Parreira et al. 2011) referring that the entrepreneurship support structures are located mostly near the major urban centres and have been focused on development of ideas and knowledge transfer of technological basis.
5.2 Intervention profile of stakeholders

From the analysis of the information, available on the internet, of the various key actors involved in the entrepreneurial ecosystem of HEI, we assume the existence of three stakeholder profiles. This first approach to stakeholder profiles will be submitted to a further process of deepening and stabilization of its “identity” when carrying out the subsequent phase which concerns the application of an online survey to the universe, which is scheduled for May 2014 (see Step 1 of the project).

To a first set of key actors, the designation of academic profile has been assigned because they integrate organizational structures of HEI and, as such, tend to occupy the physical graphic space of the institutions to which they belong. In this case, it is possible to find a diversity of names and organizational models: offices, units, academies, associations, and centres, divisions of students, junior companies, and clubs. The areas of intervention are equally diverse: insertion into active life, employment and employability, entrepreneurship, research for development, support to innovation, intellectual property rights, and transfer of knowledge.

As for the second set, designated participated profile, it incorporates private-law entities that coexist with the participation of the institutions of higher education, through stocks or capital. The participating entities take the form of non-profit associations, limited liability companies, and cooperatives of services of public interest or foundations. In this context of actors of participated profile there are specific designations already, brand names that somehow impart identity and autonomy from HEI. In this profile we can find designations that reflect different organization models, including parks, centres, institutes, workshops, endowed with autonomy and localized, generally, outside of the immediate vicinity of the academic campuses. The areas of expertise are far more comprehensive, more institutional and less individual than the academic profile, in particular regarding regional development, transfer of technology and science knowledge.

In the third set, which includes the profile of interface, it is possible to verify that the activities of stakeholders focus, above all, on the area of the transfer of knowledge and technology-based knowledge, research centres
for the market specifying the action in the innovation of products and processes. Interface structures promote a dynamic interconnection between HEI and the corporate/industrial tissue, with the aim of bringing the supply to existing needs and fostering economic and social development. The designations do not exhibit great variability, such as: Centre of Valorisation and Enhancement of Knowledge, Study Centre, knowledge and technology transfer workshop, transfer units, start-up and spin-off.

5.3 Stages of non-formal and informal learning: awareness, Training, Mentoring and monitoring

Although the approaches to entrepreneurship in higher education are very diverse, consensually the following regularities in the context of non-formal and informal learning are identified:

In awareness activities we can include the national and international programs agency, or the dissemination of initiatives, promoting events, such as lectures, workshops and seminars, provision of documentation and guides to entrepreneurship, coordination with other actors and creating synergies, promotion of contests of ideas (with recognition by the award of prizes), interface with private entities.

The training activities focus on providing/offering tools necessary for the development of an entrepreneurial idea, business plan, such as specific training, workshops, seminars and conferences aimed at obtaining specific skills.

The mentoring and monitoring are related to the creation of an area of incubation and acceleration, as well as in monitoring, consulting and coaching of ideas and projects. These stakeholders promote interconnection between the academic space, students/graduates and business/work.

**Table 1**: Phases of entrepreneurial learning by stakeholders

<table>
<thead>
<tr>
<th>Phases</th>
<th>Nº</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>1</td>
</tr>
<tr>
<td>Awareness + Mentoring and Monitoring</td>
<td>4</td>
</tr>
<tr>
<td>Awareness + Training</td>
<td>6</td>
</tr>
<tr>
<td>Training + Mentoring and Monitoring</td>
<td>6</td>
</tr>
<tr>
<td>Awareness</td>
<td>9</td>
</tr>
<tr>
<td>Mentoring and Monitoring</td>
<td>13</td>
</tr>
<tr>
<td>Awareness + Training + Mentoring and Monitoring</td>
<td>14</td>
</tr>
</tbody>
</table>

Source: Project Link.EES (2014)

Therefore, it is assumed there is a growing focus on training activities, which are aimed at providing students and graduates with tools and resources essential for the construction of entrepreneurial ideas and projects, as well as on monitoring and in building bridges with the market. Portuguese stakeholders seek also to direct the goals for the implementation of awareness-raising activities and promotion of entrepreneurship, in order to contribute to the change of mentalities and to the livelihoods of a culture and an entrepreneurial spirit.

**Some final remarks**

The non-formal and informal education has been stimulated by the EU, being seen as a crucial learning for the development of personal, social and professional competences and attitudes of the (under/post) graduates, namely in the entrepreneurial areas. The non-formal and informal learning can enhance the entrepreneurial spirit of the (under/post) graduates, and consequently, motivate them to participate in entrepreneurial activities.

In Portugal, the academy has sought, according to European and national policy guidelines, to enhance entrepreneurship among students and graduates, as an instrument to fight the problems associated with the economic situation, in particular, unemployment of young graduates. Therefore, it denotes an effort of the
The creation of cooperation networks and strategic alliances among the various key stakeholders can increase the competitive advantage of each entity and, especially, spread the knowledge produced locally and nationally to the market. To develop the collaborative work between the various stakeholders it is important to build an entrepreneurial ecosystem that requires a joint effort of all stakeholders and interested parts. Neither the top-down government measures / guidelines nor bottom-up enterprises / academic initiatives can by themselves create an effective and efficiency ecosystem.

Thus, we can conclude that all the parts of the entrepreneurial ecosystem are important for the definition of an entrepreneurial mind-set and culture between the (under/post) graduates and their involvement in the non-formal and informal activities enabling them to have a major capability and possibility to integrate the labour market and fight the social exclusion.

References


Application of the Complex Technology Assessment System for Product Development

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Abstract: An unquestionable need, resulting from the macroeconomic expectations of increasing the level of the innovativeness and competitiveness of national economies, is to develop products, technologies, and conduct projects that are innovative and comply with market needs. The importance of technology influences the need for technology assessment (TA), which is one of the key challenges in innovation management concerning support for the decision-making processes with regard to the development and implementation of technologies. The dominant actors in the field of technology assessment have been policy-making bodies; however, the subject was later directed to research and industry. In the traditional understanding of technology assessment, two aspects are stressed: the usefulness of TA in the decision-making process and the impact on the society of the introduction of a new technology or the expansion of an already existing technology. The non-mainstream of TA research emerged in business, industry, and non-governmental circles, and it is currently developed and will probably expand in the future. It is connected mainly with economic evaluation, decision-making, and technology measurement methods. The authors of the paper present the origins and development of technology assessment approaches and the methods applied. In this field, single methods and simple and complex models for technology assessment are applied. There are models focused on one homogenous group of assessment factors and complex models that simultaneously take into account various aspects of technology development. Against the background of existing approaches, methods and systems in technology assessment, an original complex technology assessment system is presented that has been developed by the authors of the paper, verified, and experimentally implemented at the Institute for Sustainable Technologies – National Research Institute in Radom, Poland. It is embedded in the stream of TA research, corresponding with the needs of business and industry. It concerns support for the process of technology development and presently comprises the following three main modules: The implementation maturity level assessment module, The commercial potential assessment module, and The innovativeness level assessment module. The forth module concerning risk assessment is currently being designed. The main advantage of the system comprises the possibility to assess innovative products at any stage of a project execution, including ex-ante, ongoing, ex-post, and follow-up, and to compare the assessments results at different stages of product development (from the concept stage, through the development stage, to the final technology stage). The practical value of the system has been proven by its use for the assessment of several hundred technological solutions for the needs of research organisations, technological parks, and enterprises in Poland.

Keywords: technology assessment, complex technology assessment system, implementation maturity level, commercial potential, innovativeness level

1. Introduction

Technological innovations are acknowledged at a macro level as a driver of economic and social development of a country and at a micro level – as a source of competitive advantage of firms applying innovative solutions as well as of research organisations involved in the development and implementation of innovative technological solutions. Traditionally, the discipline has focused on forecasting, impact assessment, and policy studies (Azzone and Manziniib, 2008, Van Den Ende et al., 1998), and its initial intention was to have an early warning system about the potential unfavourable consequences of applying a new technology (Coates, 2001) in order to facilitate more adequate policy-making. The dominant actors in the field have been parliamentary and policy-making bodies; however, the subject was later also picked up by researchers from academic groups and industry (Tran and Daim, 2008). At the time, when the first stream of technology assessment research was developed, it was focused on social aspects and was applied in public decision-making. Within this stream, technology assessment is understood as “a scientific, interactive, and communicative process with the aim to contribute to the public and political opinion forming on societal aspects of science and technology” (Decker and Ladikas, 2004). It is “designed to better understand the consequences across society of the extension of the existing technology or the introduction of a new technology with emphasis on the effects that would normally be unplanned and unanticipated” (Coates, 2001).

In a wider context technology assessment is understood as “a systematic attempt to foresee the consequences in all spheres of introducing a particular technology” (Bhatnagar and Jancy, 2003), which includes the natural and societal environment and the related organisational structures.
The second stream of TA research emerged in business, industry, and non-governmental circles in the early 1980s and developed during the 1990s and the turn of the present century (Tran and Daim, 2008). It originated from acknowledging the need to conduct technology assessment or technology evaluation to serve its strategic planning. It adopted the term technology assessment; however, it had a completely different meaning that pertained mainly to technological readiness. Within it, apart from technological readiness, aspects of other dimensions connected with technology development, e.g. its commercial or innovative potential are taken into account.

This understanding of technology assessment refers to different applications for the needs of business and non-governmental research institutions, such as the economic evaluation of technology alternatives, the selection and acquisition of strategic technologies, strategic technological planning, and so on.

In this area, two approaches can be observed: (1) technology assessment carried out by organisations developing technologies, and (2) assessment executed for the needs of enterprises, which want to select technologies that are most appropriate for their needs and implement them.

With regard to technology assessment methods, one can observe a change in the scope of their application (Fleischer et al., 2005). In the beginning, these methods were applied mainly for the assessment of large complex technologies, e.g. conventional or nuclear energy technologies or aerospace technologies. The majority of these technologies were developed and implemented by governmental institutions. With time, a shift towards rather small and widely distributed technologies can be observed.

2. State of the art – technology assessment methods and models

Technology assessment can be conducted with reference to numerous factors, i.e. technological, financial, or ecological. For this aim, single methods and single and complex models are applied. Apart from applying methods that are well established in management literature, there are newer methods and tools that have not been well documented. The changes in the character of TA and its focuses have been a factor contributing to the need of rethinking TA approaches and applying new methods and assessment systems. Such a factor was also the need to assess both incremental technologies and the more challenging task to assess emerging ones.

The first simple technology assessment models that considered only single factors were proposed in the 1970s by the National Science Foundation (Porter, 1995). With time, models and methods directed at a complex technology assessment incorporating key aspects of assessment, like implementation maturity and commercial potential, started to be developed and used.

Models focused on a single group of factors comprise, among others, the following:

- The implementation maturity assessment (i.e. Technology Readiness Levels (TRL) (Mankins, 1995) or more advanced – Engineering Manufacturing Readiness Levels (EMRL) by NASA, which initially were used by the US, Canadian and British Departments of Defence (Defence, 2006); the implementation maturity level assessment (SDW) method developed and used at the Institute for Sustainable Technologies – National Research Institute in Radom (Mazurkiewicz et al., 2010, Santarek et al., 2008);

- The commercial potential assessment (i.e. Commercial Potential Index by NASA (NASA, 2004); integrated experts methods of subjective assessment and objective analysis of facts for the identification of commercial potential of innovations (Lucheng et al., 2007, Ji-Wu, 2007), commercial potential assessment methods using computer methods of information analysis (Hongjun et al., 2007, Rui et al., 2007), the QFD technique developed by Korean researchers representing the Han Nam University and the Electronics and Telecommunications Research Institute (ETRI) that can be used for technology analysis and assessment conducted by the organisation interested in the commercialisation or implementation of the technology to the highest level corresponding to the customers’ needs (Kim et.al., 1997); Quicklook and In-Depth (Gwarda-Gruszczynska, 2010) developed at the University of Texas in Austin. The first method facilitates quick assessment of the new product and indicates its commercial opportunities, whereas the latter is used for a more detailed analysis of the product and the identification of strengths and weaknesses in the commercialisation process (Davila et al., 2006); the commercial potential assessment method by ITeE-PIB) (Belina et al., 2012);

- Assessment of ecological aspects of a technology, e.g. Environment Technology Assessment – EnTA (Kulkarni and Ramachandra, 2009) applied for assessing the effects of technologies on the environment,
particularly on human health, ecological systems and resources; it concerns the likely impact of the use of new technologies with regard to costs, monetary benefits, environmental effects, social and political impacts;

- The ethical technology assessment, i.e. “eTA” model (Palm and Hansson, 2006) focussing on the ethical implications of new technologies and aimed at identifying adverse effects of new technologies at an early stage of technological development.

With time, complex technology assessment models have been developed that simultaneously take into account various aspects of technology development. Selected examples comprise the following:

- A methodology was developed for enterprises for selecting a green (environmentally friendly) technology portfolio from the perspective of environmental strategy (Li et al., 2010). The assessment comprises two aspects: economic and environmental benefits, which are evaluated by six main objectives: cost, quality, time, service, resource consumption, and environmental impact.

- The assessment method “Managing Engineering and Product Technology” (MEPT) (Rezagholi and Frey, 2000) enables the assessment of the technology application within the organisation while taking into account success factors determined by a particular organisation. The assessment comprises two aspects: technology application and technology management.

- The assessment tool ORWARE (Assefa et al., 2005) is used for the assessment of technologies from the ecological and economic points of view.

- The Ecoeffectiveness Assessment Model (Kleiber, 2011) integrates, according to the principle of the sustainable development, environmental, economic, and social aspects of technologies; it is meant for the support of decision-making in enterprises.

- The method adopted for TA studies by India’s Technology Information, Forecasting and Assessment Council (Bhatnagar and Jancy, 2003) comprises two dimensions: technology’s economic aspects connected with technology’s influence on the business success (competitive advantage, potential growth rates of sale, the potential for new products development) and the significance of a technology (its maturity, competing technologies, potential applications, compatibility with existing systems, technical risk).

- The complex technology assessment model was used by the French Sophia-Antipolis science park for the analysis of preferred assessment criteria in 50 European and Chinese companies (Jolly, 2008). The model focuses on two basic issues, including a company’s technological competitiveness (internal factors controlled by the company and dependent on its activity and decisions), and the technology’s attractiveness determinants (external factors connected with the behaviour of consumers, government institutions, and stakeholders).

- The model by Yung-Chi Shen, Grace T.R. Lin and Gwo-Hsing Tzeng from Taiwan’s National Chiao Tung University (Shen et al., 2011) referring to the DEMATEL technique (Decision Making Trial and Evaluation Laboratory) and patent analysis aimed at the assignment of proper weights to the agreed evaluation criteria, which include the following: the technological advantage (the advancement and the technology innovativeness level as well), the business effect (also possible return on investment, and the market size), the technology development potential (including the availability of technical resources and technical success opportunities), the risk (commercial and technological).

Apart from single and complex technology assessment methods, analysis of TA methods can be carried out with respect to the objectives of their application. They can be applied for the following:

- The selection of priority technologies, i.e. the consideration of selection criteria connected with the possibility to obtain public support (Brandscomb, 1993); identification of critical technologies with significant economic or military importance (Brandscomb, 1993); the assessment model developed for the Industrial Technology Research Institute (ITRI) in Taiwan, which enables the selection of the most promising technological solutions to be financed by governmental institutions(Hsu et al., 2003); and,

- The execution of the evaluation of an organisation with a technology portfolio, i.e. the Technology Assessment Template (Van Wyk, 2010) by Chartered Financial Analyst Institute (CFA) allowing managers to perform a quick individual assessment with respect to the criteria as follows: robust technological base, effective procedures for technological renewal, and technology-conversant management.
The majority of methods applied in technology assessment concern the assessment of incremental technologies; however, some approaches to assess emerging technologies have been initiated:

- A proposal to apply, in case of a selected emerging technology – nanotechnology, the concept of science roadmapping, as a support for the conceptualisation of Nano-TA (Fleischer et al., 2005);
- A proposal of a new hybrid approach based on technology foresight and a fuzzy consistent matrix to select and assess emerging technologies (Lucheng et al., 2010), which enables the assessment of the industrialisation potential assessment of new or emerging technologies aimed at the selection of promising, infant technologies, whose implementation can form the basis for the development of local industry and which, at the same time, comply with current infrastructure, personnel and financial resources; and,
- The development and testing of a gaming methodology, called DTAG – Disruptive Technology Assessment Game applied for generating insights in the potential military value of emerging technologies and their applications (López-Vicente and Rademaker 2011).

The paper is focused on the processes of incremental technologies assessment.

3. Original complex technology assessment system

Although technology assessment has been developing since the 1960s, there is still a strong need to introduce more effective methods (Tran and Daim, 2008). Moreover, no universal methods and tools that could apply for all disciplines and products can be indicated. Thus, different technology assessment methods and systems are still being created and applied. One of them is an original technology assessment system developed at the Institute for Sustainable Technologies – National Research Institute (Mazurkiewicz and Poteralska 2012). The genesis for the system creation was from participation by its authors – scientific workers at ITeE-PIB in the management and realisation of a few strategic, multi-year, national, and international programmes, which indicated a necessity to conduct a complex technology assessment in which a number of factors are taken into account.

The system for the complex assessment of technological innovative solutions was created with the following assumptions:

- The system is intended for the assessment of incremental innovations from the area of technical support for sustainable development.
- The system is composed of the four following modules: the implementation maturity level assessment comprising detailed assessment procedures depending on the type of an innovative solution (technology, apparatus, system, material, service) (SDW), the commercial potential assessment (PK), the innovativeness level assessment (PI) and the risk assessment (currently designed) (Figure 1).
- The modules, depending on the objective of the assessment, can be used together as complementary operational packages or separately.
- Technological solutions can be assessed at consecutive stages of their development, from the concept stage, through the development stage, to the final technology stage.

Source: Authors

**Figure 1:** Complex technology assessment system
The implementation maturity level assessment module (SDW), by ITeE-PIB aims at the precise assessment of the implementation readiness of an innovative technical solution. The assessment concentrates on technical aspects and pays no attention to issues connected with the implementation process itself (Mazurkiewicz, 2010, Santarek et al., 2008).

The two-stage assessment method employs combined algorithms of initial and detailed assessment of innovative technological solutions, both of which contain a set of questions tailored to the solution assessed. The answers to these questions enable the identification of the advancement of R&D activities and the current level of implementation maturity. Characteristic features of the developed SDW assessment module in comparison to other existing maturity assessment systems consist, among others, in applying individual sets of assessment criteria for different types of innovations (material, system, apparatus, technology, service) at two stages – general and detailed.

The commercial potential assessment module (PK) by ITeE-PIB is used to estimate the marketability of a technological solution at the consecutive stages of its development. The PK method focuses on four areas – technological, market, financial, and regulatory (legal and organisational) – with individual assessment criteria. The module can also be extended with a detailed technology competitiveness assessment and a detailed financial assessment.

The PK method enables comparative analyses of the commercial potential level assessed in a particular moment and at earlier stages of a solution development process. These kinds of analyses are crucial for the possibilities of introducing a solution to the market, because the time factor significantly influences changes in its commercial potential. The higher the assessment result, the lower the risk of commercialisation or implementation failure, and the higher is the probability of obtaining significant economic, technological, and social effects of practical innovation application.

The PK method enables the identification of opportunities and threats in the area of the commercialisation of innovative solutions. It constitutes a tool supporting the decision-making process concerning the continuation or, in the case of a very low or nil commercial potential, the termination of R&D tasks.

The innovativeness level assessment module (PI) by ITeE-PIB enables the identification of the innovativeness level of a technological solution expressed by the solution’s added value for potential buyers. The module comprises the criteria as follows:

- Innovativeness, competitiveness, the role of a technology in an organisation;
- The scope of technology application and IP protection;
- Marketing criteria; and,
- Technological criteria.

The implementation maturity, commercial potential, and innovativeness level assessments are conducted by a team of experts representing a given field of science and the specialists – authors of these methods. To conduct the assessment, an original computer application has been designed by the authors of the complex assessment system (Belina et al., 2012).

4. Practical application of the complex technology assessment system

The developed system has been verified within research programmes and assessments carried out for the needs of technological parks and enterprises in Poland. It concerned the assessment of technological solutions (material, technology, apparatus, system, services) carried out with the use of individual modules of the system or the entire complex assessment system – depending on the needs.

The system can be separately applied for the assessment of individual technological solutions or for all solutions developed within a project. The assessment of particular technological solutions individually enables one to evaluate progress of their development. In this case, they can be assessed with respect to the implementation maturity, commercial potential, and innovativeness level separately; however, to have a comprehensive picture of their development, the authors of the assessment system propose conducting the complex assessment with the use of all three modules. Apart from the assessment of individual technological
solutions, there is also a possibility to assess all solutions developed within a project or a strategic programme, which enables one to evaluate if the programme as a whole is executed properly.

At the Institute for Sustainable Technologies – National Research Institute in Radom, Poland, the SDW assessments, and similarly the PK and PI assessments, are conducted with reference to all new technological solutions (ca. 170 innovations currently under development).

The assessment of solutions is made at different stages of their development. It is essential due to the changing nature of assessment results at different stages of the innovation development process (Figure 2).

In general, the majority of individual technological solutions show a systematic increase in their implementation maturity level with the time spent on their development. Results of the commercial potential and innovativeness levels change in the time function and directions of the changes varies. The commercial potential may increase and decrease in the course of a product development, because it is closely connected with the changes in the market. The innovativeness level usually decreases with the time spent on its development, which is justified by a time-limited “innovativeness durability” of a new solution.

An example of typical changes of the results of the three assessment aspects is presented in Figure 1 a). Real assessment values for a selected technological solution developed at ITeE-PIB within the “Innovative Systems of Technical Support for Sustainable Development of Economy,” 2010-2014 Strategic Programme (Mazurkiewicz and Poteralska, 2013), namely for the solution from the area of surface engineering – PVD technological stand (Figure 1 b), are presented in Figure 1c). So far the stand was subject to 4 rounds of the implementation maturity assessment, 3 rounds of the commercial potential assessment, and 2 rounds of the innovativeness level assessment. The implementation maturity achieved the highest possible – tenth level – of assessment. The results of the commercial potential differentiates from one assessment to another, the

Source: Authors

Figure 2: Changes in assessment results during the innovation development process: a) typical changes of the levels of the implementation maturity, the commercial potential and the innovativeness level, b) photograph of the PVD technological test stand, c) results of the complex technology assessment of the PVD technological test stand.
innovativeness level untypically increases, which may be a result of, e.g., taking into account the latest technological achievements while building the stand and adding additional functionalities.

Analysis of the assessment results obtained with the use of the complex assessment system designed by the authors of the paper supports decision-making concerning further development or the termination of a particular technological solution development. Analysis of the assessment results of all solutions within a particular project or research tasks supports the decision-making process concerning whole tasks – e.g. if a particular task should be terminated and funds transferred to other tasks. Information about the level of commercial potential and innovativeness is very useful in the course of making decisions on marketing activities with response to the developed solutions and making decisions on the development of products or technologies in the future.

5. Conclusions

Technology assessment is applied for the support of the technology development process. In this field, various approaches, methods, and systems are still being developed. One of the proposed methodologies comprises the complex technology assessment system developed and applied at the Institute for Sustainable Technologies – National Research Institute in Radom, Poland. It contributes to technology assessment research concerning the stream corresponding with the needs of business and industry.

The advantages of the system comprise the following:

Its possibilities:

- To assess the most essential aspects connected with the development of new technological solutions of incremental character: implementation maturity, commercial potential and innovativeness level;
- To assess innovative products at any stage of a project execution, including ex-ante, ongoing, ex-post, and follow-up;
- To make assessment with regard to the time function, i.e. taking into account the dynamics of the processes of innovative technological solutions creation;
- To compare the assessments results at different stages of a product development (from the concept stage, through the development stage, to the final product stage);
- To monitor the progress of the product development and control over the implementation stage;
- To support the decision-making whether a particular solution should be developed;
- To evaluate whole projects and programmes, within which technological solutions are developed; and,
- To generate possible directions for further development of a solution and research topics of the future.

The beneficial characteristics of the system include the following:

- The system comprises develops a set of the assessment criteria within the detailed module for the implementation maturity level assessment proposed for particular categories of products (material, system, apparatus, technology, and service) at two stages – a general, which is typical for other methodologies described in literature and applied in practice, and a detailed one, which is original and very useful in practice for technological solutions assessment.
- The open structure of the system which enables it enrichment with additional modules, and within the existing modules – with additional criteria and methods.

The limitations of the system include the following:

- Due to the fact that the effectiveness of the system application strongly relies on the selection of experts involved in technology assessment, in the case of highly advanced and complex technological solutions, subjectivity of the assessment may occur, resulting from the necessity of participation of the solution’s author in the technology assessment.

In spite of the limitation mentioned, the system has proven to be a useful tool for those developing and financing new technological solutions, supporting the technology transfer process, and applying new technologies, such as research institutions, technological parks, technology transfer offices, or entrepreneurs. It can also be effectively used for the management of the whole research projects and programmes.
The practical value of the system has been proved by its use for the assessment of several hundred technological solutions for the needs of research organisations, business support institutions, and enterprises in Poland. Among others, with the use of the system, over 170 innovative technological solutions developed within the “Innovative Systems of Technical Support for Sustainable Development of Economy” Strategic Programme co-financed from EU structural funds have been assessed.

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Entrepreneurship in Higher Education: Nascent Entrepreneurs and Their Enhancers Factors

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Abstract: The current conjuncture is characterized by technological, economic, political, social and cultural, transformations affecting relations between countries and companies. In this environment, innovation becomes the main competitive differential and entrepreneurial personality is associated with perception capabilities of opportunities. According to various authors the nascent entrepreneur has features that provide business creation, but according to recent studies Entrepreneurship is not only innate, it can be taught. Therefore, higher education institutions have a central role in the reflection on the importance of entrepreneurship education. This article aims to foresee the role of higher education for the development of the entrepreneurial potential of individuals, through the construction of a conceptual model of research which will aim to assess whether the individual will become nascent entrepreneur driven by the characteristics identified in the systematic literature review.

Keywords: entrepreneurship, nascent entrepreneur, age, gender, training

1. Introduction

The concept of entrepreneurship is characterized by its polysemy. Entrepreneurship is a key feature in today's society, which should be supported by their impact on the economics of the countries, through the creation of jobs and sources of wealth. Most authors, by the studies carried out, or even by experience, refute the fact that entrepreneurship is an innate gift, emphasizing the influence of various factors (personal, contextual / social, family) in the development of this feature, and, the various points of view converge to the influence that education can play in promoting this aspect.

2. Theoretical background

2.1 Entrepreneurship

In the mid-eighteenth century, Richard Cantillon, according Hisrich (1986) defined entrepreneurship as the term self-employment of any sort. Certain Entrepreneurs buy at prices in the present and sell at uncertain prices in the future. The entrepreneur is a bearer of uncertainty. Especially, Cantillon emphasized the role of the entrepreneur and not your personality, highlighting its economic function above the social status of the person. Say (1816) defined the concept through a combination of factors of production, stating that the entrepreneur is an individual who unites all means of production and who finds in the value of the products ... the re-establishment of the entire capital he employs, and the value of the wages, the interest, and the rent which he pays, as well as the profits Belonging to himself. The first authors that examine the theme of entrepreneurship had an academic education ranging between Economics and Psychology (Roberts, 1991). Among the economists, Schumpeter pointed up, responsible for the publication, in 1911, of the book Theory of Economic Development. For Schumpeter, the entrepreneur is one who creates innovations that allows making profits, assuming the risks involved. Schumpeter associated entrepreneurs not only to innovation, but also stressed the importance for the promotion of sustainable, responsible for creating new products and exploring new markets (Schumpeter, 1934).

2.2 Entrepreneur

Who first gave utility to the term, was the French economist Jean-Baptiste Say, in the XVII century, using the concept to define the individual who was able to increase the productivity of an economic resource (Bruyat and Julien, 2000). Over the years many different approaches have been taken to the entrepreneur term
(Moreira and Silva, 2008). For Drucker (1985), entrepreneurs are those who take the opportunity to create change with something innovative. Sarkar (2007) mentions Joseph Schumpeter, who states that the entrepreneur is who applies an innovation in the business context, and may take various forms, including: introduction of a new product, introducing a new method of production, opening a new market, the acquisition of a new source of supply of materials and the creation of a new company. Since entrepreneurship is a basic skill that can be acquired through learning, according to Kirby (2002), to the universities puts up the challenge of responding to the growing demand for training in this area. In this regard, entrepreneurship should be seen as a process that can be managed and learned (Gartner, 1985; Morris and Kuratko, 2001; Wheat, 2003). According to the Portuguese Society of Innovation, in GEM Project 2004, entrepreneurship is at the center of economic and industrial policy, covering both the creation of new businesses and the development of opportunities in existing organizations. In other words, the definition of entrepreneurship used is as follows: any attempt to create a new business or new initiative, as self-employment, a new business organization or expansion of an existing business, by an individual, team of individuals, or established businesses (Portuguese Society of Innovation, 2004).

2.3 Potential factors for entrepreneurship

The nascent entrepreneurs are the people involved in creating new businesses (Reynolds and White, 1997; Wagner 2004). The nascent entrepreneur will, following this, the person who is interested in starting a new business, hoping to be the owner of the new business, or part of it, and was active in trying to start a new business in the last 12 months (Shaver et al., 2001; Gartner and Carter, 2003; Reynolds et al., 2004a; Wagner, 2004; Bilau, 2007). According to Hoang and Antončič (2003), Cristobal (2006), Schiller (2006), Muller (2006) and Veciana (2006, 2008), the educational level of entrepreneurs have a positive side when the use of professional advice issued by the innovation network. The authors began by looking for the existence of certain personality traits that could be associated with entrepreneurial activity (McClelland, 1961). Later, other studies have pointed to the importance of different characteristics such as age, gender, origin, religion, level of education, work experience, among others (Reynolds et al., 1994, Storey, 1994). These are often called demographic variables (Robinson et al., 1991). Espiritu and Sastre (2007) analyzed the characteristics that have a positive influence on entrepreneurial intentions of students, considering the personality traits, values, socio-demographic factors and academic preparation. In the same line of research, Skudiene, Auraskeviciene and Pundziene (2010) analyzed the psychological and non-psychological characteristics, and environmental factors that influence the entrepreneurial intentions of university students in Lithuania. The result shows that both, the context and the factors, influences the entrepreneurial intentions of students. This information served as support for the design of training programs in entrepreneurship.

Similarly, Mayer (2010) conducted a review of the current state of the support given by universities to business creation, focusing directly on higher education in Mexico, trying to identify the characteristics and factors suitable for an integration plan, developing an effective program of institutional incentives in universities. With regard to demographic variables, with respects to gender, in all studies analyzed it was found that there is a higher rate of entrepreneurs in males than females (Pines, Lerner and Schwartz, 2010; Cohoon, Wadhwa and Mitchell, 2010, Teixeira, 2008; Fischer, Reuber and Dyke, 2003).

The Data relativs to the status of working student indicates that students who have had professional experience have developed characteristics such as autonomy and innovation (Shmidt, 2008). The results of the report of the Global Entrepreneurship Monitor shows interesting data regarding the age at which the rate of entrepreneurship is more prevalent in Portugal.

Thus, in 2007, the entrepreneurship rate was higher in the population between 35 and 44 years, in 2010 this rate was higher in individuals aged 25 to 34 years. In 2007, 9 out of 100 individuals were entrepreneurs; in 2010 the value drops to 4-5 entrepreneurial individuals per 100 adults. Portugal is among the 10 countries with less entrepreneurial activity in the world.

3. Hypotheses and model analysis

In accordance with the foregoing, the main research question that arises is: will the higher education institutions (HEIs) driving the emergence of nascent entrepreneurs with the factors promoters of entrepreneurial activities?
With empirical research seeks to answer the following questions:

- What are the general characteristics of nascent entrepreneurs? Identify discrepancies in gender and age, as well as the general characteristics of different entrepreneurs from different scientific areas.
- What factors encourage entrepreneurial activities? The way institutions face the issue of creation of companies, what they know and what attitudes and practices towards the same.

### 3.1 Model analysis and its layout

It appears that nascent entrepreneurs are influenced by a wide and complex range of factors, both internal and external. To examine what factors can boost or limit the entrepreneurial capacity of higher education students, we have made a model (Figure 1).

![Figure 1: Factors that promote and limit the entrepreneurial capacity](source)

**Source:** Own elaboration

**Figure 1:** Factors that promote and limit the entrepreneurial capacity

It is considered as the unit of analysis the nascent entrepreneur, seeking to deepen the knowledge about the individual who engages in the process of business creation and it takes, or not, the decision to create a company. Therefore, it becomes important to analyze some of the characteristics that may influence the decision to create companies, namely: education, age, gender, previous experiences and family history.

### 3.2 Dimensions and model variables

The conceptual model of the research aims to assess if the individual becomes nascent entrepreneur driven by the characteristics identified in Figure 2, contemplating the nascent entrepreneurs as the dependent variable and the characteristics of entrepreneurs mentioned above, as explanatory variables (independent).

![Figure 2: Conceptual model](source)

**Source:** Own elaboration

**Figure 2:** Conceptual model
The characteristics of nascent entrepreneurs are represented by variables related to the characteristics that influence the emergence of nascent entrepreneurs, as the level of education, age, gender, previous experiences and family history. This conceptual model presented assumes that the characteristics identified influence the individual to become a nascent entrepreneur.

4. Research methodology

The research methodology adopted was the case study, according to Yin (2005), wherein each search strategy represents a different way to gather and analyze data, following its own logic, with each advantages and disadvantages.

4.1 Population and sample

In the research work in analysis, the population consists of students from the School of Management, attending courses that provide training in the area of entrepreneurship in the academic year 2012/2013 and the sample was based on convenience criteria. According to the data, the population consists of pupils 185 and the sample 149 which constitutes 81% of the study population.

4.2 Instruments for data collection

As an instrument of data collection, a questionnaire was used, these being introduced in numbers and existing prior decisions (descriptive statistics and factor analysis) on the future presentation of the same. Thus, sets of questionnaires were conducted for the various courses of the School of Management oriented entrepreneurship education.

Assessment Questionnaire Training Entrepreneurship

For this study a questionnaire was used to apply to students, which had been used in the study of Simões (2010).

5. Descriptive analysis

The total number of 149 questionnaires received, 54 were from the course of GBS, 46 the course GRHCO, 24 of course GASS and the remaining 25 the other courses, respectively. As to gender 58.4 % of the questionnaires were answered by female and 41.6 % for men. With regard to age it appears that most respondents have aged 20-25 years regardless of the course they attend, and 31 from the course OGE, of course GRHCO 26, and 12 of course GASS. With regard to the class age 31-40 years, appear in the course of from 10 GRHCO. Given that the total number of students who completed the questionnaire MGRS was 9, it is important to verify that the class 3 are from 41-60 years. Please note that the majority of respondents do not have any family with their own business (58.3 %), and the majority, 104, presents studies primary / secondary, and 20 have a Bachelor's degree. It is noteworthy that 87.8 % of students do not have experience in creating new businesses or the industry. 87.1 % of respondents assumed that played no management functions. When asked about the intention of starting a new business and be the owner of all or part of it, the majority (70 %) said yes. With regard to industry to conduct this business and how long have they had tried to start, most answered no more than 24 months in the service sector.

Training arrangements, understood as the most attractive for the future of the school will be the postgraduate courses and specialization courses, with 45.5 % of respondents selecting them. Note that in total, the answers were confused between short courses (27.8 %) and master's (25.7 %). Respondents, in general, understand that training must have duration greater than 75 hours (62.7 %). It is concluded that this response was considered as that having the optimum length for the respondents to the extent that the longer the period of training and better the larger amount of knowledge transferred, having been selected in this action, training with a duration exceeding 75 hours. It appears that the best place to deliver specific training, to support the creation of companies, is a school zone where they belong or belonged respondents (52.8 %).

5.1 Factor analysis

A primary objective of this research is to examine whether the educational institutions favored ways to promote entrepreneurial activities. Two factors have been identified explanatory 55.37% of the variance, Table 1, showing the main components of the array factor after rotation.
Table 1: Factors to foster entrepreneurial activities

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>Commonality</th>
<th>FACTOR</th>
<th>VALUE P.</th>
<th>% VAR.</th>
<th>% VAR. AC.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conferences and seminars</td>
<td>0,263</td>
<td>1</td>
<td>3,189</td>
<td>39,868</td>
<td>39,868</td>
</tr>
<tr>
<td>Featured Author Disclosure</td>
<td>0,733</td>
<td>2</td>
<td>1,240</td>
<td>15,500</td>
<td>55,368</td>
</tr>
<tr>
<td>Publication of educational material</td>
<td>0,691</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated disciplines</td>
<td>0,529</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneurship courses</td>
<td>0,459</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contests</td>
<td>0,688</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partnerships</td>
<td>0,676</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>0,390</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Measure of sample adequacy Kaiser - Meyer - Olkin KMO = 0.800
Test Bartlett = 631.879, significance level α = 0

Following this two factors that have been identified, the variables are grouped as follows, discriminated in Table 2.

Table 2: Factors to foster entrepreneurial activities: Factorial analysis of the variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>FACTOR 1</th>
<th>FACTOR 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated disciplines</td>
<td>0,671</td>
<td></td>
</tr>
<tr>
<td>Entrepreneurship courses</td>
<td>0,599</td>
<td></td>
</tr>
<tr>
<td>Contests</td>
<td>0,828</td>
<td></td>
</tr>
<tr>
<td>Partnerships</td>
<td>0,822</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>0,524</td>
<td></td>
</tr>
<tr>
<td>Conferences and Seminars</td>
<td></td>
<td>0,511</td>
</tr>
<tr>
<td>Publications Articles</td>
<td></td>
<td>0,835</td>
</tr>
<tr>
<td>Publications Teaching</td>
<td></td>
<td>0,768</td>
</tr>
</tbody>
</table>

Procedure rotation: varimax

The interpretation of the results shows that there are two main factors in the reference of the best ways to foster entrepreneurial activities, referred to by the respondents.

Cooperation and development (factor 1) - one of the main factors in the reference of the best ways to stimulate the creation of nascent entrepreneurs is related to the forms of cooperation with other organizations, in which these forms aim to encourage entrepreneurial activities through formations with and no degree, and consulting, targeted to the specific needs of nascent entrepreneurs.

The variables that make up this factor are: partnerships with higher education institutions recognized with innovative capacity, the courses without graduate degree, masters degrees and partnerships.

Scientific research (factor 2) - another major factor in the reference of the best ways to stimulate the creation of nascent entrepreneurs is the result of scientific research and subsequent publication of scientific papers, constituting the variables that make up this factor a way to foster entrepreneurial activities. The variables that make up this factor are: conferences and seminars, publishing articles dissemination and publication of educational material.

6. Conclusions, limitations and suggestions for future research

After the investigation developed, the first major conclusion to be made is that the topic under study has a number of specialties that make their analysis relevant and necessary. The study of the factors influencing the emergence of nascent entrepreneurs, proved to be important to most societies and economies, but about which there is still much to discover. To develop measures that allows forward concrete action in relation to entrepreneurship. This research sought to examine in depth the factors influencing the emergence of nascent entrepreneurs and tried to obtain evidence to answer this question. The literature review demonstrated that it
is an extensive and complex work because of the heterogeneity of their origin, the different approaches used in the studies.

Considering that the objective sought to identify the general characteristics of entrepreneurs, it can be concluded that, regardless of college, attending mostly have the academic degree of primary / secondary. Another characteristic of entrepreneurs, regardless of the course they belong / belonged, is not having previous experience either in business creation, whether in business sector where they develop entrepreneurship and previously played or management functions. Another finding, target research on the general aspects of entrepreneurs is that they consider that the training should be inserted free on education. Entrepreneurs are mostly feminine gender, age presenting as majority between 20 and 25 years. Another finding gauged based on the responses is that entrepreneurs do not have family members with business / company itself. To achieve the objective of identifying the factors that the Polytechnic Institute of Tomar could encourage awakening nascent entrepreneurs:

(1) Entrepreneurs generally take courses in postgraduate and specialization courses as the best training modalities. Respondents claim that the formation must have a duration exceeding 75 hours. As for the best place to deliver specific training will be the area of the school where they belong or belonged to the respondents;

(2) Identify the ways and activities that enhance the appearance of nascent entrepreneurs: respondents assume that the forms of entrepreneurial activities used by the Polytechnic Institute of Tomar, in order of importance, are betting more in conferences and seminars, entrepreneurship, publishing dissemination of articles and partnerships, however, the results are different depending on the courses.

The main results achieved through factor analysis, took into account the objectives of the research mentioned above, by the factors present at the Polytechnic Institute of Tomar that foster entrepreneurial activities, are cooperation and development, encompassing various forms of cooperation with other and consulting organizations, are seen as the best way. Respondents saw scientific research as the best way to foster entrepreneurial activities, compared with the formations.

Thus, one can consider the Polytechnic Institute of Tomar, an institution that supports the awakening of nascent entrepreneurs, since, presents a number of factors enhancers’ entrepreneurial activities, taking as an example, the various partnerships with the business world that features and offer a wide range in terms of training regarding the level of undergraduate and master’s degrees.

6.1 Limitations of research
As a limitation of the research developed, we can refer that only have been studied students of the School of Management of Tomar, training in management and economics, and within the same sample was made to allow the extraction of results. Thus, one of the limitations was the use of a sample of the universe, and this situation is held exclusively with the size of the universe that was very broad, so we can not generalize the results. Another important limitation of the research comes from the own theoretical model. Since this is a model limited to certain characteristics of nascent entrepreneurs, it is considered that the incorporation of new factors and new variables will improve the work.

6.2 Suggestions for future research
We recognizes that it will be extremely important that further work should focus on the study of all institutions that can boost business creation or analysis other activities that can support companies organized to become more competitive , and even emerging in European and international markets .

It is still great interest in new opportunities, work and study separately different ways to foster entrepreneurial activities, in educational institutions in public and private educational institutions.
References


Innovation in the Chemical Industry: Evidences From Spanish Businesses

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Abstract: At present time, innovation is considered to be a key element in order to improve societies and businesses. In this scenario, we present an original study about how businesses in the chemical industry manage innovation in Spain. In the first section, we provide a short review of the innovation process in general and the present situation of innovation activity in businesses from the Spanish chemical industry. Then, we present the methodology used in the analysis, explaining the factor analysis technique and how it helps to analyze the chemical industry. Factor analysis is defined as a variety of statistical techniques whose objective is to represent a set of variables in terms of a smaller number of underlying variables or factors. The sample is composed of 921 Spanish businesses dedicated to chemical industry. Data has been extracted by the Spanish National Institute of Statistics (INE) asking about the year 2010 and using a questionnaire about innovation in businesses. We select variables linked with innovative activity. These variables are organized in three categories: investment in innovation, innovation results and aims of innovation. In the next section, the results are presented. We identify seven factors linked to innovation activity in chemical industry: (1) Aims of innovation, (2) R&D investment, (3) Assistants, (4) Different patents, (5) Innovation investment, (6) Intangible elements and (7) External consultants. Consequently, the most interesting factor identified by which to differentiate businesses is the aim of innovation. That is to say, management’s decisions about how to represent the aims of the strategy. Afterwards, the second factor is R&D investment, which represents R&D interest and it is also interesting in order to distinguish organizational behaviours. Following the businesses’ aims and R&D investment, personnel dedicated to support R&D activities are also important. Therefore, the international character of businesses is interesting. The less interesting factors are linked with general investment, intangible elements in general and external support to R&D. Finally, in the conclusions we explain the main findings and the implications. Firstly, the analysis is very interesting to the chemical industry in Spain, because we realize an analysis about them. We identify the critical factors in the innovation process specifying the most interesting variables so that businesses can recognize where to focus their efforts. Additionally, this study is interesting for the chemical industry in general because these results could be used by chemical companies in other nations in order to focus their efforts on critical factors and learn from others’ situations. The research also contributes to business scholarship. We propose an original study about innovation in the Spanish chemical industry in which we analyze the critical factors, and thus these results could be used in other studies in order to compare situations between industries or countries, and even could help to build a model. In future research, we would like to conduct such studies.

Keywords: innovation management; knowledge management; R&D; Spanish chemical industry

1. Introduction

Innovative activity is a fundamental element in organizations and has an influence on their competitiveness (Storey, 2000; Galia and Legros, 2004) as well as promoting survival and growth (Zahra and Covin, 1994; Ganotakis and Love, 2012). The continuous development of new capabilities is recognized by management and researchers alike as a competitive advantage (Teece et al., 1997), and its study is, therefore, very important.

Following Paton and McLaughlin (2008a) “Knowledge economies, societies and businesses represent the future” and innovation is a key element in this process (Cillo, 2005), innovation is receiving growing interest by academicians and managers (Paton and McLaughlin, 2008b). Schumpeter (1934) established a relationship between different types of innovations, considering them like a dynamic element of change (Baaij et al., 2004), and a theory of economic growth, thus their study is very interesting.

Innovation is an inherent characteristic of people. Van de Ven et al. define this concept as “the development and implementation of new ideas by people” (1989: p. 590). Innovation is a creativity and innovative capacity in people’s mind (Hotto and Champion, 2011) and in the context of businesses, it is linked with employees. Furthermore, how businesses manage innovation influences a country’s performance, therefore research dedicated to analyzing innovative activity in businesses is interesting to organizations and also to countries.
The word innovation stems from the Latin term *innovare* which means change things by introducing something new (Medina-Salgado and Espinosa-Espíndola, 1994). In scholarly research, there is not one common definition of the concept but several (Amara and Landry, 2005). One of them was provided by Bareghheh et al. (2009), who explained the concept following Damanpour (1996: p. 694): “Innovation is conceived as a means of changing an organization, either as a response to changes in the external environment or as a pre-emptive action to influence the environment. Hence, innovation is here broadly defined to encompass a range of types, including new product or service, new process technology, new organization structure or administrative systems or new plans or program pertaining to organization members”.

Therefore, innovation is linked with idea of change (Formichella, 2005), but it also includes the commercialization of invention (Schumpeter, 1942) exploiting it as an opportunity (Drucker, 1985). Following Grant (2008: p. 290-291) “invention is the creation of new products and processes through the development of new knowledge or the combination of existing knowledge; innovation is the initial commercialization of invention by producing and marketing a good or service or by using a new method of production.”

Innovative activity in organizations is linked with employees, who should focus their efforts in this process (Acemoglu and Pishke, 1999). Creativity is considered innovation (Hotho and Champion, 2011), defining creativity as the production of novel and useful ideas. At the same time as innovation is the successful implementation of creative ideas in the organization (Amabile, 1996). Thus “creativity is at the individual level, while innovation is at the organizational level” (Gumusluoglu and Ilsev, 2009: p. 461).

In this way, innovative organizations are composed of knowledge workers, that is to say, people applying ideas, concepts and information to their work where continuous innovation is their responsibility instead of manual activity (Drucker, 1993). For knowledge workers, professional development is vital to their project work (Senge, 1990), thus their needs are different from other employees. Therefore, leadership styles should be more integrated and intuitive than those of classical systems.

An activity tightly linked with innovation is research and development (R&D). This activity is linked with efficiency, quality, flexibility and innovativeness. Internal R&D is itself beneficial however, it also helps to use external R&D (Ganotakis and Love, 2012). Following Un et al. (2010) collaborations with suppliers, competitors, universities and clients linked with R&D influence product innovative activity in organizations.

Therefore, intangible resources in organizations have an increasing importance. These resources are classified into four categories (Hall, 1992): (1) Human capital, composed basically of knowledge workers; (2) Technological capital, that includes patents, industrial secret and trademarks; (3) Organizational capital, including continuous improvement in work routines and tacit knowledge transmission; and (4) Business capital, composed of people linked to the innovation chain facilitating its processes, for example: clients, competitors and suppliers.

Intangible resources are strategic because they contribute to creating heterogeneity in businesses in the same industry, and this heterogeneity produces a competitive advantage (Peteraf, 1993) because these resources only could be created in each business (Arrow, 1974). In this sense, intangible resources are difficult to imitate and they are not in the market. Their accumulation process could require a long time in order to obtain these competitive advantages, especially in cases of investment in R&D.

In the case of R&D investment it is not appropriate to shorten the formation process because maintaining a certain ratio of investments in R&D over time produces a greater increase in the stock of technological knowledge (Diericks and Cool, 1989). In order to reduce the problem of the time necessary to generate R&D, organizations should consider creating externalities and synergies through these intangibles, because their cost of use is less than their cost of generation, and the transversal character of technological knowledge suggests it could be used in different products and industries (Fernandez et al., 1998). This point facilitates cooperation possibilities and the externalization of intangible resources in innovative activity in organizations.

We choose to study Spain mainly for the current difficult economic situation. This country is considered a vulnerable economy (Bird, 2010) and its unemployed rate is the highest of European Union (Eurostat, 2013). The innovation process is linked with theory of economic growth (Schumpeter, 1934), and therefore this process could be very interesting in order to improve the Spanish situation because changes in lifestyles
stimulate innovation process in organizations related to products, services, operations, processes and people (Bareghesh et al., 2009).

The chemical industry is a strategic industry in Spain. In 2008, the added value generated by chemical industry accounted for around 10 per cent of gross domestic product (GDP), up from 2007 (increasing by about 5.7 per cent). In addition, the chemical industry has increased its internationality activity, being the second industry (after automotive) with the most exports. In general, the Spanish chemical industry has more than 500,000 employees and they are leaders in Spanish R&D activity accounting for around 20 per cent of the total of employees dedicated to R&D in this country (Serrano, 2011). These figures summarize the situation in chemical industry.

In this scenario, this paper has an interesting purpose: to offer information in order to help businesses and organizations in their innovation processes. With this aim, we realize a factor analysis in order to identify highlight factors in innovation management process using variables linked with innovative activity.

2. Material and methods

2.1 Sample collection

The sample used is composed of 921 Spanish businesses in the chemical industry (following the statistical classification of economic activities of the European Community all of them are in NACE 20). The data was gathered by the Spanish National Institute of Statistics (INE) investigating the year 2010 with a questionnaire about innovation in businesses. The authors were granted access to this database in September 2012. The sample was selected by INE randomly using the DIRCE (Centralized Directory of Businesses), to obtain a final sample composed of more than 40.000 firms in all sectors.

2.2 Variables

We selected variables linked with innovative activity. These variables are organized in three categories: (1) Investment in innovation, (2) Innovation results and (3) aims of innovation (see Table 1).

2.3 Statistical technique

The data analysis was carried out in several steps. First, we realized an exploratory factor analysis using SPSS program (Statistical Package for the Social Sciences). Factor analysis is defined as a “variety of statistical techniques whose objective is to represent a set of variables in terms of a smaller number of underlying variables or factors” (Kim and Mueller, 1994: p.1). Hair et al. (1995) recommend rotation in factor analysis because it “simplifies the factor structure and usually results in more meaningful factors” (p. 380), thus we used principal component analysis (PCA) with Varimax rotation. The aim of factor analysis is summarize the information in a smaller set of dimensions with a minimal loss (Hair et al., 1999).

In the second step, once we knew the principal factors in innovation management, we conducted a cluster analysis, a statistical technique with the aim of “classified objects (that is to say respondents, products or other entities) in which each object is very similar to others in the same cluster” (Hair et al., 1999: p. 492). More concretely, we used the centroid method, in which “the resemblance between two clusters is equal to the resemblance between their centroids, where a cluster’s centroid is its center of mass” (Romesburg, 1984: p. 136). The principal advantage of this method is that it is less affected by atypical observations than other hierarchical methods (Hair et al., 1999).

Table 1: Variables and categories

<table>
<thead>
<tr>
<th>Invest in innovation</th>
<th>Aims of innovation</th>
<th>Innovation results</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;D Researchers</td>
<td>Innovation to improve health and safety</td>
<td>OEMP Patents</td>
</tr>
<tr>
<td>R&amp;D Technicians</td>
<td>Innovation to improve quality</td>
<td>EPO Patents</td>
</tr>
<tr>
<td>R&amp;D Assistants</td>
<td>Innovation to reduce environmental impact</td>
<td>USPTO Patents</td>
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<td>R&amp;D External consultants</td>
<td>Innovation to satisfy legal requirements</td>
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<td>Researcher wages</td>
<td>Innovation to increase market share</td>
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<td>Technicians and assistants wages</td>
<td>Innovation to increase capacity</td>
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<td>Internal R&amp;D investment</td>
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<td>Equipment investment</td>
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</tbody>
</table>
3. Results

3.1 Adequacy

Following Hair et al. (1999) observations should be at least 5 times more than variables, preferably they should be more than 100 in factor analysis. In our case, we analyzed a sample of 921 chemical businesses to which we applied 33 variables, therefore the sample is adequate.

Reviewing Bartlett’s test of sphericity and Kaiser Mejer Olkin (KMO) coefficient (see Table 2) we analyzed adequacy. The KMO was 0.918, thus it was at an acceptable level. Bartlett’s test was 0, less than the explicit level 0.05, so we can conclude that factor analysis was appropriate for these data (Cronbach, 1970).

Table 2: KMO and Bartlett’s test of sphericity

<table>
<thead>
<tr>
<th>Kaiser-Meyer-Olkin measure of sampling adequacy</th>
<th>Bartlett’s test of sphericity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.918</td>
<td>34661,792</td>
</tr>
<tr>
<td></td>
<td>Df</td>
</tr>
<tr>
<td></td>
<td>561</td>
</tr>
</tbody>
</table>

3.2 Exploratory factor analysis

With factor analysis, we recognized seven factors (see Table 3) that explain around 74.150 per cent of data variability (see Table 4). Thus, following Hair et al. (1995) our study is considered satisfactory because factors explain more than 60 per cent of data variability.

Table 3: Rotated factor solution concerning innovative activity

<table>
<thead>
<tr>
<th>Variables</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
<th>Component 4</th>
<th>Component 5</th>
<th>Component 6</th>
<th>Component 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation to improve health and safety</td>
<td>.933</td>
<td>-.066</td>
<td>-.059</td>
<td>-.016</td>
<td>.009</td>
<td>.018</td>
<td>.022</td>
</tr>
<tr>
<td>Innovation to improve quality</td>
<td>.932</td>
<td>-.045</td>
<td>-.093</td>
<td>-.024</td>
<td>-.033</td>
<td>-.002</td>
<td>.017</td>
</tr>
<tr>
<td>Innovation to reduce environmental impact</td>
<td>.925</td>
<td>-.066</td>
<td>-.084</td>
<td>.026</td>
<td>.005</td>
<td>-.009</td>
<td>-.018</td>
</tr>
<tr>
<td>Innovation to satisfy legal requirements</td>
<td>.925</td>
<td>-.071</td>
<td>-.060</td>
<td>-.015</td>
<td>-.028</td>
<td>.013</td>
<td>.001</td>
</tr>
<tr>
<td>Innovation to improve flexibility</td>
<td>.925</td>
<td>-.029</td>
<td>-.055</td>
<td>-.033</td>
<td>-.026</td>
<td>.014</td>
<td>-.029</td>
</tr>
<tr>
<td>Innovation to increase market share</td>
<td>.923</td>
<td>-.068</td>
<td>-.086</td>
<td>-.022</td>
<td>-.044</td>
<td>-.037</td>
<td>-.013</td>
</tr>
<tr>
<td>Innovation to increase capacity</td>
<td>.921</td>
<td>-.054</td>
<td>-.052</td>
<td>-.027</td>
<td>-.050</td>
<td>.008</td>
<td>-.079</td>
</tr>
<tr>
<td>Innovation to consume less energy</td>
<td>.919</td>
<td>-.051</td>
<td>-.051</td>
<td>-.043</td>
<td>-.016</td>
<td>-.014</td>
<td>-.062</td>
</tr>
<tr>
<td>Innovation to reduce labor costs</td>
<td>.910</td>
<td>-.030</td>
<td>-.052</td>
<td>-.032</td>
<td>-.041</td>
<td>.007</td>
<td>-.078</td>
</tr>
<tr>
<td>Innovation to increase product/service set</td>
<td>.910</td>
<td>-.086</td>
<td>-.082</td>
<td>-.012</td>
<td>-.054</td>
<td>-.081</td>
<td>.003</td>
</tr>
<tr>
<td>Innovation to conquer new markets</td>
<td>.908</td>
<td>-.090</td>
<td>-.095</td>
<td>-.027</td>
<td>-.053</td>
<td>-.068</td>
<td>-.026</td>
</tr>
<tr>
<td>Innovation to consume fewer materials</td>
<td>.905</td>
<td>-.036</td>
<td>-.051</td>
<td>-.042</td>
<td>-.045</td>
<td>-.014</td>
<td>-.038</td>
</tr>
<tr>
<td>Innovation to replace old products</td>
<td>.903</td>
<td>-.047</td>
<td>-.053</td>
<td>-.036</td>
<td>-.030</td>
<td>-.010</td>
<td>.007</td>
</tr>
<tr>
<td>Innovation to increase general employment</td>
<td>.891</td>
<td>-.089</td>
<td>-.049</td>
<td>.030</td>
<td>-.053</td>
<td>-.034</td>
<td>-.038</td>
</tr>
</tbody>
</table>
3.3 Factor 1: Aims of innovation

The first factor is consists of all of the variables linked with the aims of innovative activity: Innovation to improve health and safety, innovation to improve quality, innovation to reduce environmental impact, innovation to satisfy legal requirements, innovation to improve flexibility, innovation to increase capacity, innovation to consume less energy, innovation to reduce labour costs, innovation to increase product/service range, innovation to conquer new markets, innovation to consume fewer materials, innovation to replace old products, innovation to increase general employment, innovation to increase the quality of employment and innovation to maintain employment. It represented around 39.9 per cent of data variability thus it was the most highlighted factor, and it was linked with managers because they manage the business and establish the objectives.

Leaders can create conditions in order to facilitate innovation in businesses (Yuki and Lepsinger, 2004). Following Vera and Crossan (2004) different leaders obtain different innovation results: while transformational leadership promotes innovation creation, transactional leadership inhibits innovation. Transactional leadership is based on the leader-follower relationship where both parties recognize their value and try to maximize their positions, whereas transformational leadership is based on a closer relationship than transactional in which the leader stimulates followers in order to achieve team objectives (Pastor, 2005). In this regard, Eisenbeiß and Boerner (2010) identify a positive relationship between transformational leadership and R&D team innovation.

3.4 Factor 2: R&D investment

The second factor represented about 8,489 per cent of the variance and it was composed of investment in internal R&D, investment in equipment, investment in buildings, investment in researchers wages and R&D researchers in the businesses. R&D is considered a determinant of innovation and it is a strategic tool in achieving a world-class status (Raymond and St Pierre, 2010). In organizations R&D activity promotes questions and flexibility, consequently it encourages changes and new concepts (Freel, 2000).

Following Cohen and Levinthal (1989), R&D investment generates, on one hand, innovations, and on the other hand, learning capacity because it promotes exploiting knowledge from the environment. Therefore, these
authors argue that businesses invest in R&D in order to obtain innovations (in product or in process), and also in order to amplify their abilities. Thus, it is no wonder that R&D investment was the second most interesting factor in order to manage innovation.

3.5 Factor 3: Assistants

The third factor included variables linked with technicians and assistants: the number of them in the businesses and their wages. It explained around 6,624 of data variability and R&D and it was linked with previous factor and R&D investment. Factor 3 is entitled like “Assistants” because it is composed of people supporting R&D activity and they help to researchers dedicated to R&D in order to improve innovation in businesses. Bobillo et al. (2006: p. 869) confirm R&D highlight in innovative activity explaining that “the R&D factor encourages innovation capable of generating a competitive dynamic, which can generate higher growth and productivity”.

3.6 Factor 4: Different patents

Factor 4 is composed of patents different from the traditional: i.e. the United States Patent and Trademark Office (USPTO), the European Patent Office (EPO) and the Patent Cooperation Treaty (PCT), and it represented around 6,653 per cent of the variance. This factor is related to international business and cooperation between businesses. Following Feng (2010: p. 235) “the patent is a knowledge-product” and they are linked with power and profits (Bessen, 2008). Countries use patents in order to protect their innovations and there is a positive relationship between patents and innovation investment (Allred and Park, 2007).

Table 4: Total variance explained

<table>
<thead>
<tr>
<th>Component</th>
<th>Rotation sums of squared loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>13,566</td>
</tr>
<tr>
<td>2</td>
<td>2,886</td>
</tr>
<tr>
<td>3</td>
<td>2,252</td>
</tr>
<tr>
<td>4</td>
<td>2,228</td>
</tr>
<tr>
<td>5</td>
<td>1,580</td>
</tr>
<tr>
<td>6</td>
<td>1,473</td>
</tr>
<tr>
<td>7</td>
<td>1,226</td>
</tr>
</tbody>
</table>

From this information, the Spanish chemical industry manages patents in different ways with some businesses using this special patents linked with international character and cooperation between businesses, while others basically using the Spanish office. Thus, this point speaks much about businesses.

3.7 Factor 5: Innovation investment

Factor 5 represented about 4,646 per cent of the variance and it is consisted of design investment, training investment and introducing innovations investment. Therefore, this factor is referred in general by innovation investment. Innovative activity influences in competitiveness of businesses (Storey, 2000; Galia and Legros, 2004) and it is also of interest in order to achieve growth in countries (Schumpeter, 1934). In this scenario, innovation investment is an essential tool for organizations.

3.8 Factor 6: Intangible elements

Factor 6 represented around 4,332 per cent of data variability and it was composed of software investment and Spanish Patent Office (OEPM) patents. Intangible elements such as knowledge are a growing emphasis in modern economies, thus intangibles are at the present time an essential tool (Iñiguez-Sanchez and Lopez-Espinosa, 2005). Following authors like Carmeli and Tishler (2004), the value of intangible elements in organizations improves interactions and performance. However, this value is not very highly considered by managers in the Spanish chemical industry, having ranked only as the sixth factor in the hierarchy.
3.9 Factor 7: External consultants

Factor 7 was composed of only one variable, external consultants, and it represented around 3,606 per cent of data variability. R&D external collaboration has been identified as an interesting factor (Un et al., 2010), however in this case it is not considered important by managers. External consultants are not an explanatory factor in the Spanish chemical industry.

4. Discussion

The most interesting factor in order to differentiate businesses was the aim of innovation, that is to say, management’s decisions regarding how to represent the aim of the strategy. The second factor was R&D investment, representing R&D interest and was also interesting as a means of distinguishing organizational behaviours. Following the businesses’ aims and R&D investment, personnel dedicated to support R&D activities were also important. Therefore, the international character of businesses is interesting. The less interesting factors were linked with general investment, intangible elements in general and external support to R&D.

In this way managers have an essential role, because they are responsible for planning. In the planning they should include the main objectives in general and also those associated with innovation activity. In addition they should choose the employees that will dedicate their efforts to this process. As consequently, managers sensitized with innovation have a positive influence in this process and results because they establish the aims and invest both in innovative people, R&D and, in general, in innovative activities.

Employees are important, but not external people (factor 7). Regarding this, external consultants represent the last factor, thus for organizations is better invest in employees dedicated to innovative activity internal.

Finally a curious fact is related to the results (factor 4), because they are less influential than other factors like for example the innovation planning in order to differentiate between enterprises.

5. Conclusion

We present an original study about how the chemical industry in Spain manages its innovative activity. In it, we identified seven critical factors linked with this topic: (1) Aims of innovation, (2) R&D Investment, (3) Technicians and assistants, (4) Different patents, (5) Innovation investment, (6) Intangible elements and (7) External consultants. People and their aims are the most highlighted resource in innovation management, linked with first factor and the businesses’ strategy.

In this way, managers interested in improve organization performance using innovative activities should focus their efforts in the planning and employees. That is to say, the composition of team works is determinant in order to promote innovative activity, thus people with skills and education are linked to organizations where innovation is the key.

This study has some practical implications. On one hand, it is very interesting for the chemical industry in Spain, because we have analysis about it. In this analysis, we identify the critical factors in the innovation process specifying the most interesting variables so that businesses may recognize where to focus their efforts. In addition the study is useful to Spanish Government because it could be a guide for improve the performance in this sector. And finally this preliminary study is interesting for academics focusing their research on knowledge creation and innovation, because it represents a representative case in one of the European Union countries.

Finally, the research also contributes to business scholarship. These results could be used in other studies in order to compare situations between industries or countries, and they could even help to build a model. In future research, we would like to realize such studies.

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References


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Innovations and Entrepreneurship at a Time of Financial Crisis in Czech and Austrian Construction Industries

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Abstract: This article describes the approach of construction companies in the border areas of the Czech Republic and Austria to innovation activities during the recent financial crisis. Within the project Development of Small and Middle-Sized Businesses in Border Areas, research into the cross-border cooperation of small and middle-sized construction companies was carried out in 2013, involving businesses active in the regions of South Moravia, Lower Austria and the city of Vienna. The research comprises 279 respondents, of which 176 were from the Czech Republic and 103 from Lower Austria and Vienna. Among other items, questioning was focused on innovation potential in the development of new products and services. The research was a follow-up event to the M00200 Cross-Border Cooperation project. Among other findings, the research shows different approaches taken by Czech and Austrian entrepreneurs to innovation activities. The research was focused in particular on the relation between the receipts from innovated products and/or services and the size of the enterprise as well as on the impact of collaboration in innovations, research and development. All the factors were studied as a continuation of theoretical support and search for secondary sources in the construction industry in both countries. An interesting result is the fact that the innovation potential tends to be carried by small companies. This fact contradicts the results of statistical analyses highlighting large enterprises as carriers of the innovation potential. Another finding is that the cooperation of enterprises in product and innovation development does not affect the turnover or the receipts from innovated products. The theoretical assumption that business cooperation would affect turnover and receipts from innovated products was not confirmed. These facts are probably linked to external factors, given by the unfavourable situation of the financial crisis, which is reflected in the construction industry in particular as well as in political and legislative interventions in both countries.

Keywords: Innovation, financial crisis, business cooperation, construction industry, small and middle-sized businesses

1. Introduction

Innovations constitute an integral part of successful operation of businesses in the market. This assumption has been verified for all branches of national economies including the construction industry. According to the OECD (1996) knowledge and innovation activities in production and distribution can be considered a basic pillar of business competitiveness. Innovations are now studied intensively at international level (see the European Union’s Framework Programme for Competitiveness and Innovation).

In regard to the role innovations play in promoting the success and development of businesses we may suppose that they also have a positive impact on businesses in times of economies in decline and crises. Research focusing on the cross-border cooperation of small and middle-sized businesses in civil engineering was carried out in the regions of South Moravia, Lower Austria and the city of Vienna in 2013 within a project named Development of Small and Middle-Sized Businesses in Border Areas. The reason for the focus on the construction industry was the current recession in this field, as shown by Diagrams 1 and 2. The fact that the economic crisis is still noticeable in this field, unlike in the manufacturing industries, continues to have an impact on the competitiveness of construction businesses. Many studies show that the predictions of the end of the crisis made in 2012 have not come true (Kislingerová, 2013). This is documented by some analytic data illustrating the problems of enterprises involved in the construction industry in the Czech Republic and Austria. In this context the questionnaire survey focused on the innovation potential of businesses and a possible collaboration of Czech and Austrian construction companies in the development of new products and services.

The subject of this study is the position of Czech and Austrian construction businesses in relation to selected innovation activities as measured by turnover in the period of crisis and deep recession in building production from 2008 to 2012.
2. Theoretical background and the formulating of hypotheses

It is not easy to give a general description of innovations in the Czech construction industry because of the inaccessibility of relevant sources. Central statistics provided by the Czech Statistical Office refers to the years 2006 to 2008 only. In the following period the construction industry was removed from statistical research. Nevertheless, for 2006–2008 the following characteristics were identified (TI2008: Statistical research into innovations, 2012): of businesses active in the construction industry, 21.1% participated in innovation cooperation; the regional market was identified as the most important for innovations in the construction industry, with 78.2% of innovations implemented, followed by the national market, with 54.6%. For the EU, only 15.3% of innovations were implemented. Also as general trends in 2006 to 2008, innovations in the construction industry were focused mainly on services (60.9%), although only 20.9% of construction companies implemented them. As for the limiting factors of innovations, lack of finance was mentioned most often (20.8% of construction companies). Surprisingly, as many as 18.2% of companies stated that innovations had not been required. For cooperation in innovations, Czech construction companies preferred cooperation with Czech counterparts. For the South Moravia Region, which is the subject of the research, a high level of entities involved in innovation activities is typical. In 2012 an invitation was made for cooperation with scientists in Brno, the Region’s capital, in the form of ‘innovation vouchers’. The highest number of applications for involvement in the transfer of technologies in the form of innovation vouchers came from construction and engineering businesses (Žára, 2012).

A closer look at the countries compared and the businesses involved shows us that most of the innovation potential in the Czech Republic is carried by big enterprises, i.e. of more than 250 employees. Research shows that innovations were carried out in 78.6% of big enterprises (more than 250 employees), 64% of middle-sized enterprises (51 to 249 employees) and 46.7% of small enterprises (under 50 employees) in the Czech Republic between 2006 and 2010 (Eurostat, 2013c). The situation in Austria is similar, with big enterprises carrying most of the innovation potential (77.1%), followed by middle-sized (59.1%) and small (44.7%) businesses (Eurostat, 2013c).
The research was based on the concept of competition advantage as featured in Porter’s approach (Kotler, 1997). As such, higher competitiveness is achieved by low costs or increased individual value the product brings to the customer.

In the context of this notion, one summarizing factor can be identified as the source of competitive advantage: innovations. Similar links between innovations and competitive advantage are mentioned by various authors (e.g. Drucker, 1985, Tirole, 2000). Other authors studying innovations and their impact say that competitiveness in the European Union is defined at the level of regions by means of productivity and the employment rate. Then the growth of productivity is influenced by innovations in the whole process of production (Ják, 2005). An important tool of the innovation process and entrepreneurship is the transfer of technologies (Švejda, 2002). In relation to the concept of Porter’s model as extended by the “sixth force”, cooperation was identified as another factor largely contributing to the development of the innovation-based competitive advantage (Brandenburger & Nalebuff, 1996). This information leads to the formulation of Hypothesis One (H1): Businesses collaborating in research and development have a bigger share of the receipts from innovated products.

As Eurostat data suggest, the main carriers of innovation potential are big companies of more than 250 employees. According to research conducted in 2006-2010 among business entities in the Czech Republic, 78.6% of such companies were innovating in that period. The rate for middle-sized businesses was 64%, while for small businesses of less than 50 employees it was 46.7%.5 The situation in Austria is similar. Eurostat states that innovation potential is also carried by big enterprises employing over 250 people, with 77.1% of them involved, while for middle-sized businesses the rate is 59.1%, and for small, 44.7%. Apart from the number of employees, CzechInvest’s methodology offers other criteria to define the size of businesses, namely their turnover and assets. As the information obtained from Austrian partners contained numbers of employees and turnover only, division by assets was excluded from the research. The above findings lead to Hypothesis Two (H2): Businesses with a higher share of the receipts from innovations achieve a higher turnover, where the share in receipts from innovations is the measure of how much they innovate while turnover is the measure of their size.

Based on the previous hypotheses we may suppose more collaboration among businesses with higher levels of activity in research and development and those achieving higher turnovers. Arising from this, Hypothesis Three (H3) was worded as follows: Businesses collaborating in research and development achieve higher turnovers.

3. Methodology

Data were collected in 2012 and 2013 within the survey Cross-Border Cooperation of Civil Engineering Businesses in the Regions of South Moravia, Lower Austria and the City of Vienna, carried out within the European project Development of Small and Middle-Sized Businesses in Border Areas. The aim of the research was the identification of competitive advantages emerging from applied strategies, focusing on cross-border cooperation of small and middle-sized businesses in the construction industry in the above-mentioned regions. A total of 3,000 entities were addressed, all of them classified in Section F, Construction (specifically, units 41 construction of buildings, 42 civil engineering, and 43 specialized construction), in accordance with the CZ-NACE classification.

The return rate for Czech respondents was 13.5%, corresponding to 177 questionnaires returned. The same number of questionnaires (177) was returned by Austrian respondents. One Czech questionnaire and 74 Austrian questionnaires had to be eliminated during the check and data cleaning because most of the questions had not been answered. So the total number of questionnaires as subjects of further analysis was 279, of which 103 were from Austrian and 176 were from Czech respondents.

Methods of mathematical statistics, especially detection of associations between variables, were used to verify the hypotheses. The response matrices as well as the results of specific analyses were processed by SPSS software. Association among factors of cooperation as related to higher innovation potential and the size of businesses (measured by turnover) was observed by means of the Kendall tau coefficient at a 5% level of significance. This coefficient was used because of the ordinal character of the variable expressing the rate of

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5 Source: Eurostat (2008), Proportion of product and or process innovative enterprises engaged in any type of cooperation by size class
cooperation among businesses. Association between the innovation activity, as measured by receipts from innovated products, and the size of the business, as measured by turnover, were observed by means of the Pearson correlation coefficient, also at a 5% level of significance, due to the interval character of both variables under observation.

4. Results

The results indicate some relations among the variables, but no significant relation was detected for any variable. Some importance was found in the composition of data obtained in all regions. For this reason, the results are interpreted both for the whole set of businesses and for individual countries/regions.

**H1: Businesses collaborating in research and development have a bigger share of the receipts from innovated products.**

<table>
<thead>
<tr>
<th></th>
<th>Number of enterprises</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (CZ and AT)</td>
<td>251</td>
<td>0,096</td>
<td>0,086</td>
</tr>
<tr>
<td>CZ</td>
<td>152</td>
<td>0,107</td>
<td>0,129</td>
</tr>
<tr>
<td>AT</td>
<td>99</td>
<td>-0,099</td>
<td>0,289</td>
</tr>
</tbody>
</table>

This hypothesis, assuming that businesses which collaborate with other businesses in research and development achieve a higher share of receipts from innovated products, was not confirmed. For both Czech and Austrian participants, connection between collaboration and the receipts from innovations implemented was not detected at the level of significance applied in the statistical analysis of the variables. The assumption based on Porter’s extended model of six forces (Brandenburger & Nalebuff, 1996), stating that collaboration among businesses leads to competitive advantage in the form of higher receipts, was not confirmed.

**H2: Businesses with a higher share of the receipts from innovations achieve a higher turnover.**

<table>
<thead>
<tr>
<th></th>
<th>Number of enterprises</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (CZ and AT)</td>
<td>241</td>
<td>-0,219</td>
<td>0,001</td>
</tr>
<tr>
<td>CZ</td>
<td>149</td>
<td>-0,215</td>
<td>0,009</td>
</tr>
<tr>
<td>AT</td>
<td>92</td>
<td>0,02</td>
<td>0,851</td>
</tr>
</tbody>
</table>

Hypothesis Two, relying on secondary statistical research into construction companies, showed a certain relation among the variables, but of inverse character. Therefore the hypothesis was not confirmed. The correlation coefficient for Czech constructors shows that innovation activities tend to be implemented by businesses with lower turnovers. For Austrian construction enterprises the rate of association was not sufficiently significant. Thus the total result for the correlation in the set of both countries’ businesses is influenced mainly by that of the Czech Republic.

**H3: Businesses collaborating in research and development achieve higher turnovers.**

<table>
<thead>
<tr>
<th></th>
<th>Number of enterprises</th>
<th>Correlation</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (CZ and AT)</td>
<td>262</td>
<td>0,06</td>
<td>0,261</td>
</tr>
<tr>
<td>CZ</td>
<td>166</td>
<td>0,168</td>
<td>0,013</td>
</tr>
<tr>
<td>AT</td>
<td>96</td>
<td>-0,076</td>
<td>0,407</td>
</tr>
</tbody>
</table>

The last of the hypotheses was confirmed partially, namely for Czech construction businesses. A low rate of association between the turnover and the intensity of collaboration was detected. For Austrian constructors this relation was not confirmed due to the low level of significance. When data for both countries were evaluated, the impact of collaboration in research and development on turnover was not confirmed.

5. Conclusion

The relation assumed between the variables, describing the cooperation of businesses in innovations and the effect of this on production in the construction industry, was not confirmed. From our internal point of view, and based on the interviews conducted, the reason for this may either be an insufficiently effective approach to innovation activities or unsuitable forms of cooperation among businesses. In the external perspective, the reason for this situation may be found in clients’ distrust of innovated products. The low interest in innovated
products may also be caused by higher prices as compared to traditional production. The unwillingness of clients to buy more expensive products at a time of crisis, results therefore in a decrease of receipts from innovated products.

Surprising findings were made with the verification of Hypothesis Two, which was another analysis of a relation of variables. Secondary studies had suggested that innovation potential in the construction industry was carried by enterprises generating higher turnovers, but our results are in contradiction of this. For Czech constructors in particular, higher receipts from implemented innovation activities can be found in enterprises with lower turnovers. This finding contradicts previous studies and the results of the Statistical Office, though it corresponds to the theoretical thesis (Jáč et al, 2005) that innovation potential tends to be carried by small and middle-sized companies. Based on this finding we can state that big construction companies (in terms of turnover) invest lower amounts of money in innovations due to the financial crisis and potential threats to their liquidity. On the contrary, small and middle-sized companies are forced by the higher pressure of competition and the negotiating strength of clients in an era of crisis to innovate more or less continuously. A prompt reaction to change and flexibility in meeting clients’ demands, relying on innovation activities, appears to be a source of competitive advantage for them, generating additional effect.

Following on from the previous hypotheses, the last relation of variables observed was the impact of collaboration on turnover. In general terms, turnover has no particular impact on the extent of collaboration in research and development. Nevertheless, a certain correlation in the variables was detected for Czech construction companies. The result can be explained by the fact that not only the form, but intensity and intensity of collaboration affect the turnover, but some other, still unknown variables may have an impact too.

To sum up, we are fully aware of the limits of this research, consisting mainly in the low number of Austrian respondents. A relatively high number of responses had to be eliminated because of insufficient answers. Another limitation was the record-keeping of financial indicators in the participating countries, although the research was adapted to differences in monetary and legislative settings. Also, there was some discrepancy in the time the questionnaire survey was applied (2012-2013) and the origin of the economic indicators (2012). Nevertheless, in the context of the interpretation of results, no essential shifts in the financial parameters of the research sample were detected. In conclusion, the results of the research show the rather different approaches of Czech and Austrian construction entrepreneurs to innovation activities during the crisis. Unlike with Czech construction companies, no particular relation was found among the items observed in Austria. These results prepare the way for a study focused on the identification of exogenous reasons in the factors under observation, such as the low level of cooperation in innovation activities.

References


Can Social Outsourcing Enhance the Development Strategy of Social Enterprises?

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Abstract: Nowadays social enterprises have been increasingly seen as a substitute for the state in those fields of national economies where its role is diminishing. In this context the emergence of such phenomenon as social outsourcing, which implies the transfer of certain business processes from the central and local authorities to social enterprises, becomes a critically important tool designed to enhance the ability of these entities to deliver public services. This process can be viewed as double-sided as it means both the legalization of transfer of social functions to the private sector and the provision of aid and experience of the public services to social enterprises. It is assumed that this transfer is realized due to the comparative advantages of social enterprises which seem to operate more efficiently than those in public sector, as they have a unique ability to combine business principles with those employed in charities and NGOs. Indeed that is not the case as evidenced by the numerous examples presented in the paper. For instance, in the UK most enterprises that deliver social services operate in private sector, which is a matter of trouble as they seek to profit-making which is a point confronted with their main mission – to reinvest their income to further social projects. Moreover, the share of such entities in the private sector in some European countries was increased for the recent decade. According to the recent data, of the homes in England registered with Ofsted in September 2011, 76% were in the private or voluntary sector. The most prominent inequalities arise when analyzing the situation with children's care services. Profit-making and cost-cutting in children's services are exacerbating regional inequalities as the firms who provide children's residential care do so where it is cheapest for them, so children are placed away from their home boroughs where property prices are lowest, and they become more vulnerable to abuse. Nevertheless the very practice of social outsourcing has been spreading steadily for the recent years and has become a sort of strategy for social enterprises in their striving to survive and strengthen their sustainability. The main task of the paper is to find out, whether such strategy can facilitate the innovation process of social enterprises.

Keywords: social enterprise, innovation, social outsourcing, development strategy

1. Introduction

Social entrepreneurship has become an increasingly popular subject nowadays, not only because of its extraordinary nature, but also because of the growing trend towards decreasing governmental expenditures in economies of most leading countries, in particular, those of the public sector. At the same time the demand for those services is increasing. In this context such a phenomenon as social outsourcing, which implies transferring some public services to the entities of the private sector and those of the third sector, presents to be inevitable and timely. Though, the practice formed in this area nowadays can’t be named effective in terms of increasing the social value of the services being outsourced in such a way to the companies operating in the private sector. So this practice needs to be analyzed thoroughly to derive the main drawbacks that prevent this field from developing successfully in favour of local communities it was designed for.

Indeed, social enterprises are not able to compete on equal terms with large corporations dominating the landscape of public services, as they are not so competitive as those in their striving to be awarded with the contracts. In fact, the tendering process, which is the main vehicle for social outsourcing, is arranged in such a way as it favours only large providers of public services, consisting usually of giant companies seeking to maximize their profits. Though, one shouldn’t neglect the fact that the public services have a very specific nature which means that they are not designed to maximize any profit, but to increase the social value of the services they deliver. In such a case, the attempt to derive profits from them as much as possible by businesses seem to be a sacrilege. Such approach has lots of knock-on and long-term effects, which can damage the industry it is used for, and some examples of such treatment will be outlined below. Besides, often the facts of extremely huge amounts of management fees emerge suggesting that this field becomes criminalized to a high extent. So, for instance, the CEO of A4E Emma Harrison paid herself £8.6 million, in a year when results were poor, and fewer than 4 in every 100 unemployed people seen by the firm managed to secure jobs for longer than 13 weeks (Guru-Murthy, 2012). Usually social enterprises become squeezed out of the market because they have no enough capital reserves, so they can’t afford to bid, and in most cases work as sub-contractors for the large companies, which become awarded with the contracts for running public services. Several social
Ruslan Pavlov

enterprises try to unite in consortia to increase their chances to be awarded with contracts, but in most cases they fail, because competing with large firms under such conditions presents to be a very complicated task to cope with.

The present paper is devoted to finding the ways which can be used to enhance the chances of social enterprises to participate successfully in such tendering processes. In order to perform this task, the state of public services and social enterprises under the current environment of social outsourcing in the UK will be analyzed.

2. Methodology

As social outsourcing is considered as a new system of managing the area of public services, the case study approach to explore this new phenomenon is used in the paper. To illustrate the suggestions being made, an analysis of different cases evidencing the prior results of realizing the strategy of social outsourcing in Great Britain is provided. It is followed by the quantitative analysis of empirical data resulted from the author’s polling of several scholars engaged in studying the problems of social entrepreneurship. Based on the suggestions made in such a way, I conclude by answering the question posed in the title of the paper.

3. Some examples of profit-seeking behaviour of commissioners from the private sector

The practice of social entrepreneurship as it exists can be named rampageous, because it provides almost unrestricted scope for the private sector to win larger shares of the market without any protecting regulations for social enterprises which seem to be the minorities in this market. So, under such conditions the large companies entering the market are likely to imply their own philosophy of profit-maximizing behaviour to their management strategy of the entities they take over in such a way. In the long run, this may result in total destruction of the public services sector, if no changes in the legal environment are made. That is the challenge which successive governments implementing the strategy of social outsourcing should address.

Consider, for instance, the children’s care services. Making profit and decreasing expenditures in these services enhance regional differences, as firms which deliver social care to children, do it when it’s the cheapest way for them – the children are moved from their native places of residence to the districts where the housing stock prices are the lowest (Williams, 2012: 13). That influences much the social and family relationship of the children being transferred, thus isolating them and making them vulnerable to abuses. The most exemplifying case in this context is that of one girl which was at the centre of the Rochdale abuse. She was moved from Essex and placed in a one-to-one home, where she was the only resident. If that sounds like a foster placement, there’s one crucial difference – she never woke up with the same staff member in the home who had been there when she went to sleep. It was not unusual for members of staff to be charged with her care who had never met her. It’s a template you might devise for a wild animal (Williams, 2012: 32). Also one of the awful consequences of such a treatment was connected with the sexual exploitation of the children being moved as a result of advantageous property deals. Ofsted figures published in May 2012 revealed that children’s homes in England – caring for 4,840 children, including 1,800 girls – had reported 631 suspected cases of young residents being sold for sex in the past five years (Norfolk, 2012). Such cases happened, in particular, in Rochdale, and were reported many times in mass media, so one can’t doubt if that is true.

As for adult social care, another problem arises – namely, the minimization of the staff wages, which reflects mainly in the fact that staff are often paid not by the hour, but by the minute, they are not paid traveling time to get from one appointment to the next. The total sum of the payable hours spent in a day amounted to about 4 hours on average, but some of the employees managed to overcome such bottleneck by decreasing the amount of 60-minute appointments and increasing 15 and 30-minute appointments, and so 2009-10 saw an increase in 15 and 30-minute appointments, and a decrease in 60-minute appointments, ramping up the amount of every hour that workers spend in unpaid transit (Low Pay Commission, 2012). Nevertheless, the wage was very low. According to one anonymous worker, it was 14 pence per minute, and if the traveling was 45 minutes, the worker could earn £3.50 per one visit and £4 per the next and then 45 minutes of nothing (Williams, 2012: 37). So, if he works 4 hours a day, he would get £33.60. That is 4.5-fold less than the income earned by a London cab driver per day. Besides, new commissioners of the public services brought down sick leave, which was previously running at 23 days per person, per year. The terms and conditions for long-term and/ or serious illness remained the same, but an end-of-year bonus for zero days off – combined with higher morale – brought that down to 0.7 days pp/pa (Williams, 2012: 57). All these facts suggest that this sector is
also a matter of cruel exploitation by the commissioners, as compared with the terms offered by social enterprises. For instance, Sandwell Community Caring Trust, which is a social enterprise operating in public sector, uses the model of operating managers, which means that being placed in equal conditions, Sandwell’s workers can’t exploit each other so that it might abuse his (or her) rights. As Emma Boswell says, “I wouldn’t expect Lisa to do anything more than I would do. That’s where you gain your respect, because if your staff can see that you would do it, they know that it works both ways” (Williams, 2012: 38). It should be taken into account when considering the competitive advantages of social enterprises in this respect.

The problems connected with prisons, which were also outsourced to the private sector, have also arisen for the recent times. The profit-maximizing policy, which is applied here too, leads to impoverishing of both – the employees and the criminals. The turnover of the staff is rather high and the levels of training are very low which results in a shortage of overall ‘jailcraft’. The private sector runs 12 prisons in the UK, accommodating 13% of the nation’s prisoners, and the pay here is lower than in the public sector – 40% lower on average (Prison Reform Trust, 2005). The very procedure of tendering implies commissioning of public services at the lowest price. So, it results in extremely low cost per prisoner which was shown by HMP Oakwood, a new prison opened by G4S in April 2012. The contractor was asked to tender at a radically reduced cost per prison, per year, and come back with £16,000, when the prison is run at capacity (Williams, 2012: 41). Normally, prisoners in this category would cost £28-30,000 per annum. Only some of that can be achieved through scale – not many savings can even be found from wages, so the prisoners also become concerned with such policy. According to an anonymous prisoner who arrived in May, and has written about the establishment for the prison newspaper Inside Time: in October 2012, all 809 prisoners were without ‘kit’, which is basically prison-speak for underwear; prisoners are expected to buy their own bedding, but it has to be from a specific supplier, at high prices; their families are not allowed to send or bring sheets in. So, the business which runs the prison helps its colleagues from the private sector to increase profits at the expense of prisoners. Besides, though the prison was designated as a working prison, contracts with external companies who might provide work have not been set up. Only some manual work for recycling companies was available for 50% of the prisoners with a salary from £7 to £9 a week (Anonymous prisoner, 2012).

All the examples aforementioned suggest that nowadays the expansion of the public services sector undertaken by large companies threatens this sector to be damaged and to lead to a real social catastrophe, if no counteraction is undertaken by the central and local authorities.

4. How does social outsourcing for the work programme take place?

Taking into account the increasing trend towards the growth of unemployment rate in the UK, the Work Programme was initiated recently and was devised to involve the private sector companies, social enterprises and charities into the process of providing new jobs for the long-term unemployed The Programme implies a selection of the most appropriate candidates among these through the tendering process. But the Work Programme bidding process was organized in such a way as only powerful corporations could afford to bid. Social enterprises could enjoy only the position of sub-contractors, as otherwise they could fail in realizing the items of the Programme because of their unstable financial state. So, the large firms became the prime-contractors which employ social enterprises and re-outsource them the functions they are expected to perform better. While in the Programme’s previous incarnation, charities and social enterprises were likely to be primes and have the direct relationship with Government, now most have been relegated to sub-contractor status, and most of the primes are large shareholder-profit distributing companies (Williams, 2012: 35). So the typical scheme of the relationship between these companies and social enterprises and charities can be represented as follows (see Figure 1)

The large contractors on the Work Programme – the primes – often enlist the services of charities and social enterprises, but the deal favours the main contractor. By June 2012, 97 charity providers had dropped out of the delivery of the Work Programme, unable to make it work (Boffey, 2012). The future of this sector is blighted by a contractual structure in which the lion’s share of the business goes to very large private providers, on the basis that they have the capital to take risk. The first thing often subcontracted is that risk: in simple terms, the ‘hard-to-reach’ cases, the riskiest proportion in many areas (probation, skills and learning, addiction, unemployment) are parcellled out to the third sector, who have a track record in solving more knotty social problems. But the terms for these organizations have usually proved impossible to meet. They lacked the financial support, as the amount they got under the Programme’ conditions wasn’t sufficient. So,
they had to subsidize their work from their own capital reserves, but this wasn’t sufficient either. This result was that some charities had to pull out of the Work Programme altogether, being unable to continue subsidizing it, or unable to justify spending their reserves in that way. This holds even for charities like St. Mungo’s, which have quite healthy balance sheets. Besides, the subs experienced a lack of referrals from primes. According to NCVO report, the number of referrals was lower than expected. Over a third of subs – and these are named organizations on the original bid’s supply chain – had no referrals at all: 15% had between one and ten; 40% had 50 or more, and even this top group claimed that it had expected greater numbers (Winyard, 2012). Seven out of 10 charities have said they may have to pull out of the scheme because they couldn’t make it work financially – half expect to fail within six months, the other quarter before the end of the contract. There’s significant evidence of primes not paying subs on time (Williams, 2012: 50), thereby impoverishing them.

![Diagram](image_url)

**Figure 1:** Typical scheme of social outsourcing for the work programme

All these examples also suggest the idea of developing a new paradigm in this field – namely, creating the National System of Social Outsourcing, which means forming institutions that ensure a wider representation of social enterprises in this system and protection of these rights like a protection of minority shareholders in large companies.

5. **How can we change the social outsourcing system to make it work in favour of social enterprises?**

One of the most important problems preventing the adequate assessment of the real quality of services, which the primes or their subs are expected to provide, is the lack of transparency in this market. In this sense it is asymmetric, and so in the process of tender when comparing two bidders offering low prices on their services, it’s very hard to justify on their quality and predict, whether they would perform effectively further and what would be the position of subs if they were implied. Thus, one of the most urgent tasks when creating the National System of Social Outsourcing is to form the mechanisms of ensuring transparency to decrease transaction cost and provide the appropriate quality of services.

If we use the Work Programme in terms of measuring the position of social enterprises, we’ll see that it is unenviable. First, the Programme which is designed to solve problems connected with transfer of public functions of employing the long-term unemployed people by means of outsourcing is based on the system of payment by results, which was disadvantageous for social enterprises. Second, bidders in most cases were asked to offer a discount on the existing price of the Programme; again, this biased the process in favour of companies who could offer huge discounts, on the basis that it would be worth it to get them into the market, even if they couldn’t, in the short-term, make a profit. That also restricts the abilities of social enterprises to attract additional capital which presents to be not a redundant thing for them, allowing for their miserable state. So the chance to become a monopolist in this market for a large corporation was predetermined by the gap in the legislation of the UK. Such cases must be prevented by the regulations of anti-monopoly agencies and fixed in the nation-wide acts passed by the government. The legislation must be enlarged to apply the regulations designed for the private sector markets to the public services markets so that such discounts would be prohibited.
The trend of decreasing governmental expenditures presents to be irreversible, so it would be naive to expect the central and local authorities to subsidize social enterprises in their striving to fulfill the terms of their contracts. In this context using an alternative scheme of financing, which implies such participation of business and social enterprises that could be mutually beneficial for them at the stage prior to the latter entering the market of outsourced services. A conceptual model of such interaction is depicted in Figure 2.

**Figure 2:** A conceptual model of interaction between private sector companies and social enterprises

For the recent decades the market of financial tools for social entrepreneurship has been growing steadily. Two most prominent institutions, which could be viewed as complimentary subsystems, has evolved at this market – social stock market and microfinance institutions. As evidenced by the statistical data, since 2004 the investment into the microfinance sector has been increasing significantly (see Figure 3). The most essential contributions to this process were made by such microfinance vehicles as Deurtche Bank, Triodos and BlueOrchard Finance. Triodos is well known as one of the first social enterprises to issue shares, thereby contributing to the formation of social stock exchange in the United Kingdom. On the other hand, an interaction between social stock market and microfinance organizations, which is reflected in attracting private capital by the microfinance organizations also takes place. This trend is especially distinguishable in Latin America, where the ability of some of the leading microfinance institutions in the region to sell bonds successfully on their local capital markets is leading the way to the ever-increasing availability of private capital funding. As Marulando and Otero (2005) suggest, ‘with such funding, microfinance in the region will see the elimination of what in past years was the key constraint to the growth of the industry, that of access to sufficient capital’. Also we see a larger presence of private investors in Latin America microfinance, particularly, investors from the United States and Europe with an interest in a social return that is as strong as their interest in a financial return. The experiences of the first investment funds in Latin America and the Caribbean – most particularly that of ProFund Internacional – demonstrate the very important role of investment in the growth of microfinance in the region.

**Figure 3:** Growth of microfinance investment vehicles (MIV) in the world

Source: Rozas et al. (2012)
### Table 1: Annual growth rates of MIV portfolios (%)

<table>
<thead>
<tr>
<th>Regions</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latin America &amp; Caribbean</td>
<td>42</td>
<td>41</td>
<td>35</td>
<td>37</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>32</td>
<td>38</td>
<td>43</td>
<td>35</td>
<td>37</td>
<td>34</td>
</tr>
<tr>
<td>East Asia &amp; Pacific</td>
<td>1</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>South Asia</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: Rozas et al. (2012)

As a matter of fact, the main problem is how to attract business to participate in the process of supporting social enterprises by means of mechanisms of social stock exchange and microfinance institutions (MFIs), and the idea of creating such investment funds, which proved their efficiency in Latin America, as was shown, presents to be worthwhile. From this point of view, it would be a successful way to stimulate them to acquire shares of social enterprises, quoted at the social stock exchange which is forming now in some European countries, as well as in the United States by granting them a remission of taxation on the dividends which result from buying these shares, as well as from capital gains, which they would get when selling these shares at the secondary market, if the prices raise. As for attracting business to participate in supporting MFIs, a system of endowment which is widespread as a supplementary source for several universities, should be implemented. Though, when applying to the MFIs it should be used so that a certain part of the funds invested could be used by businesses to derive their further income, while the rest, which could amount to 50%, would be kept frozen and so would be treated as an asset-locked part. At the same time a certain part of the income being derived in such a way must be streamed in favour of MFIs, which are the main beneficiaries of such system.

6. Can social outsourcing improve the development strategy of social enterprises and what should be done in the public sector policy?

In this section the results of the polling carried out by means of the facilities, provided by the website “http://www.surveymonkey.com”, are presented. The respondents of the polling were the scholars from different countries that were engaged in studying the problems of social entrepreneurship. The questions which were asked are as those as presented in Table 2. The majority of respondents answered the main question, posed in the title of the paper, positively. So, it induces us to think that social outsourcing is not such a negative phenomenon as it seemed to be at a glance. Allowing for the facts of excessive fees taken by the top-management of public services enterprises, the next question was designed to specify the share of profit which seems to be reasonable to pay for managers of those enterprises. As it can be seen, most people tend to choose 10% as the most preferable option. And if we compare the answers to the first and the second questions, we'll see, that the majority of people that agree that this strategy is an improving one for social enterprises, tend to choose this share of profit. The majority of answers to the third question can be divided into two parts. The first is connected with developing a special inducive environment for social enterprises and the second one is related to the development of the abilities of social enterprises to survive under the stringent conditions of competition in this field.

<table>
<thead>
<tr>
<th>Number of respondent</th>
<th>Do you think social outsourcing can improve the development strategy of social enterprises?</th>
<th>What share of profit do you consider to be reasonable to pay for managers of public service enterprises?</th>
<th>What should be done in the public sector policy to support social enterprises in their striving to be awarded with the contracts of social outsourcing?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>5%</td>
<td>Some arrangements to achieve more transparency among large companies should be done.</td>
</tr>
<tr>
<td>Number of respondent</td>
<td>Do you think social outsourcing can improve the development strategy of social enterprises?</td>
<td>What share of profit do you consider to be reasonable to pay for managers of public service enterprises?</td>
<td>What should be done in the public sector policy to support social enterprises in their striving to be awarded with the contracts of social outsourcing?</td>
</tr>
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<td>----------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>10%</td>
<td>a) Creating a climate of openness and accountability with the public sector administrators but also political personnel; b) Create an atmosphere of trust that social enterprises can provide the same or even better level of service; c) Supporting social enterprises with their tasks and wherever possible provide appropriate training and guidance.</td>
</tr>
<tr>
<td>3</td>
<td>N/D</td>
<td>5%</td>
<td>Recognition and reputation as persons. Motives of social entrepreneurship are highly personal.</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>10%</td>
<td>Training is critical, both in technical and financial skills. Funding is also important, and this must be achieved through partnership with local banks. Ongoing support is also critical such as procurement of assets etc.</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>10%</td>
<td>Facilities and priorities should be created and implemented/given to public authorities</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>10%</td>
<td>The government should provide more taxation advantages for social enterprises.</td>
</tr>
<tr>
<td>7</td>
<td>Yes</td>
<td>15% or more</td>
<td>Incentives should be provided to support social enterprises. Their role, importance and impact should be recognized in serving the communities.</td>
</tr>
<tr>
<td>8</td>
<td>Yes</td>
<td>10%</td>
<td>One should raise awareness, improve commercial attitudes in social enterprises.</td>
</tr>
<tr>
<td>9</td>
<td>Yes</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>N/D</td>
<td>-</td>
<td>a) Agree what a social enterprise; b) Decide, then, how to protect social enterprises through regulations and support; c) Fund more research to generate evidence.</td>
</tr>
<tr>
<td>11</td>
<td>Yes</td>
<td>15% or more</td>
<td>To provide an inductive environment for effective functioning.</td>
</tr>
</tbody>
</table>

One should emphasize the answer of the ninth respondent. As the need to participate in the process of social outsourcing’ commissioning induce social enterprises to develop their commercial activities, it can serve as a factor encouraging the innovative activity of social enterprises, as the latter is a key factor of commercial
success of all the businesses entering the market. So, social outsourcing can be viewed as a factor encouraging the development of the innovative potential of social enterprises in such way.

7. In conclusion

To sum up our suggestions, we should answer the question stated in the title of the paper. Taking into account the current state of things, the answer should be negative because social enterprises initially are put into unequal conditions with large companies which should compete with them in this market. So, they don’t have any real chances to win this battle and to be awarded with the contracts they are striving to get. Their position as subcontractors is vulnerable, allowing for the decreased amount of referrals they get from their primes. They could work as subcontractors under other terms and conditions which would be more convenient and fair, if certain amendments in the legislation are made. Besides, they could cooperate with these companies in such ways which could be beneficial for both. The paper provides one of the possible ways of such cooperation. Such cycle of financial streams as depicted in the scheme developed here presents to be an innovative solution of the problem we tackled. So it could contribute in some way to forming a strategy of development of social enterprises within unstable environment, and thereby encourage them to develop their innovation scope. Though, taking into account the results of the polling, we should conclude that the answer to the aforementioned question could be positive, as social outsourcing can facilitate the growth of innovation potential of social enterprises, which was underpinned by the statement of the necessity of developing commercial attitudes in social enterprises, that they face in such situation, which, in turn, can cause the need of those enterprises for innovations.

References


The Impact of Inbound and Outbound Open Innovations: Empirical Evidence for SMEs across Europe

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Abstract: The concept of open innovation has reinforced the importance of external knowledge and cooperation in enhancing firms' innovation performance. The literature on open innovation suggests that large firms are more likely to open up the innovation processes than small firms. However, open innovation is equally relevant for SMEs, as a complementary innovation activity to firms' absorptive capacity. This study examines the effect of both inbound and outbound open innovation practices on innovation performance of small and medium-sized enterprises (SMEs) across 28 European countries. Studies focusing on SMEs usually investigate open innovation activities in one or few countries. By investigating open innovation processes in SMEs across Europe, our study is the most comprehensive quantitative analysis of the impacts of various open innovation activities on SME innovation performance. Hypotheses derived from the open innovation literature are empirically tested on a cross-sectional data of 620 SMEs in manufacturing, Information and Communication Technology (ICT) and service sectors. A novelty of the study is the classification of countries depending on their innovation performance measured and published in annual European Innovation Scoreboards. Furthermore, only very recently researchers begin to explore open innovation outside high-tech industries. This study investigates how open innovation affects innovation performance of SMEs in high- and low-tech industries, ICT and service sectors. The extent of opening up of the innovation process and its impact on innovation performance vary between micro, small and medium-sized firms, between those firms operating in national innovation systems more conducive to innovation and those in less innovative countries, and between high-technology and low-technology industries. Overall, customer involvement is found to have a positive impact on SME innovation performance, whereas participation in innovation networks and clusters has an adverse effect. Moreover, licensing-out is positively related to innovation performance in firms located in countries whose national innovation systems are more conducive to innovation. The findings are relevant for both managers and policy makers across Europe. From managerial perspective, empirical evidence indicate that certain open innovation activities have a positive influence on innovation performance, such as customer involvement, while a few have no or even negative impact on the output of innovation processes, such as participation in innovation clusters and networks. Furthermore, it provides evidence that SMEs across Europe adopt a portfolio approach to innovation, internalizing innovation through absorptive capacity as well as organising open innovation activities. These findings are consistent with the stylised fact advanced in the literature on absorptive capacity, that opening up the innovation process by exploiting sources of external knowledge is a complementary process to firms' absorptive capacity. Moreover, our findings suggest that policy makers should adopt a policy mix fostering both absorptive capacity and open innovation activities. However, a policy design should take into account heterogeneity of SMEs with respect to their firm, industry and country specific characteristics.

Keywords: open innovation, SMEs, innovation performance, absorptive capacity

1. Introduction

This study examines the effect of both inbound and outbound open innovation practices on innovation performance of small and medium-sized enterprises (SMEs) located in 27 EU countries and one non-EU country (Bosnia and Herzegovina). Studies focusing on SMEs usually investigate open innovation activities in one or few countries (Schroll and Mild 2011). By investigating open innovation processes in SMEs in all but one EU member state, this study is the most comprehensive quantitative analysis of the impacts of various open innovation activities on SME innovation performance. The findings from the study are relevant to managers in SMEs across the European Union as they suggest which open innovation strategies have a beneficial effect on innovation processes. Furthermore, it provides evidence that SMEs across Europe adopt a portfolio approach to innovation (Stanko and Calantone 2011), internalizing innovation through absorptive capacity as well as organising open innovation activities.

The study is structured in four sections. First, the study relies on open innovation literature to make a distinction between inbound and outbound open innovation practices and to formulate hypotheses about the
effect of open innovation on SME innovation performance. Subsequently, the methodology is reviewed, followed by the discussion of the main results. The final section presents implications for practitioners and managers.

2. Theoretical framework

With Chesbrough’s (2003) seminal book, open innovation emerged as a new conceptual framework in innovation literature (Van de Vrande et al. 2010). The concept of open innovation encompasses two distinct types of innovation activities. Inbound open innovation (technology exploration or acquisition) refers to innovation activities stemming from external sources of knowledge, which enhance and complement internal technological capabilities. Inbound open innovation includes the following activities: technology scouting; customer involvement; external networking; external participation; outsourcing R&D; and, inward licensing of Intellectual Property (IP). Outbound open innovation (technology exploitation or commercialization) is associated with the commercialisation phase of the innovation process, whereby firms outsource the market expansion to external organizations who are better suited to commercialise existing technologies (Chesbrough and Crowther 2006; Dahlander and Gann 2010; Van de Vrande et al. 2009). Outbound open innovation refers to several practices: venturing and outward licensing of IPs.

In their review of the determinants of innovation outsourcing, Stanko and Calantone (2011) conclude that a successful opening up of the innovation process critically depends on to what extent firms’ environment is conducive to open innovation. Environmental factors that affect firms’ exploration of external knowledge are market and technological uncertainty and the extent of appropriability (i.e. patent protection). Given the importance of external factors in facilitating open innovation, this study suggests that firms located in countries with a higher innovation performance (‘Innovation leaders’ and ‘Innovation followers’) are engaged in both inbound and outbound innovation practices, whereas firms operating in countries with a lower innovation performance (‘ Moderate’ and ‘Moderest innovators’) are more likely to open up towards inbound open innovation. Consequently, the impact of open innovation on SME innovation performance will be differentiated depending on countries’ innovation performance. This has led the formulation of the following hypothesis:

Hypothesis 1: A larger number of open innovation practices has a positive effect on innovation performance in firms located in ‘Innovation leaders’ and ‘Innovation followers’ groups of countries compared to ‘Moderate innovators’ and ‘Moderest innovators’ groups of countries.

Numerous studies indicate that firms perform more inbound than outbound activities (Schroll and Mild 2011; for a review see Huizingh 2011). Van de Vrande et al. (2009) report that Dutch SMEs are undertaking twice as much inbound than outbound practices. It can be expected that this trend will be prevailing among SMEs in our sample as well. Huizingh (2011), in his discussion on the effects of external factors on open innovation, suggests that outbound open innovation is more performed in the environment characterized by strong IP protection, than in situations pertinent to weak appropriability mechanisms. Under the assumption that more innovative national innovation systems have a stronger IP protection, the following is proposed:

Hypothesis 2: Income generated from selling patents and know-how has a positive and significant effect on innovation performance of SMEs in ‘Innovation leaders’ and ‘Innovation followers’ groups of countries, but no impact in ‘Moderate innovators’ and ‘Moderest innovators’ country groups.

Following Van de Vrande et al. (2009), limited financial resources determine the level of openness and type of open innovation strategies adopted by SMEs. Namely, SMEs mostly engage in user innovation (i.e. customer involvement, as termed in the open innovation literature) and in external networking, particularly in informal networking (Parida et al. 2012; Teirlinck and Spithoven 2013; Van de Vrande et al. 2009). In contrast, SMEs rarely exploit other, more costly, sources of external knowledge, such as outward and inward IP licensing, venturing and external participation. Accordingly, we posit the following:

Hypothesis 3: Customer involvement positively affects innovative sales in SMEs irrespective of the country in which they are located.

The literature provides opposing arguments with respect to a degree of openness among SMEs. For instance, Teirlinck and Spithoven (2013) report that, among Belgian SMEs, very small firms with a headcount of between 10 and 20 employees are less likely to engage in research cooperation than medium-sized firms, whereas small firms (with more than 20 and fewer than 50 employees) are most likely to both cooperate and outsource R&D.
activities. In contrast, Van de Vrande et al. (2009) suggest that medium-sized firms are more prone to opening up innovation processes than are small firms. Following this line of argument, it can be suggested that micro firms are also less likely to undertake open innovation than small and medium-sized firms. Accordingly, the following hypothesis can be formulated:

Hypothesis 4: In medium-sized firms, a larger number of open innovation activities has a positive influence on innovation performance, than in micro and small firms.

Most early research on open innovation focused on open innovation modes in high tech industries because they are more inclined to open innovation (Chesbrough and Crowther 2006; Gassmann et al. 2010; Schroll and Mild 2011). As high-tech industries are characterized by a strong patent protection and a higher demand for technology (Lichtenal 2009), they are more inclined to outbound open innovation. This has led to the formulation of the following hypothesis:

Hypothesis 5: There is a positive relationship between outbound open innovation and innovative sales in the high-technology industries and the ICT sector.

Although open innovation started in high-technology industries, a recent trend shows that firms in low-technology industries are beginning to open up their innovation processes (Gassmann et al. 2010; Santamaria et al. 2009). Customer involvement is among first open innovation practices to be adopted in low-tech firms, but, more recently, other forms of cooperative networking, such as with suppliers, universities and knowledge brokers, are gaining importance among this category of firms. Thus, we posit the following:

Hypothesis 6: There is a positive relationship between customer involvement and innovative sales in low-tech industries and service sectors.

Although SMEs might be more inclined to informal networking with other firms (Van de Vrande et al. 2009), our data allow us to investigate how formal networking through strategic alliances and non-equity alliances affect innovation performance. SMEs are less likely to form strategic alliances than large firms, due to the fact that a higher level of physical resources is needed for this type of open innovation (Narula and Hagedoorn 1999; Narula 2004). Following Hagedoorn (2002), non-equity alliances are more relevant for firms in high-tech and ICT sectors, than for firms in medium and low-tech industries. Namely, the preferred form of partnering (joint venturing or contractual partnerships) depends on the degree and speed of technological changes, in a way that technological stability (slow technological changes) favour joint venturing, whereas rapid technological advances favour non-equity, contractual arrangements. This led us to formulate the following hypotheses:

Hypothesis 7: Strategic alliances and non-equity alliances have significant and positive effects on innovative sales in high-tech industries, and no effect in low-tech and service sectors.

3. Data and model

Dataset used in the analysis was gathered in 2010 within the MAPEER project commissioned by the European Commission’s DG-Research. The survey questionnaire covered the period 2005-2010. The sample includes 620 SMEs from 28 European countries. The sample consists of 304 micro firms, 200 small firms and 116 medium-sized firms.† Given a small number of firms from individual countries, they were grouped into four categories following the European Innovation Scoreboard (European Commission, 2011): ‘Innovation leaders’; ‘Innovation followers’; ‘Moderate innovators’; and ‘Modest innovators’.

The dependent variable is the share of sales from new products and/or processes (innovative sales). The variable is categorical, ranging from 1 to 6 (taking a value from 1 if the share of sales is from 0-10%; is equal to 2 if the share of sales is from 11-20%; is equal to 3 if the share of sales is from 21-30%; is equal to 4 if the share is between 31 -40%; is equal to 5 if the share is from 41-50%; and is equal to 6 if the share is above 50%). Innovative sales is a proxy for a direct innovation output, while patents measure an intermediate innovation output (Pakes and Griliches 1980).

Innovation performance, as a dependent variable measured by innovative sales, is a function of absorptive capacity, firm characteristics, environmental (external) factors and open innovation practices. Two measures of absorptive capacity are included in the model. The share of R&D personnel in the total number of

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† Micro-sized firms are defined as those with fewer than 10 employees, small firms with more than 10 and fewer than 50 employees and medium-sized firms with more than 50 and fewer than 250 employees.
employees is a categorical variable, while having a separate R&D department is measured as a binary variable (=1 if a firm has a separate R&D department; 0 otherwise). Finally, firms' innovative activities are measured by their patent application. The model includes two binary indicators of patent applications, the first indicator is equal to 1 if the firm owns any patents in the EU (0 otherwise), and the second indicator is equal to 1 if the firm owns any patents in the US (0 otherwise).

The following variables are included to control for firms' characteristics. The firm's degree of internationalization is modelled by including a binary indicator that is equal to 1 if the firm undertakes exporting activities. Exporting firms tend to have more incentive to innovate as a result of competitive pressure on international markets (Busom and Fernandez-Ribas 2008; Parida et al. 2012). To control for the firm size, three binary indicators were created: for micro firms (less than 10 employees), small firms (between 10 and 49 employees) and medium-sized firms (between 50 and 249 employees). The model also includes firm age as a continuous variable and a quadratic term of firm age, to control for its diminishing return on innovation performance.

The model also takes into account environmental factors, such as competitive pressure, industry characteristics, and whether firms operate in technology parks and if they integrate cluster/technology platforms. Competitive intensity is measured as a binary indicator equal to 1 if the firm reports that the competition is strong in its main markets (0 otherwise). Furthermore, two binary indicators were included for those firms that are located in technology parks, and for those that integrate cluster/technology platforms. Finally, in order to control for sectoral heterogeneity, firms are grouped into six industry categories: high tech; medium high tech; medium low tech; low tech; Information and Communication Technology (ICT); and service sectors (as a base category).

Our data contain information about a single outbound open innovation practice - outward licensing of IPs, and two inbound practices - external networking and customer involvement. In addition, external networking encompasses six different sources of external knowledge: 1) use of online technology or knowledge brokers/intermediaries; 2) informal networking with other firms; 3) informal networking with research organizations; 4) strategic alliances with other firms; 5) non-equity alliances with other firms; and 6) participation in innovation networks, S&T parks and clusters. Each source of external knowledge is measured on a five-point scale (from 'Do not apply at all' to 'Apply extensively'). Based on a scale, binary indicators were created for each source, where the indicator is equal to 0 if the firm reports either of three categories ('Do not apply at all'; 'Do not apply'; or 'Neutral') and is equal to 1 if the firm reports either 'Apply' or 'Apply extensively' of a particular source of knowledge.

4. Results and discussion

Because the dependent variable - innovative sales is measured as a categorical variable, an ordered logit model was utilized, under the assumption that the error term follows a binomial distribution (similar to Lichtenthaler 2008; O' Regan and Kling 2011). The results are presented in Table 1 below. Overall results by country groups indicate that a degree of openness depends on the level of countries' innovation performance. Namely, firms operating in countries categorized as 'Innovation leaders' and 'Innovation followers' adopt a portfolio approach to open innovation model, i.e. performing both inbound and outbound open innovations. Moreover, Hypothesis 1 is confirmed as a larger number of open innovation practices is positively related to innovation performance. Firms from 'Moderate innovators' group operate under a semi-opened model, performing inbound open innovation but outbound practices, while firms in 'Modest innovators' group maintain a closed innovation model (Keupp and Gassmann 2009; Schroll and Mild 2011). It is of importance to note that, although SMEs differ with respect to their degree of openness, the common feature of SME innovation activities across all country groups is a positive effect of internal innovation capacities, implying that absorptive capacity plays a critical role in SME innovation performance.

Looking at the influence of various networking relationships, the results indicate that, indeed, in medium-sized firms a broader set of open innovation practices is positively associated with innovation output than in micro and small firms, which confirms Hypothesis 4. However, in medium-sized firms, the effects of cooperation with other firms, of cooperation through strategic alliances and of participation in innovation clusters are negative.

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1 Micro firms are a base category.
2 Manufacturing industries are grouped based on NACE classification according to technology intensity (OECD 2006).

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Finally, customer involvement has a positive and highly statistically significant effect on innovative sales in micro and medium-sized firms, but no effect in small firms. Hypothesis 5 is partially confirmed; outward licensing of IPs has a positive impact on innovation performance in firms operating in the ICT sector, but no effect in high-tech firms.

Hypothesis 6 cannot be rejected; customer involvement positively affects innovative sales in low-tech and service sectors. Finally, Hypothesis 7 is partially confirmed; while cooperating through strategic alliances has a positive effect on innovative sales in SMEs in high-tech industries, cooperation in non-equity alliances has a positive impact on innovation performance in firms in service sectors, but no effect on innovation performance in firms in high-tech industries and the ICT sector.

Table 1: Estimation results: Dependent variable: Innovative sales - share of sales from new products and processes

<table>
<thead>
<tr>
<th>Variable</th>
<th>All firms</th>
<th>Innovation leaders</th>
<th>Innovators</th>
<th>Moderately innovators</th>
<th>Modes of innovators</th>
<th>Micro firms</th>
<th>Small firms</th>
<th>Medium-sized firms</th>
<th>High-tech industries</th>
<th>Low-tech industries</th>
<th>ICT</th>
<th>Services</th>
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<td>(0.360)</td>
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<td>(0.372)</td>
<td>(0.356)</td>
<td>(0.433)</td>
<td>(0.430)</td>
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<td>(0.029)</td>
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<td>Modes t innova tors</td>
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<td>(0.323)</td>
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<td>(0.298)</td>
<td>(0.360)</td>
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<td>(0.374)</td>
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<td>0.752</td>
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<td>1.388* **</td>
<td>0.737* **</td>
<td>0.942* **</td>
<td>0.777</td>
<td>0.798* **</td>
<td>0.529</td>
<td>1.806* **</td>
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<td>1.572* **</td>
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<td>(0.267)</td>
<td>(0.331)</td>
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<td>0.674*</td>
<td>0.516* **</td>
<td>0.119</td>
<td>0.640* **</td>
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Dragana Radicic and Geoff Pugh

<table>
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<th>Variable</th>
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<th>Innovation leaders</th>
<th>Innovators</th>
<th>Moderate innovators</th>
<th>Modes innovators</th>
<th>Microfirms</th>
<th>Small firms</th>
<th>Medium-sized firms</th>
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<td>80.54*</td>
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<td>114</td>
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<td>116</td>
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<td>165</td>
<td>127</td>
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</table>

Note: Standard errors in parentheses. Levels of significance: *** p<0.01, ** p<0.05, * p<0.1.

5. Conclusions

This study explores how inbound and outbound open innovation strategies affect innovation performance in SMEs across Europe. Given that SMEs are rather heterogeneous group of firms, they are differentiated with respect to size, industrial and country-specific factors. Empirical results reflect this heterogeneity - the extent of opening up of the innovation process and its impact on innovation output vary among micro, small and medium-sized firms, between those operating in national innovation systems more conducive to innovation and those in less innovative countries, and between high- and low-technology industries. Overall results indicate two trends among European SMEs. First, SMEs engage in inbound and outbound open innovation activities to complement their limited resources, although their degree of openness varies. As expected, the most persistent positive performance effect of open innovation is found for customer involvement, which is in line with the argument advanced in the literature (Van de Vrande 2009; Parida et al. 2012). Second, empirical results are conclusive regarding a positive impact of firms' absorptive capacity on innovation performance, pointing out the importance of internal innovative capacity for SME innovation.

The findings provide relevant implications for managers, who design and implement open innovation strategies, because our study reveals a differential impact of inbound and outbound innovations on SME innovation performance. Some arguments from the literature are confirmed in the study, such as a positive association between customer involvement and innovation performance, and the critical role that absorptive capacity plays in internal innovation capacity as well in enhancing firms' opening up processes. However, managers should also be alert that some open innovation practices, such as participation in innovation clusters, could have a detrimental effect on innovative sales.

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Critical Factors for Innovation and Strategic Competitiveness in Global Companies

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Abstract: Companies are the main forces that drive an economy toward economic growth. Innovation encourages competitiveness within firms, and at the same time builds the conditions for it to happen. One of the most determinant factors of competitiveness is the teams workforce. As the world becomes more and more global, firms are working worldwide, under economies that are moving towards creating products and services with higher added value. Innovation management within the firms requires a particular vision on “global teams”. How will they go about the innovations? How will they be handle knowledge management? What are the transfer knowledge and learning rules for communities and workforces? How will the data analysed from global companies and different cultures be supported? The central hypothesis of this research has been focused on this particular approach: “The management of Global Companies needs to work on solving innovation basal factors to be successful in the search for managing a global workforce”. So the challenge is to implement innovation processes that stress the focus on data support, cultural alignment and developing strong capabilities for the high performance workforce to create new value. The present paper identified, through the analysis of eight multinational companies, factors that determine the success of competitive strategy and innovation in global companies. We worked with an open-ended interview methodology and selected firms based on three specific criteria. By way of research results, we worked developing a model for managing innovation including the factors identified as success promoters: i) Cultural Strategic Alignment through the value chain, ii) Standardization of Processes along entire value chain, iii) Transversal strategic management indicators throughout the entire organization. iv) Incorporation of technological tools for collaboration. In fact, we can conclude that global firms need to address innovation management among their tools to strengthen their innovation processes like: knowledge management, learning process and feedback, human resources and global workforce, productive chains, and management of their core competence and complementary assets.

Keywords: innovation, strategy, global workforces, global companies, and knowledge transfer

1. Introduction

Innovation within global organizations is a challenge that requires a particular focus on the way these companies are strategically targeting efforts and resources which would render higher value-added indexes within the setting they operate in. Competing in complex markets and entering into global markets strongly is a challenge that requires multidimensional efforts in which necessary critical factors must be taken into consideration, in order to achieve dependable results. It is foreseeable that these critical factors are in position with the sole purpose of increasing the productivity of the firms. In order for this to happen, it is necessary to begin the course towards innovation by linking the challenges of managing the company and providing tools which regard success as the goal behind efforts to be innovative. From there, stimulate the needed articulation to improve competitiveness. Understanding the process that successful companies followed in their process toward global competitive innovation, as well as the factors to consider in being more innovative within the firms, will allow us to address higher rates of innovation. It is in this general context that the management of innovation has a central role in enhancing the skills of our firms to generate higher levels of productivity. The required innovation should allow for the incorporation of more value to what they produce. It equally requires companies to adopt a strategic innovation management model to be implemented by way of management models that drive positive results in highly competitive global contexts.

2. Literature review

Innovation, a concept coined in the early twentieth century, refers to the process of creative destruction by which the economy is strengthened by the driving force of companies, and the entrepreneurial spirit that sustains the cycles of economic development in capitalism (Schumpeter, 2011). Therefore, the most important challenge for companies that innovate is to create the ability to re-invent themselves as a way to anticipate the life cycles of products and processes within the industry (Christensen, 2000). In this regard, the company that intends to innovate must know their assets very well, as they are the main source of differentiation in the process of effectively responding to the market. Their assets will allow them to incorporate the necessary knowledge to reinvent themselves and consider new and improved attributes that would permit them to stay competitive (Prahalad & Hamel, 1990).
The precise particularity of the innovation management perspective in global companies is in the importance that these types of businesses put on creating the necessary conditions to incorporate lessons learnt, that which the company is able to administer in respect to what it knows and the way it does what it does not known. The main challenge is to respond to the intensity of social and technological change from a perspective that identifies internal and external powers through which they will be able to respond to the need to increase the value of their products globally. These are changes that companies must be able to face, incorporating the set of capabilities that ensure the successful management of their innovation (Christensen et al., 2000).

Beyond what has been presented, innovating in these companies, is not just thinking something new, but rather requires promoting a process of organizational change, thereby modifying the behavior of workforce involved in the process. In this way, the company should seek to ensure that it achieves the proper integration of the innovation strategy with the competitive strategy, using resources, time and efforts to move along the process of innovation (O’Reilly and Tushman, 2004). It could be said that this open-minded view is what differentiates successful companies from unsuccessful ones. The importance of developing a proposal for innovation, which is meticulously coupled with the particular characteristics of the company, is essential if they plan to innovate with an eye on the global markets being willing to pay more for what these companies produce. A systematic management of the knowledge focusing on the capabilities of the company will allow extensive access to new markets, generate the basis for understanding and respond better to the requirements of customers (Prahalad & Hamel et al., 1990). To be competitive, firms must comply with standards and incorporate management practices characteristic of companies that have managed to carry out successful expansion processes. They must take into consideration these elements while linking innovation strategy with the original purpose of the company. Companies that have conquered global markets, have been able to put the “know how” at the core of management, encouraging its entire value chain in the development of activities that promote greater interference in the profitability (Hansen & Birkinshaw, 2007).

Implementing a bold innovation strategy means challenging classical strategic proposals, therefore renovating technical processes. Generating innovation challenges the close interaction between product innovation, processes and organizational conditions of the business. The strategy of companies in global markets is primarily focused on achieving higher profit margins, and better results when seeking long term differentiation strategies (Utterback et al., 1996). All this will be possible, as long as the management generates balanced conditions that make it possible to achieve the expected competitive skills required to sustain innovation strategy (Schilling, 2013). The installation of dynamic capabilities for innovation, which determines the strategies by which radical innovation is promoted within the company, requires proper management of knowledge and thereof facilitates capabilities within the firm (Teece, Pisano & Shuen, 1997). This is essential in the administration of innovation management considering: organizational changes, product and production processes which accompany socio-technical change. In other words, obsolescence of products and production processes cannot be seen as separate from the management process of innovation in the business. Different types of innovation are needed, using strategies to understand capacities to innovate, and thereby obtaining successful results. At the same time we need to build the capacity to manage the factors that facilitate the commercialization of new products. Corporate workforces within global companies should develop the ability to constantly look back, paying attention to the processes and products of the past, while still looking ahead, preparing for the innovations that will define the future (Oreilly & Tushman, 2004). The aim is to provide conditions that facilitate the design of a dual-purpose organization: exploiting existing business, while at the same time exploring a related new business (Govindarajan & Trimble, 2005). Innovation, therefore, is based on the installation of a new organizational form for its management, which ensures the development of the necessary skills that enable successful innovation strategy in enterprises. In this sense, as we can see in Table 1, the relationship between structure, team, culture and system, are elements that can generally be identified in the configuration of the strategy within companies that achieve high levels of competitiveness and innovation in global markets.

Each of the factors mentioned in Table 1 is connected to the decision of how to generate long-term competitive advantage. A long-term strategy is only possible if it includes the knowledge that allows it to exist and stand out, so as to incorporate it in its administration and be competitive day by day. Innovation is possible through the discovery of these dynamic capabilities; when they are the foundation that allows the firm to understand that new competitive advantages are the source of develop.
We define dynamic capabilities as “the firm’s ability to integrate, build and reconfigure internal and external competence to quickly and agilely redirect changes in the competitive environment to match the organization’s ability to engage new and innovative forms of competitive advantages, given the conditions of dependency and the positions of specific market” (Barton , 1992). Thus, companies that were successful with their global expansion strategy, and are able to constantly reinvent themselves; focus on key processes and simple rules as a principal strategic alternative to highly competitive and complex environments (Eisenhardt & Sull , 2001). Simple management rules must somehow better identify and exploit opportunities and threats which require concrete decisions and coordination within highly complex environments.

3. Research methodology

The central hypothesis of this research has been based on this particular approach: “The management of Global Companies needs to work on solving the innovation basal factors in order to be successful in the pursuit of managing global teams”. So the challenge is to implement innovation processes that place the focus on data support, cultural alignment and developing strong capabilities for the high performance workforce in order to create new value. To carry out the study, the research addressed the question “What was the process followed like for companies that have had success with their global competitive strategy aimed at higher value-added?”.

The research is based on an empirical study of eight multinational firms selected under the following criteria: i) be a multinational firm, ii) be successful in their overall expansion process, and iii) be located in production areas where differentiation is not absolutely necessary to stay competitive. Companies included in the sample have been defined using acronyms such as: MF1, MF2, MF...#, referring to Multinational Firm 1,2,.. Thus safeguarding the confidentiality within the empirical study.

While carrying out the research, concern was taken to understand the factors that determine the process toward success of these companies in order to determine an approach to innovation management with effective results. ‘Interviews’, a fundamental tool of qualitative research, were used to collect data. This method proved to be very relevant, as it facilitated the creation of situations through questions and answers, thereby achieving a better understanding of the meanings that the very same actors interviewed gave on the topic in question (Olabuenaga, 2003). Data were collected throughout an intermittent period of five months, during which the information gathered was processed, generating different approaches, and the results presented to a team of managers belonging to one of the companies in the sample for their evaluation. This analysis information is part of a strategic process proposed by the “grounded theory” (Glaser & Strauss, 1967), in which the process of analyzing “the constant comparative method” is done, by which the analysis ranges from comparing specific incidents of data, these concepts are then refined, the properties identified and the interactions explored, in order to advance the integration of a coherent theoretical proposal (et al. Glaser & Strauss, 1967). This analysis was executed by a process of analytic induction (Katz, 1983), which allows for an adjustment between the data of qualitative research and the theoretical explanation of the phenomenon of investigation. According to the proposed method of analysis, the steps of the analysis were: 1. Topics, cues and intuitive interpretations of the data obtained were created, implementing diagrams to ascertain the underlying guidelines of the research. 2. Emerging, recurring and significant issues were searched for, generating tentative list of topics, without settling on any of them in particular. 3. A typology was developed using a classification scheme that will be useful in the development of concepts and theories. 4. The elaboration of concepts and theoretical propositions were expanded, which facilitated the generation of a “sense of general reference” (Blummer, 1966). The results of the research are presented as the product of a

<table>
<thead>
<tr>
<th>Structure</th>
<th>Formal structure reported, decision of authority, information flow, tasks, processes, flow charts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workforce</td>
<td>Leadership Traits, personnel policies, promotion and career policies</td>
</tr>
<tr>
<td>Systems</td>
<td>Planning, budgeting and control systems, criteria for evaluating business performance, incentive systems and compensation</td>
</tr>
<tr>
<td>Cultural</td>
<td>Notions about valued behavior, integrated business assumptions, bases of decision</td>
</tr>
</tbody>
</table>

Table 1: Definition of guidelines for finding success factors of management (Govindarajan & Trimble et al. 2005)
Felipe Rivera

process of benchmarking, a consequence of the comprehensive work in regard to how the firms included in this investigation manage their competitive strategies and innovation at a global scale.

4. Presentation of the result cases studied

Of the cases studied, it has been possible to determine how the firms give meaning to various factors that influence the success of their competitive strategies. These are elements that respondents have stated they put at the core of management and through which base the principal actions and decisions that lead to success. According to the results of our research we have identified that each case presents different strategies which explain their success and high level of global competitiveness. After conducting and analyzing the interviews with managers of these companies, we have identified some elements that allow for a high level of interpretation regarding the factors we are looking for.

In the case one, MF1, states that, due to its high presence in global operations, and high level of customer intimacy, service is one of the most important means of differentiation. By achieving this, they maintain a high level of acceptance for management changes among in their workforce, with significant levels of process standardization, and a very important management of organizational culture. This allows them to lead a management process by which it is possible to incorporate incremental and organizational innovations on a global scale. Thus, the company manages to differentiate and be highly competitive.

MF1, management is addresses not only their employees and production processes, but it also encourages innovation at the providers’ level, making them adopt the characteristic form of “doing things” of this multinational. MF1 provides interesting practices designed to create instances where teams of suppliers are invited to work inside the plants of the company for a period of time during which knowledge is transferred, and work standards are installed under 16 work processes defined and differentiated between mayor or minor processes, and sustain the change management if it’s necessary.

In the second case, MF2, places its high degree of attention to the participation of the workforce involved in operations as one of the most important attributes of management, always keeping them in mind and making sure they feel highly committed whenever it is necessary to incorporate an innovation in the company. There is a strategic vision of “top-down”, where it is the CEO who has the final say on decisions, but the opinion and knowledge the workforce provides weigh in, as they are the ones who are responsible to transfer the mode of doing the things to the core of the innovation capacity. MF2 bases its management on a total quality strategy, focusing on “Kaizen”, promoting a system management model, in which it worked for 4 years on standardizing information on a global scale. This is considered core in the success of the overall management of the company. The key here is placed on the involvement of the people. The strategic reasoning is not only to form a company with excellent results, but also a workforce that has valuable knowledge about the work they perform. The MF2 driving the innovation process like continuous improvement helped for differentiation between hard or soft changes, in the same time get it with exchange knowledge for standardization between areas and prize or incentives for promote the innovation way.

In third firm case, MF3, proposes a strategy of “neuronal integration”, where strategic guidelines come from the parent company, and are disseminated by an organization of existing micro-companies for each key process. In this process the management role they call “linker”, representative from the micro-companies with the best performance in the processes, is extremely important. They are to permanently conduct “process audits” within the company in its different plants in the world. This way, like is possible understand like MF3 ensures high production standards. It incorporates strong innovation in processes when disseminating an innovation strategy aligned with the competitive strategy of the company, regardless of the culture in which the company is operating. The focus is based that different plants advanced in different ways, so is necessary a very strong strategy of transfer for microcompanies working teams improve or adopted innovations.

MF4, the fourth case, company bases its competitive strategy on forming teams to focus on 25 topics within the company. They are to address production processes quality by holding face-to-face meetings every 12 months with the purpose of discovering new innovations. The way the processes quality indicators are handled is very important in this case. The goal must always be to reach the highest potential. This requires the incorporation of incremental and radical innovations when it comes to incorporating a new product from a country. The management process involves case analysis and a structured workforce with critical processes
that are constantly revised. The company focuses on key management tools, including elements such as: social capital, technology, innovation in processes, products, research and development, and virtual workspaces; promoting the concept of being a "global", and above all "learning company".

MF5, fifth company in study, the focus is primarily on creating a relationship based on quality and cost reduction strategies. Thus, any product innovation and process will be evaluated against the benefits of cost efficiency and quality compared with the perception of customers. Based on how the interviewee expresses this, it is a strategy that requires a high level of alignment along the value chain; it is the only way they see to stay competitive and innovative. In the opinion of the manager interviewed, the company has the challenge of responding to complex requirements of the customer, including: lower prices, higher quality, and speed; forcing all of their management under a management strategy of lean on all of their processes at the lowest possible cost. This company explains the success of their management at a global scale, with their ability to constantly reinvent themselves and to generate strategies for continuous innovation in processes, products and organizational forms through quality management based on indicators from which information is delivered in a decentralized manner, increasing levels of knowledge transfer for generating global standards.

MF6, sixth company believes that rooting their management on innovations that allow them to lead the market is the main tool in developing a strategy that puts them at a competitive level. In this way, they define management variables which they consider “controllable”, as it is possible for management to directly influence performance and, alternatively, they control “easily-influenced” variables, which are usually in the vicinity of the company. Along these lines, the innovation strategy is to satisfy the customer, and this is done by reducing to a minimum the easily-influenced variables which are high-impact when they are not sufficiently aligned, by way of managing the controllable variables. The relevance that access to information has in this case is worth mentioning. The quality of their processes often depends on variations or observation of metrics in each of their operations. This is due to the difficulty of being present in each place the process is executed in.

Eighth company, MF8, is the case of a firm, which served the purpose of systematically validating the results of the research process. The work process was show permanently results and pivoting to a committee of managers, who worked as a panel of experts in the course of research. When a factor was legitimized by this group was considered measuring economic and technique feasibility incorporate it into the management of the company, and define the level of impact this could have on the innovation process.

Consequently, the cases studied allowed us to generate a list full of topics that make up the main body for the construction of the typology and classification. From which we finally opted for those which we have proposed as the key factors that constitute the theoretical result of the investigation, and therefore support the development of the proposed model: workforce selection, definition of experts, definition of key issues, committees per management area, communication of a common strategic vision, cultural alignment, simple rituals that allow for the crossing of borders in forming workforce, cross-participation in hierarchical positions, top-down view, daily tasks, and incentives and rewards, high levels of process standardization, centralized indicators, documentation to promote standardization, virtual meeting spaces, open access platforms for the company and key suppliers, versatility and job rotation as a means of recognition and transfer of knowledge. A condensed analysis of how each case contributed to the development of the items found can be found in the following table:
Table 2: Types and classification scheme

<table>
<thead>
<tr>
<th>Activity</th>
<th>MF1</th>
<th>MF2</th>
<th>MF3</th>
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<th>MF5</th>
<th>MF6</th>
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<td>FACE-TO-FACE AND VIRTUAL MODULES</td>
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<td>INDICATORS CENTRALIZED IN ANALYSIS</td>
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<td>INDICATORS (FOCUS ON CUSTOMER)</td>
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<td>CULTURAL ALIGNMENT / CLEAR MESSAGES (COMMON CODES)</td>
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<td>CLEAR INCENTIVES</td>
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<td>STANDARDIZATION OF GLOBAL PROCESSES (ADJUST &lt;) (ADJUST &gt;)</td>
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<td>DATAWAREHOUSING, SAME INFORMATION, DIFFERENT RESOURCES OF</td>
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<td>OPEN ACCESS TO PLATFORM OF INFORMATION (SHAREPOINT)</td>
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<td>REDUCTION OF COSTS OF GLOBAL OPERATIONS</td>
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5. Critical factors for deployment of innovation and competitiveness in global companies

According to the results of our research we have been able to identify that each of the companies analyzed presents different management strategies, which explain their success and high level of competitiveness which has allowed them to sustain an innovative model. Of the successful experiences checked, the key aspects that have led to the development of these higher rates of innovation can be extracted. Overall, the evidence indicates that successful innovation business strategy emphasizes the development of greater knowledge in their production processes, thus developing products with greater value. But, how does really this happen?. The principal components, which together make the basal aspects to facilitate a model of innovation in companies that are successful in their overall competitive strategy are:

1. Workforce culturally aligned, able to reproduce the company strategy throughout the company. By “cultural alignment” we mainly refer to those managing activities of the companies designed to foster a workforce with a global vision in all processes and operations wherever the company is located. We include in this, a process of “top-down” decisions, which enables the management of corporate goals crossing organizational and extra organizational boundaries for actions that may be performed at various stages of the production chain. The cultural alignment is often stimulated by the need to meet high requirements of customers in different parts of the world. Under this objective these companies promote a single message, which contains key company values. Generally, it is possible to link cultural alignment to ritual practices that bring non-hierarchical workforces together as essential elements in the transformation and the possibility for innovative management that impacts the entire company. In short, this is a factor that ensures success, allowing the adoption of innovations as a result of consistently communicating a way of doing things, which is unique and must be present in every process of the company.

2. Standardization of processes which establish standards for proper transfer of knowledge and learning along the entire value chain. The “standardization process”, both internally (within the company) and externally (suppliers and other actors in the value chain of the company), is a second factor identified as key to the success of innovation management. Standardizing at this point is not due purely to “Fordist” strategies, but it is standardization in a productive chain, involving various networks of enterprises, suppliers, etc. This concept
of standardization is not associated with a high yield of products, but with how to create production conditions to respond to complex markets. In short, we can show that this is a process of “post-Fordist” standardization, where the standardization of processes from an engineering perspective coexists with the socio-technical logic with changes that go beyond manufacturing process, involving the environment and the workers themselves in a logical constant review of its management.

3. Incorporation of technology platforms for collaboration. A third major factor in the management of these companies is knowledge management, which is enhanced by the acquisition and design of virtual spaces for collaborative creation, and procedures for the registration and use of that knowledge in the generation of innovations. This is a trend that is being implemented by companies as part of their competitive strategies, but it certainly promotes and facilitates the management of knowledge transfer, allowing greater competitive advantage through innovation.

4 Transversal indicators of strategic management for the whole organization, supporting “data” in different cultural settings where strategic management is encountered. A fourth factor is “Indicators of strategic management”, a unique way to measure management provided in order to facilitate both knowledge transfer and innovation and management of change every time someone decides to identify a more appropriate and effective way to perform a particular task, thus facilitating decision making by workforces from different cultures. In most cases, having indicators for the key processes of the organization is a condition for the transfer of knowledge and innovation when the way to perform, and “do” a particular task or function is subject to cultural variations depending on the country or locality where it is operating.

6. Conclusions

The development of innovation management in global organizations needs to be viewed differently and to have different tools applied to management which would create team alignment regardless of their remoteness or global alienation. More than a disadvantage, this requires that they look at the innovation process with a different outlook, maturing along the way to create the collaborative networks and alliances needed for successful innovation. These are companies established in countries where conditions are not always favorable for the proper implementation of innovation, therefore efforts are required in managing the workforce to maintain the required productivity standards.

Therefore, an innovation management model for these firms should consider 4 enabling factors of innovation that will enable the deployment of the conditions to generate new business initiatives.

1. Cultural Strategic Alignment through the value chain;
2. Standardization of processes along the entire value chain;
3. Transversal strategic management indicators throughout the entire organization.
4. Incorporation of technological tools for collaboration.

The goal of each of these factors is to create a space for forming a workforce capable of operating under various conditions, but enabling conditions for innovation to occur in highly competitive scenarios.

A proper innovation management process should begin with recognizing the core competencies of the workforce that performs them, and consider it one of the main source for the creation of new value for the industrial sector to be decided improved. As part, incentives must be found to promote the participation of players within the value chain in the innovation process, thereby creating links to achieve higher standards among those who participate. At the same time it is necessary to implement management capabilities of complementary assets in the company. This will enable the generation of alliances where necessary to complement the skills of the company with other actors in the innovation environment.

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The Views of University Professors of East Timor About Entrepreneurship

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Abstract: Entrepreneurship has been recognized as a source of sustaining basis in fostering innovation, creating opportunities, local sustainability and socio-economic development of a country, since is a transforming process from an innovative idea to an enterprise. Entrepreneurship has been argued as the most effective economic policy in the global economics and social history. The Strategic Plan for Development of East Timor from 2011 to 2030 reports that since 2007 only 9% of the population had economic conditions to leave the so-called “poverty line” and that 41% of East Timorese are still classified as poor. Given this diagnosis, the government of East Timor defined the private investment in Small and Medium Enterprises (SMEs) as one of the four pillars of the economic framework by 2020. To ensure the growth of the private sector in rural and urban areas, government established a development program with several initiatives such as legislative changes, creation of financial support, and faster process enterprise creation. Being private sector a social priority, and given the limitations of existing employment in East Timor, it is necessary to recognize the individual attitude of entrepreneurship and promote this new dynamic of job creation. Authors believe that universities, especially the state university, the East Timor National University (National University of Timor Lorosa’e) should assume a leadership role in promoting entrepreneurship among its students. For East Timor, it is critical to highlight the mission of universities and professors in their role of education and preparation of young people, providing them with an entrepreneurial attitude that allows them to succeed in creating their own employment. This is even more important because there is no formal teaching entrepreneurship at academic level in East Timor. The paper presents results from an ongoing research that aims to contribute to the discussion of the theme of entrepreneurship in East Timor. The survey EmpreendeTIMOR: UNIVPROF intends to study the perception that East Timor academics have in relation to entrepreneurship. Based on a sample of 123 Timorese university professors, from five Timorese universities, the survey analyze how professors perceive entrepreneurs and entrepreneurship, what is their risk predisposition, how they perceive the skills and competences of their students, and how they perceive the role of the University and its professors in promoting entrepreneurship. Results suggest a good image of entrepreneurship and entrepreneurs but require further analysis since professors recorded contradictory results in two negative statements. Professors present a low risk predisposition. In relation to their students' skills and capacities, professors reveal a high confidence in the abilities and skills of their students to be successful in their own business and in their technical or financial preparation. Regarding the role of universities and its professors in promoting entrepreneurship, the professors expressively recognize its importance and relevance, and agree with a more proactive role in promoting entrepreneurship.

Keywords: entrepreneurship; university professors; attitudes; survey; East Timor

1. Introduction

The Restoration of Independence of East Timor took place twelve years ago and the country’s economic development has been very slow, concentrated in urban areas and not reaching rural areas. Traditionally, East Timor is an economy based on subsistence agriculture, with a scattered and living near the poverty line rural population. Aware of the situation, and based on the Strategic Development Plan 2011-2030, the Timorese government plans a major investment in rural development, agriculture, petroleum, tourism and private sector (RTDL, 2010).

Currently, entrepreneurship emerges as an important point of strategic and political agenda of many countries, with the initiative of self-employment to show a positive effect on the development of their economies. In addition to measures defined by the Timorese government, the Timorese private sector can be stimulated by encouraging the definition of support entrepreneurship programs.
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This research aims to contribute to the theme of entrepreneurship by the inclusion of education as a key player in promoting it. It is essential to highlight the role of schools, including universities, in their role of educating and preparing young people by providing them with an entrepreneurial attitude that allows them to succeed in creating their own employment. As there is no formal academic teaching of entrepreneurship in East Timor, university professors can be at the forefront to encourage their students to seek solutions for their professional future. How Timorese professors perceive entrepreneurship? Are they prepared to take on a more active role?

This paper is organized into five sections, besides the introduction. Section 2 examines the importance of education in promoting entrepreneurship. Section 3 gives a brief review of the Timorese economic development. Section 4 presents the results of the study designed to understand the perception of Timorese university professors about entrepreneurship. Finally, Section 5 presents the main conclusions.

2. The importance of education for the promotion of entrepreneurship

Entrepreneurship is the creation of a new business, such as self-employment or the development of new opportunities in existing businesses or organizations. By contributing to the creation of a dynamic culture, entrepreneurship plays a central role in public opinion that is translated into a growing political concern over the issue and with the renewed media interest (Amoros and Bosma, 2014). Entrepreneurship is the key factor to promote economic and social development of a country. Therefore, members of the Organization for Economic Cooperation and Development (OECD) give priority in its policy entrepreneurship as an alternative to solve the economic crisis that countries go through (OECD, 2009).

Moreover, policy makers believe that higher levels of entrepreneurship can be achieved through education and especially through entrepreneurship education. Authors such as Curteis (1997), Dolabela (2002) and Sarkar (2010) reinforce the idea that the growth of the entrepreneurial capacity of a country depends on the education and cultural knowledge of entrepreneurship on the part of all citizens. Entrepreneurship can thus develop as a cultural phenomenon linked to the development of education. Other authors, such as Rajman (2001) and Askun and Yildirim (2011) argue that education provides the general skills, training and knowledge that facilitate access to the business world. Education enables individuals to assess the extent of the labor market, the type of goods or services that are sought after by clients and even organize the business. For Carayannis et al. (2003) there is no doubt that entrepreneurship education seeks to build knowledge and skills, and also increase the likelihood of business success. Souitaris, Zerbinati and Al-Lahan (2007) and von Graevenitz, Harhoff and Weber (2010) add that entrepreneurship education increases the intention of starting a new business.

Education is fundamental to the entry of young people and citizens in the labor market and the successful integration and participation in society. However, many young people leave the education system without having acquired the skills needed for a smooth transition to employment (CEC, 2007). To reduce this phenomenon, the European Commission proposed a new Open Method of Coordination (OMC) in the field of education centered in the following long-term strategic problems: Lifelong Learning and Mobility, Quality and Efficiency, Equality and Citizenship, Innovation and Creativity as well as a new approach to suit the needs of the labor market and skills in the XXI century (CEC, 2009).

The entrepreneurship education is a key to increase the entrepreneurial spirit in individuals and make them aware of the fact that business failure is the starting point for a new beginning (CEC, 2007). For knowledge in entrepreneurship, education systems should ensure an effective and relevant education in a lifecycle perspective, stimulating the individual potential for creativity and autonomy, while avoiding mismatches in relation to the labor market. The implementation of entrepreneurship education in primary, secondary and higher education should provide a better basis for the acquisition of skills and capabilities to be able to later develop autonomy and entrepreneurship. A formal, thorough and good quality education will open immediately the path to specialized training that will make this more effective spirit (OJEU, 2006; CEC, 2008).

Entrepreneurship is an essential skill, as it helps young people to be more creative and self-confident in whatever they undertake and to act in a socially responsible manner (CEC, 2006). Promoting entrepreneurship in any country is essential in order to support the creation of micro and / or small and medium-sized innovative companies, enabling economic and social renewal (OECD, 2009). In this sense, it is essential to
promote the role of schools, including universities, in its role to educate and prepare young people for the future. Giving them an entrepreneurial attitude enables them to use tools for success upon its entry in the labor market (Sarkar, 2010). It is also important that the educator acts as being sensitive to the business world in order to help promote measures to support entrepreneurship.

The development of entrepreneurial mindsets requires the participation of teachers among all levels of study. This implies changes in school culture and in the way professors approach their role. They need to be equipped with the right skills, knowledge and attitudes to facilitate the professional development and entrepreneurial behavior of their students (European Commission, 2011).

3. East Timor: Some insights

Economic growth is the ideal backdrop where the private sector can thrive and consolidate its presence. However, economic growth can only exist in a combination of several factors, including political and social. Societies with democratic governments, social institutions, fair, high educational, housing and health level, combined with low crime rates, are more stable and productive, creating better conditions for economic development.

In any country around the world, the existence of private sector is crucial for economic growth and prosperity of its people. So the private sector plays an important role in creating jobs and wealth, offering goods and services, and contributes up to solving social problems, increasing government revenues, and a central place in training and market development.

Despite a recent past filled with conflict, in recent years, East Timor reached sufficiently high levels of political and social stability to be able to take advantage of the exploitation of natural resources and initiate rapid economic and social development. Recognizing that the future sustainability of the East Timor economy depends on building a strong private sector, the East Timorese Government has been giving priority to building a business and investment environment that supports the startup and growth of enterprises (RDTL, 2010).

Through its Strategic Development Program (PED) from 2011 to 2030, the East Timor Government considers the private sector as a development partner and has sought to encourage its growth through “Referendum Package”. In addition to the strategic partnerships between the private sector and Government in urban and rural areas for the construction of small and medium sized infrastructure (RDTL, 2010), it is intended to ensure the growth of the private sector and the standardization of requirements and procedures for business registration so, that it is easier and faster to create a business in East Timor (RDTL, 2012). Still to empower the private sector, the Office of Business Development (IADE) established several Centers for Business Development with the mission of giving training in the identification, creation, improvement and expansion of businesses. The private sector is also supported by the Chamber of Commerce and Industry of East Timor, which provide advice to companies on all areas of existing business and provide training to improve the skills of human resources in the private sector (RDTL, 2010).

The economic development of East Timor is dependent on the creation of employment and income for the Timorese people. The existence of a diverse private sector and the establishment of new businesses and industries are essential to the creation of jobs for the Timorese people and to allow transition to a non-oil dependent economy.

Underdeveloped or developing countries need a sizeable population of entrepreneurs willing to take risks, deploy new business, adopt new technologies and compete, create jobs and foster growth of their economies. In this particular context, it is important to note that education is the best tool to develop knowledge about entrepreneurship of all citizens. Are Timorese professors available to help in the promotion of an entrepreneurial culture?

4. Data collection and analysis

This paper presents the preliminary results from a survey named EmpreendeTIMOR: UNIVPROF. The survey intends to study the perception that East Timor academics have in relation to entrepreneurship. Taking this as a convenience sample, university professors from various academic institutions of East Timor were invited to collaborate in the study. It is important to note that none of the universities in the study have
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entrepreneurship courses. The sample has a total of 123 respondents. The professors’ age ranges from 23 to 53 years, with a mean of 35.77 years and a standard deviation of 7.954 years. The gender distribution has male domain, with 82.1% males and 17.9% females. In addition to gender and age, respondents also indicated their university’s affiliation and disciplines they teach (open question). Subsequently, based on the analysis of the disciplines listed, each respondent was classified in one of five teaching areas: 1) Engineering; 2) Economics and management; 3) Sciences (mathematics, statistics, physics and chemistry); 4) Education; 5) Other.

The summary of respondents’ background is presented in Table 1. The majority of respondents teach at the National University of East Timor (45.5%) or Dili Institute of Technology (24.4%). Regarding the areas of education, it notes that the respondents are mainly from the area of engineering (30.9%), economics and management (25.2%) or sciences (22.0%).

Table 1: Respondents affiliation and teaching area (n=123)

<table>
<thead>
<tr>
<th>University</th>
<th>Percentage of Respondents</th>
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<tbody>
<tr>
<td>National University of East Timor (Universidade Nacional de Timor Lorosá’e)</td>
<td>UNTL 45.5%</td>
</tr>
<tr>
<td>Dili Institute of Technology (Instituto de Tecnologia de Dili);</td>
<td>DIT 24.4%</td>
</tr>
<tr>
<td>Eastern University of East Timor (Universidade Oriental de Timor Lorosá’e)</td>
<td>UNITAL 12.2%</td>
</tr>
<tr>
<td>University of Dili (Universidade de Dili);</td>
<td>UNDIL 11.4%</td>
</tr>
<tr>
<td>Institute of Religious Sciences (Instituto de Ciências Religiosas);</td>
<td>ICR 6.5%</td>
</tr>
</tbody>
</table>

Teaching area
- Engineering: 30.9%
- Economics and management: 25.2%
- Sciences (mathematics, statistics, physics and chemistry): 22.0%
- Education: 13.8%
- Other: 8.1%

The questionnaire began by assessing the perceived image of entrepreneur with four statements adapted from Carayannis et al. (2003) (three statements) and Kruckertz and Wagner (2010) (one statement):

1. In business, it is preferable to someone having the initiative to create their own employment (be an entrepreneur) than being an employee in a large company or state company;
2. The initiative to create their own employment (entrepreneurship) is basically an exit and resource for people who have failed;
3. The success of someone who creates their own job (an entrepreneur) is strongly determined by “luck”;
4. The training is more important than personality as a success factor in the initiative to create their own employment (entrepreneurship).

Each respondent was asked to indicate their level of agreement with the statements presented (Likert scale with 5 levels ranging from 1 – “I strongly agree” to 5 – “strongly disagree“. The analysis of responses is summarized in Table 2.

From the analysis of responses and in particular the positive responses (i.e., sum of responses 4-“I agree somehow” and 5 – “I totally agree”), it appears that a large majority of respondents agree that it is preferable someone take the initiative to create self-employment (statement 1, 88.6% of positive responses), but simultaneously also agree that this is an exit or resource for people who failed (statement 2, 78.0%). This result seems a little inconsistent and raises some questions: Are the professors protrude in this statement and believe that in their particular circumstances, have their own job is an exit to people who have failed? Or is it just a misinterpretation? It may be interesting to explore this in the future.

In turn, the analysis of the two statements relating to the success, there is a lower level of agreement with the effect of luck (claim 3, 56.1%) and a significant agreement with the decisive effect of training (claim 4, 78.9%). Thus, it is possible to notice high recognition training as a determinant of success.
In addition to the perceived image of the entrepreneur, the initial research question included two statements regarding perceived image of entrepreneurship adapted from Carayannis et al. (2003) (Likert scale with five levels).

1. It is more beneficial to society have large companies than many small businesses;
2. Competition is undesirable because it destroys the economy.

The results are summarized in Table 3. On the one hand, the majority of respondents agree with a perspective of larger companies (statement 1) and on the other side disagrees on the existence of competition (statement 2). It is interesting to note that, from the perspective of entrepreneurship, both statements are negative, which would lead to answers with a more discordant nature. But this does not apply in the particular case of Timorese university professors. Does the agreement with the statement 1 (large companies) signals a desire for stability, job security? It may be interesting in the future to explore this discrepancy.

### Table 2: Perceived image of entrepreneur

<table>
<thead>
<tr>
<th>Statement</th>
<th>Do not know/Do not answer</th>
<th>I totally disagree</th>
<th>I disagree somewhat</th>
<th>Do not agree, or disagree</th>
<th>I agree somewhat</th>
<th>I totally agree</th>
<th>% Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>In business, it is preferable to someone having the initiative to create their own employment (be an entrepreneur) than being an employee in a large company or state company;</td>
<td>0.8%</td>
<td>0.8%</td>
<td>5.7%</td>
<td>4.1%</td>
<td>48.8%</td>
<td>39.8%</td>
<td>88.6%</td>
</tr>
<tr>
<td>The initiative to create their own employment (entrepreneurship) is basically an exit and resource for people who have failed;</td>
<td>1.6%</td>
<td>4.1%</td>
<td>10.6%</td>
<td>5.7%</td>
<td>37.4%</td>
<td>40.7%</td>
<td>78.0%</td>
</tr>
<tr>
<td>The success of someone who creates their own job (an entrepreneur) is strongly determined by &quot;luck&quot;;</td>
<td>0.0%</td>
<td>13.8%</td>
<td>17.9%</td>
<td>12.2%</td>
<td>31.7%</td>
<td>24.4%</td>
<td>56.1%</td>
</tr>
<tr>
<td>Training is more important than personality as a success factor in the initiative to create their own employment (entrepreneurship).</td>
<td>0.0%</td>
<td>2.4%</td>
<td>8.1%</td>
<td>10.6%</td>
<td>31.7%</td>
<td>47.2%</td>
<td>78.9%</td>
</tr>
</tbody>
</table>

### Table 3: Perceived image of entrepreneurship

<table>
<thead>
<tr>
<th>Statement</th>
<th>Do not know/Do not answer</th>
<th>I totally disagree</th>
<th>I disagree somewhat</th>
<th>Do not agree, or disagree</th>
<th>I agree somewhat</th>
<th>I totally agree</th>
<th>% Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is more beneficial to society have large companies than many small businesses</td>
<td>1.6%</td>
<td>4.9%</td>
<td>11.4%</td>
<td>8.9%</td>
<td>40.7%</td>
<td>32.5%</td>
<td>73.2%</td>
</tr>
<tr>
<td>Competition is undesirable because it destroys the economy</td>
<td>5.7%</td>
<td>27.6%</td>
<td>18.7%</td>
<td>11.4%</td>
<td>24.4%</td>
<td>12.2%</td>
<td>36.6%</td>
</tr>
</tbody>
</table>

In the survey there was also a question to analyze the professors’ risk predisposition. Respondents indicated their level of agreement with two statements from Raijman (2001) using a Likert scale, ranging from 1 (I totally disagree) to 5 (I totally agree):

1. Start a business of your own is risky because it may lose all;
2. It is true that you are the boss himself, but manage your own business involves hard work and responsibility and just brings big headaches.

The responses resulted in percentages of positive responses higher than 50%. Since the statements presented are negative, these results suggest a low predisposition to risk by Timorese university professors. Interestingly,
the neutral option (do not agree, nor disagree) presents percentages between 10.6% and 13.0%. The Table 4 summarizes the responses.

**Table 4: Risk predisposition**

<table>
<thead>
<tr>
<th>Perception</th>
<th>Do not know/Do not answer</th>
<th>I totally disagree</th>
<th>I disagree</th>
<th>Do not agree, or disagree</th>
<th>I agree somewhat</th>
<th>I totally agree</th>
<th>% Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start a business of your own is risky because it may lose all</td>
<td>0.0%</td>
<td>13.8%</td>
<td>22.0%</td>
<td>10.6%</td>
<td>35.0%</td>
<td>18.7%</td>
<td>53.7%</td>
</tr>
<tr>
<td>It is true that you are the boss himself, but manage your own business involves hard work and responsibility and just brings big headaches</td>
<td>0.0%</td>
<td>11.4%</td>
<td>18.7%</td>
<td>13.0%</td>
<td>34.1%</td>
<td>22.8%</td>
<td>56.9%</td>
</tr>
</tbody>
</table>

The survey also analyzed the perceptions of professors regarding their student skills and capabilities. Respondents indicated their level of agreement with four statements from Oosterbeek et al. (2010) using a Likert scale, ranging from 1 (I totally agree) to 5 (I totally disagree):

1. I am very confident about the technical skills of my students;  
2. The technical knowledge of my students is very good;  
3. If any of my students decides to participate in creating their own business, I am confident that will succeed;  
4. The financial knowledge of my students is very good.

Figure 1 summarizes the responses obtained. The analysis of the positive responses, shows values varying between 61.8% (statement 4) and 74.8% (statement 3). The results suggest good levels of confidence in the abilities and skills of their students to be successful in their own business and in their technical or financial preparation.

**Figure 1:** Perceptions of professors regarding their student skills
The survey also analyzed the perceived role of the University and its professors in promoting entrepreneurship. Each respondent was asked to indicate their level of agreement with six statements (Likert scale with five levels). The six statements were developed specifically for this survey:

1. University students should be encouraged to be creative and different;
2. University students must understand that the creation of an own business is a viable alternative;
3. University professors should communicate the advantages and disadvantages of creating a self-employment;
4. The University should create incentive programs to the initiative of self-employment (entrepreneurship) of their students and / or professors;
5. University students should have the opportunity to obtain a basic education at University about how to create their own employment (entrepreneurship);
6. Professors should use their knowledge to teach their students the value of the initiative to create their own employment (entrepreneurship).

The answers are presented in Figure 2.

A significant majority of respondents agree with all statements, with percentages of positive responses to vary between 80.5% (statement 4) and 95.1% (statement 5). Interesting to note that:

- The statement with the highest percentage of responses "I totally agree" is the statement 1, with 69.1%;
- The statement 2 presents a high percentage of positive responses (81.3%) and at the same time the highest percentage of negative responses (8.1% of total answers 1-“I totally disagree” or 2 – “I disagree somewhat”);
- The statements with the highest percentage of neutral responses (3-“Do not agree, or disagree”) are the statements 2 and 4 (both with 9.8%).

Given the results, one may conclude that the Timorese academics agree with a more active role of universities in promoting entrepreneurship. Professors also have the awareness of the need for professors themselves have a more active role in promoting self-employment among their students.

5. Conclusions

Entrepreneurship is a growing culture in every way. For an entrepreneur to exert its activity, it is necessary to take risks, identify opportunities, seek knowledge, make decisions, show leadership and planning, and above all, entrepreneurial instinct. The entrepreneurial capacity of a country depends on the education and cultural knowledge of entrepreneurship on the part of all citizens. Entrepreneurship develops as a cultural phenomenon linked to the development of education, able to promote the creation of micro and small companies to develop urban and rural areas of a country (Curteis, 1997; Sarkar, 2010).

In East Timor, the promotion of entrepreneurship should be seen as a key opportunity to increase the number of individuals with initiative to create new jobs. The country needs to train entrepreneurs who take responsibility for job creation and contribute to the economic development of the country. Since entrepreneurship has no formal teaching at Timorese universities, it is recognized as pertinent the viewpoint of Timorese professors about entrepreneurship. The research aims to explore the potential for collaboration of professors to foster entrepreneurial behavior of their university students and thereby contribute to further discussion on the topic of entrepreneurship in East Timor.

The survey resulted in 123 valid responses, mainly of male respondents (82.1%), professors at National University of Timor Lorosâ’e (45.5%), with an average age of 35.77 years. The paper analyze the perceived image of entrepreneurs and entrepreneurship, risk predisposition of professors, perceived skills of their students, and the perceived role of the University and its professors in promoting entrepreneurship.
1. University students should be encouraged to be creative and different;  

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2. University students must understand that the creation of an own business is a viable alternative;  

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3. University professors should communicate the advantages and disadvantages of creating a self-employment;  

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4. The University should create incentive programs to the initiative of self-employment (entrepreneurship) of their students and / or professors;  

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5. University students should have the opportunity to obtain a basic education at University about how to create their own employment (entrepreneurship);  

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6. Professors should use their knowledge to teach their students the value of the initiative to create their own employment (entrepreneurship);  

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Figure 2: The perceived role of the University and its professors in promoting entrepreneurship

In terms of perceived image, the Timorese professors demonstrate a good image of entrepreneurs and entrepreneurship. However, two situations are identified with seemingly contradictory results that arise from a high agreement on two negative statements: “the initiative to create their own employment (entrepreneurship) is basically an exit and resource for people who have failed” (78.0% of positive responses, image of the entrepreneur); “It is more beneficial to society have large companies than many small businesses” (73.2% of positive responses, image of entrepreneurship). Both situations suggest the need for future research to clarify why this finding. The analysis of risk predisposition of Timorese university professors indicates low values. It may result from the fact they already have a stable job. In terms of assessing the skills of their students, professors perceive them as high. Professors demonstrate good levels of agreement with the technical and financial expertise as well as the potential for entrepreneurial success of their students. Regarding the role of the university and its professors in promoting entrepreneurship, the majority of professors agree with a more active role of the university and themselves in promoting entrepreneurship among its students.
The results indicate the existence of a good receptivity of university professors on the issue of entrepreneurship in East Timor. As entrepreneurship is a new social priority in East Timor and the Government intends to increase the relevance of the private sector, it is believed that the Timorese universities should contribute to its dissemination. For East Timor, it is essential to highlight the role of universities in its role of educating and preparing young people for future working life, providing them with an entrepreneurial attitude that allows them to succeed in creating their own employment. It is recommended in particular that the public university, i.e., the National University of East Timor, assume a leadership role in promoting entrepreneurship among its students. The inclusion of disciplines on this subject in the curricula of the courses should be the first step.

Acknowledgements

The third author would like to thank the scholarship granted by the East Timor Government and the National University of Timor Lorosa’e. The authors also wish to acknowledge the support of CGIT and Algoritmi Centre, two research centres at the University of Minho, Portugal. This work is supported by FEDER Funds through the Operational Programme Competitiveness Factors – COMPETE, and National Funds through FCT - Foundation for Science and Technology under the Projects PEst-OE/EME/UI0252/2014 and Pest-0E/EEI/UI0319/2014.

References


Social Enterprise and Social Capital: A Proposed Methodology for Developing Innovation and Entrepreneurship in a Deprived Cornish Peri-Urban Locality

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Abstract: The English countryside invokes idyllic notions of an indigenous population living a rural dream desired by those who cannot escape urban pressures. However, this neglects the social reality for some individuals living in rural communities characterised by pockets of intense deprivation, where generational unemployment and domestic violence have created a landscape of anxiety and hopelessness. Voluntary organisations in these marginalised and lowly populated localities have found funding harder to obtain resulting, in some cases, in closure. The panacea for some analysts has been, the conception that the social enterprise model will improve wellbeing by achieving higher levels of social capital and participation amongst community members. The paradigm envisaging community activists entering into partnership with social entrepreneurs, effectively implementing public policies of the increasingly minimalized state negcts contending perceptions of social reality possibly embraced by community members in urban-rural environments. These contending, but equally legitimate, pre-dispositions about the relationship between the individual and community involvement can be understood as (1) a preference for hierarchical community management; (2) the belief that community services should be determined by market mechanisms and (3) the perception that initiatives are instruments of potential or actual control rendering them determined automatons. This last assertion may be the most relevant analysis regarding those residing in the deprived rural areas, specifically Cornwall in our case study. Nevertheless, all three understandings prompt the question – what is a realistic level of engagement in social enterprise initiatives in deprived localities? It is proposed therefore that a community-based participatory action research project, informed by the work of Freire (1985, 1996) and Bourdieu (1976, 1984, 1990 and 1998) may provide a methodology for enterprises to address stakeholder apathy and negativity in Cornwall.

Keywords: Cornish deprivation, participatory action research, Bourdieu and Freire

1. Introduction

If the social enterprise model is to be a fundamental element in addressing future welfare needs of rural communities then, alongside accepting unattractive business locations and low profit margins, its overt social aim could better focus on developing social capital amongst stakeholders. If omitted from the enterprise’s business plan the particular dynamics possibly existing in marginalised localities amongst potential employees and customers may result in a business environment failing to appreciate the unique co-production of social needs with the economic agenda. In this context, entrepreneurs need awareness of the communitarian assertion; community members should play a key role in addressing the needs of their neighbours (Etzioni, 1995 and 1997). In this paradigm it is axiomatic that communitarian proselytizers address the issue of community empowerment through the belief that the social nature of human beings is quintessential within community dynamics. Current researchers advocate community development through shared experiences sustaining common values and maintaining inclusive belief systems. Therefore, having met their personal responsibilities individuals are obliged to then contribute to the well-being of others through systems of mutual exchange (Etzioni, 1996). Nevertheless this communitarian aspiration consistent with the altruistic elements in social enterprises, may be thwarted by low levels of engagement amongst community members.

To explore these issues, this paper begins with a statistical analysis of a deprived peri-rural area, namely Cornwall’s Camborne, Redruth, Illogan and Pool (CRIP) linear settlement, before discussing how social enterprises could ameliorate the area’s needs. It then considers four contending perceptions of social reality (Dixon et al., 2009a, 2009b) illustrating the dilemma arising from contending predispositions, potentially encountered by the social entrepreneur, before offering a process that aspires to achieve regenerated social capital through “unity in diversity” (Ravn, 1991: 102-3).
The participatory action research design analyzed here attempts to facilitate reflection that transcends the dichotomy of objectivity and subjectivity in a framework of informal education, accommodates realistic wage expectations and enables effective community consultation and partnership working in a process of continuing summative evaluation and renewal in the search for permanent social change.

2. Understanding Peri-Urban Cornish deprivation

To examine critically the relations between models of social enterprise and deprivation we utilise the case study of Cornwall. Cornwall is in the top 5% of the most deprived areas of the UK, with the peri-urban localities in CRIP in the top 2% (CCCIT, 2013). Around 20% of the working age population in CRIP earned below the living wage in 2012, one in five households experienced fuel poverty (Cornwall Council, 2012). Gerard (2008:25) identifies poverty in Cornwall as “grinding”. Cornish wages are 25% below national average and house prices 17% above; the ‘democracy deficit’ has hit Cornwall hard. The economy struggles from the big picture even before considering that it has the highest water rates in the UK. In the 2010 indices of deprivation, CRIP scored in the lowest category on all measures (Cornwall Council, 2012). Harrison (2014) is clear: the poorest will be most devastated by welfare reforms, since Cornwall generally and the CRIP area specifically boasts some of the poorest people in the country. Hope was coming, though, Gerard (2008) asserted, in terms of the unitary authority for Cornwall, but sadly Mumford (2014:12) sees the same gloomy picture when researching CRIP as one area of the country which Westminster has “simply forgotten about”. Mumford (2014) identifies peri-urban areas of Cornwall as having one-third of their number claiming out-of-work benefits: George Eustice MP, in the same month reported delight that unemployment in CRIP had dropped by 500 people since the year before. Juxtaposed to this Cornwall Council have realised that reforms in welfare have meant an untenable choice. Having capped Council Tax benefit at 75% in January 2013, forcing the most impoverished to be faced with a council tax bill, in April 2013 they announced they would be helping the poorest households for up to 50% of their bill, an amount increased to 100% in April 2014, “rather than force them to choose between paying their council tax and heating or eating” (Cornwall Council, 2014:1). This is seen as a short term solution in CRIP, where grants to overcome rural poverty do not apply and where urban poverty, astereotypical of the Cornish idyll, is largely ignored by policy-makers.

3. The social enterprise model: essential attributes

This section explores the social enterprise model which is predicated on producing social capital. Bourdieu (1986: 249) defines social capital as “...the aggregate of the potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition.” This theorizing is rooted in concepts of power and subtle inculcations of power related to the dispositions of individuals. Therefore, language represents, expresses and confirms power in its symbolic terms. Thus, language and discourse are power in action and our analysis of interpersonal and group relations should focus on interpersonal relations rather than ontological debate about structure and agency.

3.1 Management style

The new social enterprise, its mission to provide an essential service in localities, should consider the notion that individuals have a fundamental need to socialise with others and, by working within collaborative groups concurring with a set of common aspirations, individuals can experience empowerment as self-esteem, and possibly access to material resources, increase. In this paradigm participants discover their shared values, attitudes, and beliefs, enabling the development of a strong moral code that is necessary to redress contemporary social deficits.

The entrepreneur should consider adopting the role of facilitator as illustrated in the fourth element of Whittington’s Typology (1993: 214). Within this choices are shaped by prevalent cultural norms in egalitarian forums where the entrepreneur learns from and with others. In this context the boundary between what Ridley-Duff and Bull (2011: 125) refer to as “the conceptions of social enterprise... and other forms of enterprise activity” is one of absolute clarity.

3.2 Leadership style

Martin and Thompson (2010: 64) maintain that leadership for social enterprises require innovative risk taking alongside capacity to grasp an opportunity and to utilise scarce resources. Whilst these assertions may be regarded as universal Bass (1998) offers analysis of transformational leadership accommodating strategic
imperatives in the functioning of a social enterprise in oppressed neighbourhoods. Values, morals and ethics are fundamental to the transformational leader as goals are articulated without compromising core principles. Consideration is always given to employees, both paid and volunteers, having meaningful, purposeful roles and personal development plans. Whilst there must be an awareness of short-term financial survival nevertheless the enterprise’s social mission and its adherence to developing human potential remains permanently intact.

4. Community members contending pre-dispositions

Idealism about the efficacy of community-based initiatives are inherent to community activists’ beliefs. These beliefs are “somehow maximally secured against doubt” (Welbourne, 2001: 40) through the application of individuals’ preferred formula for attaining their personal standard of truth. When community practitioners proclaim the existence of a construct called “community” in the theoretical domain of being it acts as “a description or inventory of the things that are supposed to exist according to a particular theory, which might but need not be true” (Jacquette, 2002: 3).

However, when adherents to the concept of community seek to convert the sceptic to the principle themes of community and community activism the question arises which personal principles this sceptic must compromise, and whether such an action would fundamentally violate this sceptic’s ideological convictions?

There follows an analysis of three contending perspectives that may be embraced by the individual in the relational situation of community involvement — all of which regards the concept of community and its capacity to enhance the lives of its members with a degree of scepticism.

4.1 The hierarchical explanation of community

Durkheim recognised that social structures can influence an individual’s cognitive structures and, therefore, social actions; with mental representations of the world arising from social participation (Bergson, 2004). Therefore, society creates facts about social structures, institutions, norms and values transcending the individual and constraining both their behaviour and social action through their social relationships. Thus, community members may be socialised into believing certain rules and norms, the violation of which attracts penalties. This scenario (Pinker, 2002: 53) “does not mean that benevolence and co-operation cannot evolve. It means only that benevolence, like flight, is a special state of affairs in need of an explanation, not something that just happens. It can evolve only in particular circumstances and has to be supported by a suite of cognitive and emotional faculties.”

Thus, creating such a common bond for some community members may only evolve in the principles enshrining the “common good” of society, which has priority over local community interests. Thus, their utopia is a vision reminiscent of Plato’s Republic ([c410-347] 2000), featuring a social order where everyone has, and is aware of, their pre-ordained position. In such a society, an elite would exercise knowledge-based power through a sophisticated legal system that has benefited from a tradition of tried and tested remedies.

Therefore, those embracing the hierarchical model of community take actions posited as predictable as their rational decisions are based on prescribed rules, procedures and strategies best able to produce justice. The notion of entrepreneurial risk taking creates unease as competition between citizens might arise, fragmenting the social framework. Thus, social mobility through the propagation of social capital, with its goal of empowering citizens, is not an imperative on the community agenda.

Instead concepts of community are recognised as tools to further traditional conservative imperatives for the state to preserve power over its subjects. This reaction is partially driven by contemporary insurgences of neo-liberal thought with emphasis on economic freedom and profit “that may pose a threat to traditional forms of social life, to custom, religion and morality” (Scruton, 1996: 11). So, communities should contribute towards preservation of established hierarchical institutions, fearing the infiltration of community organisations by radical solutions for sustainable change furthering the aim of liberating the oppressed.

Organically, state and society combine to form a nation in the tradition of Comte’s ([1830-42] 1896) positivist project to identify the invariant laws governing the social world in acknowledgement of the interrelated nature
of social institutions. This basic uniformity or regularity draws upon natural groupings, not classifications imposed as a result of the feelings of individuals (Aristotle [c.335-322] 1976).

4.2 The market explanation of community

Some community analysts (Wallman 1984, Bulmer 1986) present scenarios at neighbourhood level reflecting a “rational/utilitarian sociological tradition” (Crow, 1997: 19). Thus behaviour is explained in a framework reminiscent of research conducted by Homans (1951), revealing that people would enter into exchanges with ‘equal’ others provided it was to their mutual benefit and they could avoid interaction with others not their equals. This style of interdependence, limited by self-interest, exemplifies the observation that cultural and/or financial disadvantage may limit people’s ability to participate in the affairs of their community (Lister 1990). This mode of making decisions about social engagement is based on a particular set of believed or anticipated rewards. Implicit is satisfying the need to better understand social reality via acquisition of information from others (Festinger 1950, 1954; Schachter 1959; Wills 1981). Explicit, is the expectation that rewards will exceed the believed or anticipated costs, whether monetary or material (Foà and Foà 1971) or in time spent (Heider 1958).

Whilst wealth creation is a function of the social enterprise paradigm nevertheless social needs in deprived localities implies, certainly initially and possibly in the longer term, minimal returns on capital. When reviewing these sparse financial opportunities community members who value the capacity to optimise their own utility through freedom of choice can conclude that the synergy of the social agenda with economic outputs creates an undesirable paradox. Thus, “the real bottom line is that there are individual actions, that there are outcomes of those actions, and that individuals choose actions in terms of their outcomes, using some decision rule or other” (Laver, 1997: 28; see also Bacon [1623] 1997, Machiavelli [1513] 1999). Here, decisions can accord with a consequential ethical framework underpinned by the effects of the free market.

The ideologies underpinning the market model are liberalism, neo-liberalism and libertarianism. This presents challenges to community praxis, as they are founded on the principle of individual autonomy — a doctrine which community advocates associate with the cause of social atomisation and fragmentation. Therefore, community proselytisers would try to influence self-interested utility maximisers exhorting “that free individuals require a community,” which backs them up against encroachment by the state and sustains morality by drawing on the gentle prodding of kin, friends, neighbours, and other community members, rather than building on government controls or fear of authorities” (Etzioni, 1995a: 15). However, those developing social enterprise informed by community praxis must recognise the pursuit of an acceptable level of individual self-interest is an inevitable feature. This leaves the crucial maxim — it is the individual’s unencumbered self that is the only being that can decide an individual’s social role — forgone in return for a hypothetical promise of protection from the possibility of state interference in the arena of individual choice.

4.3 The anarchical understanding of community

Popple notes “anarchism advocates the establishment and the operation of voluntary associations based on co-operative principles and mutual aid” (1995: 34) enabling inclusion as a theoretical base informing radical community praxis. However, this model contributes to a distinct set of contending beliefs about community praxis resulting in discrete opinions about the desire to, the capacity for, and the processes of engaging with community.

The anarchical community member creates their essence, in a process where they are subsumed by compositional arrangements in their lives or they understand and utilise the potentialities of their own agency. During this lifelong journey of choice between affirmation of individual will or acquiescence to false constraints of determinism each person will be alone, confined within their own reality, unable to share their observations and conclusions with anyone else. Thus, Finch notes that “I do not know whether anyone else has what I have when I have a direct experience of the senses” (1995: 175, n. 4) which resonates with Wittgenstein’s assertion that “I am my world” ([1922] 1961: 5.63).

Adherents to the anarchical model of community can display apathetic attitudes towards community initiatives as they experience alienation from their fellow citizens. Thus, the acquisition of knowledge is limited to personal experience reflecting the Sartrean notion of existence proceeding essence (Sartre, [1938] 1964). Individuals can be committed “outsiders” (Wilson, 1957) with sophisticated systems of philosophical, political
and ethical beliefs. Therefore, it is important to emphasise the wide cultural diversity that manifests amongst these individuals, avoiding the error of labelling them as a social sub-stratum or residuum, characterised as the Marxist "lumpenproletariat" (Marx and Engels, [1848] 1967: 93) or as the “underclass” (Murray, 1996).

Individuals, living in a social reality of deprivation, where the structures of society appear malevolent, might feel socially excluded to the extent that embracing an anarchical understanding of community seems the only course to follow. The extent that a social entrepreneur might encounter this degree of scepticism about a welfare initiative is an empirical question beyond the scope of this paper however, the presence of such vales, attitudes and opinions seems plausible.

5. Re-defining contending pre-dispositions

5.1 Social capital in the field of community and social enterprise

Dixon, Dogan and Sanderson (2009a and 2009b) assert that the four social reality perspectives — described here as hierarchical, market orientated, communitarian and anarchical — provide a typology of four distinct contending methodological configurations. If the social entrepreneur is aware of these differing perceptions then the theorising of Bourdieu can provide a coherent framework that can inform a process of reconciliation.

Bourdieu’s (1976 and 1990) concepts of field — a bounded realm of activity, for instance community, education, politics — habitus — the practical awareness of people in a field of activity that generates actions and bestows meanings — and the doxa — an experience that often produces unquestioning acceptances of objective structures as though they were natural — offers a site ontology that transcends the dichotomy between structure and agency.

Within the field of community a differentiation can be applied to the variable social contexts in which individual’s consciously and subconsciously internalise their self-identity through their relationships with others. The material or ethereal assets that are at stake in the field of community can be designated as generators of social capital. Critically as Bourdieu has observed, there is a link between a field of individual practices and the concept of habitus. In this notion Bourdieu’s reveals the necessity to focus on an agent’s practices of self-domestication. Jenkins (1992: 76) provides a succinct description of the concept as composed of a set of dispositions “which include a spectrum of cognitive and affective factors” that induce people to act and behave in particular ways in specific situations. The emphasis here is on social mediation, or the practices that take place between agents rather than those initiated by agents. This leads Bourdieu to introduce “the doxic experience” (1990: 20). This construct is not regarded as having a permanent unanimity but it seems that an individual must experience a reflexive process, most likely as a result of specific circumstances, before they would alter their internalised practices.

As the social entrepreneur comprehends the differing dispositions that have contributed to varying types of social capital within the field of community activity then Freire’s cycle of participatory action research can be utilised to achieve an empowerment that can contribute to the implementation of an effective social enterprise.

5.2 Shared meaning systems and unity-in-diversity

The process proposed by Freire can be illustrated as a cycle (see Figure 1) where community members coalesce into a group to address common needs (1996: 64–7). In this scenario, the social entrepreneur “would work with but never on” (Freire, 1985: 40) people by offering generative themes for group reflection. These generative themes might consist of case studies, commentary, photographs, films or even plays. However, whatever the medium used, the intention would be to generate reflection amongst participants over their shared experiences. This reflexivity would lead to a “pulling in of analysis” (such as social research and ideological interpretation) that can add to the collective understanding of shared experiences. Such action would be of particular value when it highlights the suffering of being submersed “in the reality of oppression” (Freire, 1996: 27) by the everyday operation of institutions and organisations. Through collective investigation of these issues, it is proposed that participants would have reached a stage of reflection where the doxic experience can become a reality.
The cycle of action-reflection-action becomes a methodology for participatory action research as others in the community either join the existing group or form new groups to analyse, evaluate progress and critically reflect over the performance of the outputs and outcomes from the social enterprise project.

The notion of unity-in-diversity is used here to describe the optimal mode of community involvement in a social enterprise or enterprises where community members have construct a model of social reality, modulated by the wish to construct an inclusive collective that accepts the legitimacy of contending perspectives on the social world (Ravn, 1991: 102–3). This modulation would reconcile opposing values, attitudes and opinions to the extent that collective action becomes possible whilst contending predispositions continue to exist. Thus, community members have reconstructed their expectations about community relationships, stimulated by Freire’s cycle of reflection and understood why community members would anticipate different outcomes from their community based on their past experiences.

The transcendental notions expounded here can be related to Olli’s work (1995 and 1999), where the conceptualisation of coherent, sequential and synthetic individuals provides a means of exploring the relationship between people and their preferred system of bringing meaning to particular situations. Olli argues that the coherent individual would consistently support one shared meaning system in any specific set of circumstances thereby embracing an absolutism that is indifferent to contending social reality perspectives. Alternatively, sequential individuals adjust their shared meaning system in any given circumstance if there are perceived net benefits to be gained from this action. Finally, the synthetic individual would freely adopt differing ways of understanding social reality, moving freely from one shared meaning system to another by embracing relativism. Therefore, if social entrepreneurs wish to facilitate community members in working towards the aim of achieving the concept of unity-in-diversity then they should consider adopting the position of a synthetic social realist. Through this role, there would be opportunities to empathise with contending perceptions, and these experiences can be translated into exploratory hypotheses concerning community members’ exigencies. In this vista the social entrepreneur will be committed to “a sense of unity and meaning, while fully appreciating and respecting that others may follow paths that are equally important” (Rayn, 1991: 103). Moreover, the entrepreneur learns from the community and its unique dynamics being prepared to change course if necessary.

Thus, the unity and diversity principles become mutually inclusive complementary experiences that are fundamental precepts to achieving the stakeholder involvement that is essential for a successful social enterprise.
6. Conclusions

In this paper we have argued that social entrepreneurs need to critically reflect on their praxis if the concept of social enterprise is to be an effective tool in addressing the needs of marginalised localities, such as CRIP. By doing so they can aspire to affect change in those deprived places, particularly when delivering welfare services. We believe that entrepreneurs need to adopt the approach of a facilitator in social service engagement so that their praxis becomes “a liberating and progressive force” (Popple, 1994: 24). Underlying this assertion is the lacuna in much contemporary social enterprise literature fails to recognise the difference between individual’s sense of identity, purpose and their multifarious and sometimes contending perspective on social realities. These personal interpretations and histories of experience lead to particular values, attitudes and beliefs in relation to their membership of a community and involvement in community initiatives.

Moreover, the proposed participatory action research project in CRIP reflects the urgency needed to address welfare issues in a uniquely deprived area. In this context, social enterprise, with its emphasis on measuring its success by its social value is a model that can offer a means of purposeful change in a reality where return on capital is inadequate for private sector intervention and the voluntary sector is unable to maintain its services with the withdrawal of funding.

Although the proposed research is specific to CRIP the ideological analysis and methodology are relevant to other deprived communities on a national, european and indeed global scale.

References


Improving Absorptive Capacity Through Social Media Networks for Firms’ Innovativeness

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Abstract: firm’s innovativeness come mainly from its ability to recombine knowledge acquired through external collaborative networks. Firms are increasingly employing social media to manage relationships with consumers so as to improve their own absorptive capacity and to generate new and innovative products and services. Absorptive capacity and social media become keys for the creation of a competitive advantage of a firm. The use of social media platforms can provide a wealth of information about individuals and their networks, which can be utilized for various business purposes. It allows people to create online communities and share user-created content (UCC). Within this context the active connections among people – “the trust, mutual understanding, shared values and behaviours that bind the members of human networks and communities and make cooperative action possible” (Cohen and Levinthal, 1990) – allow companies to generate innovations. More specifically, my aim is to investigate how firms give meaning to the information they collect and accumulate through these information technologies that enables them to interact with customers, suppliers, partners among others in order to absorb external knowledge, and to improve firm’s innovative performance of a firm. Having analysed the data extracted by Amy and Poston (2013) on 217 global companies in diverse set of industries such as high tech and electronics, food and beverage, consumer durables, among others through the application of Partial Least Square Path Modelling with IBM SPSS software, I demonstrated the crucial role of social media in enhancing absorptive capacity.

Keywords: absorptive capacity, social media networks, innovation performance, global companies

1. Introduction

With a more widespread access to internet, microblogging, social networking sites and weblogs have changed the way in which marketers implement their business strategy. From an overview of the current literature, it appears that many of existing new products or service emerged from business model focus on social media platforms. They used social media platforms such as Blog, Facebook, Twitter, YouTube among others to acquire information related to needs of consumers and then absorb and transform such knowledge so as to create new products or services (Bharati et al 2013).

Social media platforms are being adopted by a growing number of entrepreneurs. As mentioned by Stelzner (2013) 86% of marketers declare that social media is important for their business, 69% have decided to learn more about social media platforms and 66% plan on increasing blogging activities in 2013. Stelzner also highlights three types of benefits generated from the use of social media platforms. The first one is to generate more exposure (89%); the second benefit regards the increase in online traffic (75%) and the last one refers to lead generation (64%).

As pointed out by Amy and Poston (2013) the development of social media networks within firms accelerate and deepen service innovation and growth by promoting specialization within customers, suppliers, other companies. This, in turn, results in faster time to market, faster product adoption and lower product development cost for companies.

In this process, not just marketers are relevant players but also consumers. They utilize social media platforms to create, modify, share and discuss internet content (Kietzmann et al 2011). Garretson (2008 p.12) argued that “consumers increasingly use digital media not just to research products and services, but to engage the companies they buy from, as well as other consumers who may have valuable insights”. Social media platforms have become the perfect tool to influence current and potential consumers (Hanna et al 2011). Companies create brand communities in the form of brand fan page on social media platforms where it is possible to develop an interactive relationship between the company and its consumers by linking and commenting on the brand’s posts (Mc Alexander et al 2002; Muniz and O’Guinn 2001).

According to Nielsen Wire (2012) 47% of social media users prefer to comment on or ask a question about a company’s product or service on Facebook but 29% of social media interact with company on its page and 28%
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on their own personal page. Hence the virtual space represents a profitable chance for companies to gain positive favour with consumers in order to build a strong brand loyalty and reputation. Chesbrough (2011: 21) opines that “companies create future products based on information received from their customers” developing a high level of absorptive capacity. With the use of social media platforms the firms describe and promote products or service to potential customers and co-create also new product or service with customers (Tussyadiah and Zach 2013).

Given that firms acquire information through social media networks, such information becomes valuable and profitable with the development of a high absorptive capacity. Absorptive capacity is the ability of a firm to identify the process of acquiring external knowledge, transferring and assimilating it into the organization and then generating a new knowledge (Cohen and Levinthal 1990). The specific features of absorptive capacity are its wider scope and prompt availability, as well as the higher probability of involving new elements, so, unlike external industrial knowledge. It has a much higher chance of encouraging innovativeness. Knowledge absorption plays a crucial role, as the acquisition and transformation of different types of external knowledge can benefit the firms in the innovation process (Del Giudice and Scuotto 2014).

Research on the relationship between social media networks and innovation performance is fundamentally new area. The majority of academic scholars have focused their own research on social media platforms as marketing tools (Berinato 2010) or on how these channels increase marketing communication effectiveness (Dholakia and Durham 2010; Kozinets et al 2010; Trusov et al 2009) but little is known about how they may benefit firms.

This study aims to analyse if there is a correlation between social media networks, absorptive capacity and innovation performance through the application of PLS-PM by using IBM SPSS software.

Looking through the data extracted by Amy and Poston (2013) on 217 global companies in diverse set of industries such as high tech and electronics, food and beverage, consumer durables, among others, it has been confirmed that the firms improve their own innovation performance, by building an high level of absorptive capacity and developing social media networks.

2. Leveraging social media capabilities in innovation performance

In the new millennium, the ubiquitous mobile and tablets devices, characterize the ability to access information and interact with other people everywhere (Scuotto and Morellato, 2012). The convergence of such devices have not only introduced new software paradigms and applications, but also, and more importantly, changed the way in which companies interact with costumers.

Social media are “web based services that allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection and view and traverse their list of connections and those made by others within the system” (Boyd and Ellison 2008: 211). They are user-friendly, inexpensive and innovative channels and they also are internet and mobile based technologies (Fischer 2011). “Social media is a group of Internet- based application that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content” (Kaplan and Haenlein 2010: 61). In reference to the classification of social media by Kaplan and Haenlein (2010), it is possible individuate the following social platforms: Facebook as social networking, You Tube as video sharing, Pinterest as picture-sharing, LinkedIn as professional networking, Blogs as weblogs, Foursquare as location-based social networking website and Twitter as microblogging.

Some authors pointed out that the value of social media comes from how a particular platform is used and from the level of social media capabilities (Hanna et al 2011; Kietzmann et al 2011; Fisher and Reuber 2011). Social media networks provide to a given organization profitable ways to attract new customers, to drive sales, to improve the brand image and to support branding and customer service (Culnan et al 2010). Social media platforms are defined as virtual customer environment (VCes) and they allow firms to engage a large volume of costumers at relatively low cost and at a higher level of efficiency than normally achievable with more traditional communications tools (Schmallegger and Carson, 2008).
In order to create value through social media platforms, companies need to make a “mindful decision” regarding the initial implementation of a social media strategy following from the development of social communities and management of potential and realized absorptive capacity. In early stage innovation process, companies have to decide what type of social media platforms to adopt, how they should be used and how monitor content and measure value. The firm should enhance social media networks aligning the platforms with its organizational culture, its interests of target market and its business objectives. For example, Twitter is a valuable platform to rapidly communicate with costumers but “would probable a bad option if you can’t respond quickly” (Culnan et al 2010: 247).

These virtual platforms are used to implement a company’s social media strategy and to expand new social content, in which valuable information from customers can be selected for their purchase (Schmallegger and Carson 2008). Hvasss and Munar (2012) claim that social media platforms are virtual spaces where companies are able to interact directly with consumers and monitor recommendations. Social media networks have a positive impact on firms encouraging them to spend time and energies to interact and absorb knowledge with external actors.

Given that currently the use of social media platforms within organization system plays a crucial role, I propose that the investment in the development of social media networks is efficient in extracting profitable knowledge from customers and to turn it into products and services ideas. This leads to the consecutive proposition that can be expressed as follows:

\[
H1. \text{The development of social media networks enhances of firms’ innovativeness.}
\]

3. A high level of absorptive capacity

According to Cohen and Levinthal (1990), the ability of a firm to identify the process of acquire external knowledge, transferring and assimilating it into the organization and then generating a new knowledge is fundamental to measure the firm’s innovative capabilities and innovative performance. This process is defined as absorptive capacity, where innovation results more from borrowing rather than from invention (March and Simon 1958). Robert et al (2012) opine that absorptive capacity needs both a stock of existing knowledge and an ability to absorb new knowledge. They also emphasized that internal or existing knowledge influences the firm’s ability to identify and absorb external knowledge. This is due to the fact that the internal knowledge firms cannot determine the value of external knowledge. Zahra and George (2002) identified two dimensions of absorptive capacity: 1. Potential absorptive capacity and 2. Realized absorptive capacity. The first one is characterized by knowledge acquisition and assimilation, which knowledge acquisition is the capability of firm to recognize, value, and acquire external knowledge and assimilation is the ability of firm to absorb external knowledge. While realized absorptive capacity is distinguished by knowledge transformation and exploitation, which knowledge transformation can be defined as the ability of a firm to develop routines through which combine existing knowledge with newly acquired and assimilated knowledge and knowledge exploitation is the process through which a firm refines, extends and leverages existing competences or generates new ones by acquisition and transformation of external knowledge (Zahra and George 2002).

In the field of social media, firms need to develop a high level of absorptive capacity by interacting with customers, suppliers and other partners. Therefore, for the success of an innovative company, the acquisition and exploitation of knowledge capable of bringing together with new ideas are not sufficient. So a virtual network structure is required in order to support innovation process in the long run and to make it successful enough to be deemed legitimate. Absorptive capacity and social media networks are important for the success of an innovation strategy, as the presence of only one of them is not sufficient (Bharati et al 2013). Given the fundamental role of absorptive capacity in determining the innovation performance of a firm, I concur with Zahra and George (2002) in regarding the absorptive capacity as an explanation of innovative performance at the firm’s level.

This leads to the following proposition that can be expressed as follows:

\[
H2: \text{Absorptive capacity as predictors of innovative performance at firm level.}
\]
4. Innovation performance

Following the above discussion, it can be inferred that the advantages of innovation stem from the improvement of absorptive capacity through the development of social media networks. Many researches stressed that absorptive capacity contributes both directly (Lichtenthaler 2009) and indirectly (Lane et al 2006) to innovation performance. According to Zahra and George (2002), absorptive capacity has a crucial role in innovation process. As they said “a firm with higher absorptive capacity is better able to sense changes its environment, explore available alternatives, adapt solutions that are available, and thus exploit innovation meets its needs” (Zahra and George 2012 in Bharati et al 2013: 10).

Innovation has been considered as the ability to develop products able to meet the needs of the market, the ability to use existing technology to develop products, the ability to develop new products or update existing products to meet the needs of markets, and the ability to acquire new technology to create new opportunities (Alder and Shenhar 1990). Duncan (1972) also argued that innovation is a creative strategic action involving implementation of existing ideas to generate new ideas or figure out a problem. Innovation is also conceived as “a means of changing of organizations either as a response to changes in the external environment, or as a pre-emptive action to influence the environment” and as “the process of generating and using any idea, practice, or object that the adopting organization regards as new” (Damanpour 1996 in Zeinolabedin and Seyed 2011: 432). Innovation becomes a result of interactive relationship among suppliers, customers, other companies and research centres (Laursen and Salter 2006). Mansfield (1986) also suggested that the collaborations with other stakeholders enables the firms to accelerate product time to market, product adoption and consequently reduce product lifecycle. Innovation is performed in cooperation with external actors (Reichwald and Piller 2009). As defined by Chesbrough and Crowther (2006: 222), “innovation is generated from the “use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [...] firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology”. Social media platforms are virtual environments with social communities where individuals and communities share, co-create, discuss, and modify user-generated content (Kaplan and Haenlein 2010).

The main role of absorptive capacity as well as social media networks results in the following research hypothesis:

\[ H3: \text{A high level of absorptive capacity and the development of social media networks positively influence firms’ innovativeness.} \]

5. Empirical findings

In recent literature, several authors have focused their research on social media platforms as marketing tools (Berinato 2010) or on how these channels increase marketing communication effectiveness (Dholakia and Durham 2010; Kozinet et al 2010; Trusov et al 2009). Little is known, however, about how they may benefit innovation performance of a firm. No major study has analysed the correlation between absorptive capacity, social media networks and innovation performance.

Examining the available data provided by Amy and Poston (2013) on 217 global companies in a diverse set of industries such as high tech and electronics, food and beverage, consumer durables, among others, this research aims at investigating whether the improvement of a high level of absorptive capacity through the development of social media networks positively influence the innovation performance of firms. In order to explore this research question, PLS-PM was applied through use of IBM SPSS software package.

The PLS is a method fit for this exploratory research because it focuses on prediction data (Lohmoller 1989; Bharati 2013). The PLS is characterized by both a factor model and a path model. Factor model (Tabachnick and Fidell 2013) enables the researcher to evaluate items or manifest variables in relation to their own latent variable or factors. Path analysis (Weston et al 2008), on the other side, measures the positive or negative connection between LVs. Unlike traditional multivariate procedure, PLS provides explicit and estimated error of variance parameters (Byrne 2013), and is apt to examine more than one regression equation/relationship at the time as well.
The unit data collection in this study is a firm. The sample, as mentioned above, was composed by 217 firms in a diverse set of industries. They were selected in reference to three control variables such as firm size, annual revenue, and the level knowledge of social media platforms.

- Firm size is a one of the most relevant factor of innovation performance. As established in innovation literature, firm size could be considered a proxy for slack resource and infrastructure that improve firms’ innovativeness (Roger 2003).
- Annual Revenue is a factor that represents both the firm’s ability to survive and to invest in R&D activities (Utterback 1974).
- The level knowledge of social media platforms is a factor in line with the capacity of a firm to use social media platforms in order to acquire and absorb external knowledge so as to turn it into product or service (Culnan et al 2010).

Following the above mentioned theoretical framework and the data by Amy and Poston (2013), three latent variables such as absorptive capacity, social media networks and innovation performance have been selected. Each single LV has 3 items (table 1), which are considered like the “reflection” of their latent variables (Tenenhaus et al 2010).

**Table 1:** Latent and manifest variables

<table>
<thead>
<tr>
<th>Latent variables</th>
<th>Manifest Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovation Performance</td>
<td>Faster time to market (y1)</td>
</tr>
<tr>
<td></td>
<td>Faster to product adoption (y2)</td>
</tr>
<tr>
<td></td>
<td>Product lifecycle management (y3)</td>
</tr>
<tr>
<td>Absorptive Capacity</td>
<td>External Knowledge (y4)</td>
</tr>
<tr>
<td></td>
<td>Internal knowledge (y5)</td>
</tr>
<tr>
<td></td>
<td>R&amp;D activity (y6)</td>
</tr>
<tr>
<td>Social Media Networks</td>
<td>Social communities (y7)</td>
</tr>
<tr>
<td></td>
<td>Social Media platforms (y8)</td>
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<tr>
<td></td>
<td>Social Media Capabilities (y9)</td>
</tr>
</tbody>
</table>

A path diagram has been drawn to illustrate the set of relationships hypothesized (Figure 1).

**Figure 1:** Path diagram

The squares represent manifest variables whereas the ovals are latent variables, among which social media networks and absorptive capacity are exogenous latent variables, i.e. they are synonymous with independent variables that influence the value of endogenous latent variable such as innovation performance. Furthermore, it is necessary to specify that absorptive capacity is both exogenous and endogenous. It means that it influences the value of endogenous latent variable and, at same time, it has influenced by exogenous one like
social media networks. Innovation performance is a dependent variable. One-way arrows indicate the impact of exogenous LVs on endogenous one, and MVs on LVs.

In order to make a reliable evaluation, the unidimensionality of the block of MVs and its LV have been evaluated by Cronbach’s Alpha. Alpha for absorptive capacity was .85, for Innovation performance .81, and for social media networks was .73. The score of these factors resulted >0.70, meaning that MVs are correlated positively with its LV (table 2).

**Table 2: Cronbach’s alpha**

<table>
<thead>
<tr>
<th></th>
<th>Cronbach’s Alpha</th>
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<tbody>
<tr>
<td>Absorptive Capacity</td>
<td>.85</td>
</tr>
<tr>
<td>Innovation Performance</td>
<td>.81</td>
</tr>
<tr>
<td>Social Media Networks</td>
<td>.73</td>
</tr>
</tbody>
</table>

Successively $R^2$ has been estimated so as to verify the quantity of variance of endogenous variables in relation to exogenous variables. As emerged from findings the value of $R^2$ results as positive for innovation performance (0.88) and absorptive capacity (0.71) (table 3).

**Table 3: $R^2$**

<table>
<thead>
<tr>
<th></th>
<th>Absorptive Capacity</th>
<th>Innovation Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2$</td>
<td>.71</td>
<td>.88</td>
</tr>
</tbody>
</table>

Moreover in order to verify the unidimensionality of the blocks illustrated into path diagram above, a path analysis has been applied. From which resulted that absorptive capacity (7.8) is the most important factor to improve the firms’ innovativeness. Although the presence of social media networks (6.3) is also relevant in enhancing absorptive capacity and encouraging the development of new products or services (figure 2).

**Figure 2: Path analysis**

These findings demonstrate the reliability of the research hypothesis as above-mentioned presented earlier:

$H1$. The development of social media networks enhances innovativeness of firms.

As resulted $R^2$ analysis social media strategy has a positive correlation with both absorptive capacity (0.71) and innovation performance (0.88).

$H2$: Absorptive capacity as predictors of innovative performance at firm level.

The high impact of absorptive capacity on innovation performance was registered by value 7.8.

$H3$: A high level of absorptive capacity and the development of social media networks positively influence the innovation performance of firms.

Path analysis shows that innovation performance has a positive correlation with absorptive capacity (7.8) and social media networks (6.3).
6. Discussion

Interestingly, while most companies are familiar with the use of social media platforms for outbound marketing and communication efforts, leveraging social media for product innovation is a new concept for many. This research showed the positive impact of a high level of absorptive capacity on firms’ innovativeness. It also contributes to firm innovation literature. Although the absorptive capacity concept is widely examined in literature, there still is a relatively little knowledge on the relationship between absorptive capacity and social media network.

The present research, analysing data extracted by Amy and Poston (2011) on 217 global firms in diverse set of industries, endeavours to explore a new research area by focusing on the evaluation of the correlation between the high level of absorptive capacity, the development of social media networks and the improvement of innovation performance and observe three fundamental aspects.

The first concerns the positive correlation between the absorptive capacity and the innovation performance of global firms, which was demonstrated through the value path analysis, i.e. 7.8.

These values confirm the theory by Cohen and Levinthal (1990), referring to the ability of a firm to acquire external knowledge, transfer and assimilate it into the organization and then generate a new knowledge. Moreover the positive value (> .70) linked to relationship between manifest variables and absorptive capacity shows a clear evidence that absorptive capacity is characterized by both a stock of existing knowledge and an ability to absorb new knowledge (Robert et al 2012). It appears that the firm’s ability to identify and absorb external knowledge is limited in the absence of internal or existing knowledge, as the firm would not be able to independently evaluate the value of external knowledge.

Subsequently, the role of social media as predictor both enhancing absorptive capacity and innovation performance was confirmed by the following values of R² .71 and .88.

According to Kaplan and Haenlein (2010), social media networks enable firms to create social communities shared by external actors such as customers, suppliers, other companies, among others, as an environment where to share and discuss their respective ideas and co-create new product together with firms. Chesbrough (2011) also pointed out that firms develop new products or services on the basis of contents generated by users. The development of social media networks accelerates and deepens service innovation and growth by promoting specialization within customers, suppliers, other companies, resulting in faster time to market, faster product adoption and lower product development costs for companies (Amy and Poston 2013).

Therefore for the success of an innovative company, the acquisition and exploitation of knowledge capable of bringing together new ideas is not sufficient. In addition, social media networks are necessary to increase firms’ innovativeness. Absorptive capacity and social media networks have a crucial role in innovation process of a firm (Bharati et al 2013).

Building on the idea that innovation includes the ability to develop products that would to meet the needs of the market, the ability to use existing technology to develop products, the ability to develop new products or update existing products to meet the needs of markets, and the ability to acquire new technology to create new opportunities (Alder and Shenhar 1990), the present research demonstrates via PLS- PM that the capacity of a firm to absorb existing knowledge by social media networks positively contribute to its innovativeness. I believe that an increment in the use of social media platforms along the implementation of a tailored social media strategy may facilitate the engagement of large volume of customers, stimulate the ability to build collaborative networks and encourage innovativeness.

7. Limitations and further research

In the current market a lot of companies are using, or planning to use, social media platforms to enhance their own innovativeness. I claim that the social media platforms are relevant not just creating an online presence but also developing valuable strategies based on mindful adoption of social media networks, community building, and absorptive capacity (Culnan et al 2010). Indeed, the present findings emphasize two relevant entrepreneurial mindsets with reference to the usage of social media platforms: 1. the entrepreneur’s ability
to create a new online network through social media platforms; and 2. her capacity to collaborate with external stakeholders (Hanna et al 2011).

The present study offers a framework to understanding the relevance of the use of social media in innovation process, and the adoption new mental models and strategies. In this way, social media networks would enable marketers to develop new product or service thanks to collaboration with external stakeholders as customers (users). Such collaboration would be a process of discovery, realization, and exploitation of a new idea (Garretson 2008; Chesbrough 2011).

Academically, the present analysis provides an evaluation among social media networks, innovation performance and absorptive capacity through PLS- Path Model in order to discover and assess the correlation among these latent variables, which has not been studied previously.

This study is not without limitations. First of all, the indirect data used and related to global firms have been jointly analysed. Hence, it could be interesting to expand this study and to analyse closely Small Medium Enterprise (SME), building interesting and valuable case studies to present a more comprehensive picture of how social media may support innovation process. Furthermore, the present research addressed mainly the use that companies make of social media such as Twitter, Facebook, and YouTube, among others, to interact with customers, defining social media platforms as a virtual customer environment (Schmallagger and Carson 2008). To this extent, further research could be focused on the implementation of a company’s social media strategy aimed at supporting absorptive knowledge among its own employees.

Reference


Regional Structure of the Country on Costs and Results of Innovative Activity: The Case of the Russian Federation

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Abstract: Innovations have a great impact on the progress of modern society. Highly developed countries are homogenous in providing high living standards while countries with lower level of innovative activity cannot keep such a level and differ substantially from each other in values of main social indicators. We show it with the model of the relation between Global Innovation Index and Human Development Index for more than 100 countries. Generally the level of innovative development changes for the better worldwide. But the countries and their counties, or regions, progress in different ways. To provide the effective control of the regional development it is important to obtain relevant information presenting regional structure of the country on innovative development indicators such as the output of innovative products and services and the expenditure on technological innovations. As a descriptive model we first use kernel density estimates of probability density function. Some groups in the structure are close to each other and hardly distinguished by traditional grouping procedures. In order to find if the regional system is really heterogeneous we use fuzzy approach to classification that seems to be the most suitable for compound structure analysis. It is based on a statement that each element (region) is a member of each group, and the degree of this participation is a value of the membership function. Both parametric decomposition of probability density function and nonparametric «c-means» clustering are applied for regions stratification on the innovation potential and activity indicators. For identified groups (strata) we search the influence of various factors on innovative development using weighted variables. As weights we apply the values of the membership function for corresponding group. For group profiling and modelling along with general indicators of regional economic development the specific indicators of small enterprise evolvement are used. Modelling results show the role of small entrepreneurship in innovative development in identified regional groups.

Keywords: innovative development, population well-being, regions stratification, fuzzy clustering, small enterprise

1. Introduction

Growth of living standards is the main goal of modern society. Population well-being indicators have become the decision-making criteria for social and economic policy. Countries and international organizations pay great attention to measuring and fostering the progress of society. Innovative technological development is considered to be the mainstream in providing of the progress.

Interconnection between innovations and quality of life becomes the matter of great importance. From one hand technological development create new possibilities for life improving. In turn, the quality of life is one of the most important factors of innovative development. The question is if there is a convergence in the processes of the modern society progress. For the answer we first have to define indicators characterizing various sides of the development.

For comprehensive analysis of the problem various approaches to the measuring of the population well-being should be considered. So named objective indicators using quantitative values characterizing consumption and living conditions can hardly be fitted for all the countries. At the same time some less-informative indicators based on the well-being subjective estimates are more universal. Their combination may give the proper perspective for the researcher.

Innovations have a great influence on economical, social and political progress of modern society. The achievements in innovative development make countries more competitive and create new possibilities for their population.

The level of innovative development varies from country to country. A lot of indicators for its monitoring are published and widely used in estimating competitiveness of the countries and other aspects of their economic and social development. Less investigated are the processes of innovative and technological development of regions in a particular country. Effective management of the technological development includes relevant
impacts to each part of the regional system. In order to provide the effective control of the development it is important to obtain the information support, which may be based on statistical models describing the structure of the regions. This analysis for such vast country as Russia may show if the regional structure of the country is substantially heterogeneous, and define the most important factors for fostering further progress.

Widely used ordinary clustering may be useless for defining the complicated structure of the objects. When classifying on the base of quantitative indicators the most effective is parametrical approach. It allows distinguishing groups which are close to each other and substantially intersected. Parametrical procedures are hardly applicable in multidimensional variable space and in the case of great enough number of extreme values, so we have to use nonparametric procedures like clustering. But they may be more relevant when fuzzy approach for really uncertain structures is applied. It is based on assumption, than each element is a member of each group at the corresponding degree. This kind of classification seems to be the most suitable one for defining the structure of regions.

2. Literature and data sources review

Official statics offices, international organizations, research centres, universities, national statistics services measure and publish indicators of population well-being on regular base. A great amount of information on the subject may be found in reports and papers. Some of them are focused on the methodology problems concerned constructing the indices and indicators.

There are many kinds of indicators of the population well-being such as Index of Economic Well-Being (Sharpe, 1998), Index of Social Progress (Estes, 1998, 2002), and others. One of the most widely used indicators is the Human Development Index (HDI). A lot of interesting indicators are proposed, but many of them are focused on the particular aspect such as Health-Related Quality of Life (Andersen, 1999), Social Weather Station (Mangahas, 1998).

As an indicator of innovative and technological development the Global Innovative Index (GII) can be used. It was created by Business School INSEAD, and since 2012 it is co-publish by INSEAD and the World Intellectual Property Organization (WIPO, a specialized agency of the United Nations). The Global Innovation Index ranks countries on parameters like Institution and Policy, Human Capacity, Infrastructure, Technological Sophistication and Business Markets to arrive at a global ranking for nations on innovation.

Many authors concentrate their attention on searching the impact of technological development on modern society, and in turn on the social progress influence on creating new technologies. Fagerberg et al (2011) analyze factors that shape the technological capabilities of individual U.S. states and European countries. The analysis demonstrates convergence in technological capabilities from 2000 to 2007. The results indicate that social capabilities, such as a highly educated labour force, an egalitarian distribution of income, a participatory democracy and prevalence of public safety, condition the growth of technological capability. Kundu and Sarangi (2004) presented the report concerning the methodology of building a Composite Index for Asia reflected both information and communication technologies and Human development aspects.

As a main data source the Russian Federal State Statistics Service database is used for solving problems and modelling indicators of innovative activity. For creating composite indicator of population well-being the indexes provided by Gallup are used.

3. Innovative development impact on quality of life

Well-being is an integral characteristic of social and economic conditions and the needs of the individual or social group. There are two methodological approaches for the measurement of the achieved level of well-being:

The first approach, which can be defined as a subjective one, bases on the well-being as a subjective degree of satisfaction of people with their lives. In this case, the man himself appreciates well or bad is his life on various criteria, so the idea of the well-being for each individual can be based on the results of sociological survey.

The second approach estimates the well-being of the population on the following principles:

- objective assessment of well-being;
ability to compare indicators of well-being in the current period with their means in the previous periods;
comparability of population well-being indicators in various countries and regions.

In this case, the well-being is the composite measure of subjective satisfaction of the person and objective indicators provided by other people who have complete and accurate information and the necessary skills in the field of research. This approach involves the construction of a socio-economic indicators framework that reflects human well-being in more comprehensive way. Many international and regional organizations are engaged in the development of well-being indicators. Each of them is developing indicators in accordance with their interests.

The most widely used and universal index of social progress of the society is the Human Development Index (HDI) that is an integral measure of human development. It measures the average achievements of each country in three basic dimensions: a long and healthy life (health), access to knowledge (education) and a decent standard of living (income).

Data availability determines HDI country coverage. To enable cross-country comparisons, the HDI is calculated on the base of data from leading international data agencies and other credible data sources available. According to the United Nations classification Russia is in the group of countries with high HDI.

Another universal index based on alternative approach may be constructed as the first principal component of the partial indexes provided by Gallup.

A uniform system of measuring the level of innovative capacity, as well as of measuring the level of well-being, does not currently exist, and every index depends on the organization, which conducts a survey of innovation activity, using different sets of parameters. One of the most interesting and universal in countries comparing is the Global Innovation Index. The GII “recognizes the key role of innovation as a driver of economic growth and prosperity and acknowledges the need for a broad horizontal vision of innovation that is applicable to both developed and emerging economies, with the inclusion of indicators that go beyond the traditional measures of innovation”.

The Global Innovation Index relies on two sub-indices, the Innovation Input Sub-Index and the Innovation Output Sub-Index, each built around pillars. Five input pillars capture elements of the national economy that enable innovative activities: Institutions, Human capital and research, Infrastructure, Market sophistication, and Business sophistication. Two output pillars capture actual evidence of innovation outputs: Knowledge and technology outputs and Creative outputs. Each pillar is divided into sub-pillars and each sub-pillar is composed of individual indicators. Sub-pillar scores are calculated as the weighted average of individual indicators; pillar scores are calculated as the weighted average of sub-pillar scores. Four measures are then calculated:

- The Innovation Input Sub-Index is the simple average of the first five pillar scores.
- The Innovation Output Sub-Index is the simple average of the last two pillar scores.
- The overall GII is the simple average of the Input and Output Sub-Indices.

The Innovation Efficiency Index is the ratio of the Output Sub-Index over the Input Sub-Index. The GII model is revised every year in a transparent exercise to improve the way innovation is measured.

For the research of interaction between innovative development and living standards the regression model has been constructed. Nonlinear regression model of HDI was specified as a logistic curve

\[
HDI = \frac{y_{\max} - y_{\min}}{1 + \exp \left( a_0 + a_1 \ GII \right)} + y_{\min} + \varepsilon,
\]

where \( y_{\max} \) and \( y_{\min} \) are max and min levels of HDI for the model, \( a_0 \) and \( a_1 \) are the parameters of the logistic curve, \( \varepsilon \) is the error term.

After identification the model may be presented as follows:

\[
HDI_{\text{est}} = \frac{0.443}{1 + \exp \left( 5.174 - 1.698 \ GII \right)} + 0.481
\]
The model curve along with initial data is presented on Figure 1.

![Figure 1: Model of the relation between global innovation index and human development Index](http://hdr.undp.org/en/statistics/hdi)

Countries with high level of both indicators form relatively homogeneous group, while countries with low level of innovative activity are extremely heterogeneous, and the level of HDI in these countries depends mostly of other factors, e.g. natural recourses, history etc. Some of countries are in between and tend to become the members of the advanced or the following groups.

From another perspective we can see on Figure 1 three domains with different variances according to the Global Innovation Index value. For the first (following) group value of GII is lower than 3, the lower border of the most developed countries is approximately 3.7, and the group in between may be referred to as the middle one. Inside each group we can hardly find any relation between HDI and GII, and the overall interaction is rather determined by the between-group difference in mean HDI. We consider the regional structure of Russia as substantially heterogeneous, and presenting the Russian regions as countries in the corresponding scatter plot provides the similar pattern with following, middle and leading groups of regions on innovation development.

Created models allow estimating social impact of innovative development indexes. The dual role of the social climate may be discussed in the context of the research. From one hand the social climate of the society is formed under influence of the technological environment. From the other hand the latter may be considered as a factor of progress in technology and innovations.

4. **Selection of homogeneous groups of regions using parametric and nonparametric approaches**

It is reasonable to produce analysis of the regional development separately for homogeneous groups of regions and compare the results. Russian Federation includes 83 regions; some of them are the components of more large ones. On economical reasons we also will consider Altay as an agglomeration of two regions: Altay region itself and Altay republic. Few regions can hardly be included to the list because of their peculiarities and lack of data for the particular period. So the main set includes 73 regions. They differ essentially on the level of development and structure of economy. Modern economy is based on innovations, so along with the variable characterizing the output of innovative products and services \( x_1 \), the expenditure on technological innovations \( x_2 \) will be used for modelling and stratification. While the former presents the achieved level of innovative development, the latter describes the innovative potential. Both factors are measured in million roubles per 1000 inhabitants and logarithms of their standard deviations are approximately equal.

In classifying the best way to extract maximum information contained in scalar variable values is to create a parametric model of the probability density function (pdf). Theoretical assumptions along with the general sharp of the distribution can help in specification of the model.

A model of the distribution which is relatively free of theoretical guessing may be created on the base of kernel density estimation. One of the most preferable kinds of kernel is Gaussian that provides the smoothing of the
empirical distribution without breaks. The effective bandwidth should allow avoiding both over smoothing and under smoothing. The result of pdf kernel estimation is presented on Figure 2.

Source: own elaboration

**Figure 2**: Estimated probability density function for the logarithm of output of innovative goods and services in Russian regions, 2012 year (kernel bandwidth=0.5)

As it was predicted earlier, three groups of regions may be distinguished in that nonparametric model of general distribution.

We consider data to be a sample of a population of regions with the same properties as regions of Russia in corresponding proportions. Each value in the sample is an observed value of the population for one case (region). As usual the main problem of the parametric approach is to determine the type of theoretical distribution for population. In creating each value of \( x \) a great amount of factors act as multipliers, so we can suppose the lognormal distribution for the homogenous subpopulation

\[
f(x) = \frac{1}{2\pi x_1 x_2 (1-\rho^2)\Sigma^{1/2}} e^{-0.5(\ln x - \mu)^T\Sigma^{-1}(\ln x - \mu)},
\]

where \( x = (x_1, x_2)^T \) and \( \ln x = (\ln x_1, \ln x_2)^T \) are the vectors of variables, \( x_i \) is the output of innovative goods and services, \( x_2 \) is the expenditure on technological innovations;

\[
\mu = \begin{pmatrix} E(\ln(x_i)) \\ E(\ln(x_i)) \end{pmatrix} \quad \text{and} \quad \Sigma = \begin{pmatrix} \sigma_1^2 & \rho \sigma_1 \sigma_2 \\ \rho \sigma_1 \sigma_2 & \sigma_2^2 \end{pmatrix}
\]

are the expectation and variance-covariance matrix of \( \ln x \).

Considering three close to each other groups of regions in the population (see Fig.2) we may present pdf as a normalized weighted sum of three lognormal functions. Each i-th group in this sum is in turn a lognormal distributed homogeneous population \( f(x, \mu_i, \Sigma_i) \). So for the whole population

\[
f(x) = \sum_{i=1}^3 q_i f(x; \mu_i, \Sigma_i),
\]

\( q_i \) is a i-th group’s share in the population so that \( \sum_{i=1}^3 q_i = 1 \).

The maximum likelihood estimates \( \hat{\theta} = (\hat{\mu}_1, \hat{\mu}_2, \hat{\mu}_3, \hat{\Sigma}_1, \hat{\Sigma}_2, \hat{\Sigma}_3, \hat{q}_1, \hat{q}_2, \hat{q}_3)^T \) for independent parameters of theoretical distribution may be obtained from the equation

\[
L(\hat{\theta}) = \prod_{i=1}^3 f(x_i, \hat{\theta}) = \max_{\theta} L(\theta), \quad \text{or} \quad \hat{\theta} = \ln L(\hat{\theta}) = \sum_{i=1}^3 \ln f(x_i, \theta) = \max_{\theta} \ln l(\theta).
\]

The estimating results are presented in Table 1.
Three homogeneous groups have been identified with the model. The most numerous is the group of leading
regions which includes just half of the whole population. The group of followers is the most variable like the
group of the following countries on Fig.1.

To determine the real level of innovation development the scale effect should be eliminated, so the relevant
indicators for this purpose should be normalized by its dividing on the population of the corresponding region
or the number of employees. If the theoretical assumption meets the empirical estimates of the probability
density function, the approach may be fruitful. But that is not the case. Taking into account the normalized
data scatter plot (Figure 3), we can hardly rely on high goodness-of-fit of the estimated parametric model
because of a great number of outliers on it.

That is why the nonparametric clustering seems to be more suitable. But the model should correspondent to
the nature of the phenomenon, so the fuzzy modification of “k-means” clustering may be applied. In a
traditional clustering it is supposed that each case should be a member of any one cluster. Fuzzy “c-means”
clustering is based on the statement that each case obtains at some degree the features of all the clusters, and
a measure of such a membership for i-th object (i=1,...,n) in j-th cluster (j=1,...,k) is a value of a membership
function $\mu_{ij} \subset [0;1]$.

![Source: own elaboration using data of](http://www.gks.ru/bgd/regl/b11_14p/Main.htm)

**Figure 3:** Scatter plot of the Russian regions on logarithm of output of innovative goods and services and
logarithm of expenditure on technological innovations, 2010 year

The membership function may be specified using the distance from the object to the centre of the cluster $r_{ij}$
in the following way:

$$\mu_{ij} = \frac{1}{(r_{ij})^2} \sum_{j=1}^{k} \frac{1}{(r_{ij})^2}.$$ 

The number of clusters has to be defined in advance, and the empirical distribution analysis and its projections
might be useful. Also it is necessary to select the starting centers of the clusters, for example, it may be first k
cases. Then, we have to calculate the membership function for the next case correcting the centers of all the
clusters

$$\overline{\ln x_j^{(v)}} = \sum_{j=1}^{k} \left( \ln x_j^{(v)} (\mu_{ij}^{(v)})^2 \right) / \sum_{j=1}^{k} (\mu_{ij}^{(v)})^2.$$
After calculations using all data the procedure will be repeated while the maximum difference between the values of the membership function $\{\mu_{ij}^{p}\}$ and $\{\mu_{ij}^{(p+1)}\}$ for the same case and cluster at p-th and (p+1)-th iterations becomes less than predetermined threshold limit. All the values $\mu_{ij}$ form a membership matrix.

The number of cases in the group or cluster is defined as a weighted sum of all the values of the membership function in the group. Generally it is not an integer value. Properties of each cluster may be presented with its etalon means, for this purpose a kernel of the cluster should also be used. The kernel of cluster includes regions with big enough value of the membership function $\mu_{ij} \geq \mu_{ij}$ (e.g. $\mu_{ij} \geq 0,7$).

Classification using more than one variable seems to be more comprehensive. Fuzzy modification of the so named “k-means” clustering allows making this analysis more informative.

5. Fuzzy clustering results

According to the first (parametric) stage of classification three groups were considered. The results of fuzzy classification are presented in Table 2.

Table 2: Characteristics of the groups, 2010 year

<table>
<thead>
<tr>
<th>Mean group value</th>
<th>Groups of Russian regions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$\ln x_1$</td>
<td>Following</td>
<td>Middle</td>
</tr>
<tr>
<td>-0,52</td>
<td>0,38</td>
<td>0,74</td>
</tr>
<tr>
<td>$\ln x_2$</td>
<td>0,24</td>
<td>1,14</td>
</tr>
<tr>
<td>Group share, %</td>
<td>26,9</td>
<td>31,5</td>
</tr>
</tbody>
</table>

Source: own elaboration

Despite the difference in values of indicators, the structures of this (nonparametric) and previous (parametric) models are alike. The most numerous is the leading group including more than 2/5 of all the regions. The least numerous is the group of underdeveloped on producing innovations regions with the share about 1/4.

The membership function values are presented in the Table 3. The membership for the particular region in the corresponding group is delighted by grey color which is the darker the greater is the value of the membership function.

Table 3: Membership function for Russian regions, 2010 year (fragment)
Viacheslav Sirotin and Marina Arkhipova

<table>
<thead>
<tr>
<th>Regions</th>
<th>Following</th>
<th>Middle</th>
<th>Leading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Udmurtia</td>
<td>0,00</td>
<td>0,02</td>
<td>0,98</td>
</tr>
<tr>
<td>Stavropol</td>
<td>0,01</td>
<td>0,05</td>
<td>0,95</td>
</tr>
<tr>
<td>Tomsk</td>
<td>0,01</td>
<td>0,07</td>
<td>0,93</td>
</tr>
<tr>
<td>Vologda</td>
<td>0,01</td>
<td>0,16</td>
<td>0,82</td>
</tr>
<tr>
<td>Orenburg</td>
<td>0,03</td>
<td>0,16</td>
<td>0,81</td>
</tr>
<tr>
<td>Leningrad</td>
<td>0,04</td>
<td>0,17</td>
<td>0,79</td>
</tr>
<tr>
<td>Chuvashia</td>
<td>0,04</td>
<td>0,19</td>
<td>0,77</td>
</tr>
</tbody>
</table>

Source: own elaboration

Regions with great enough value of membership function are considered to form the kernel of the corresponding group (Table 4).

**Table 4:** Regions of the group kernels in 2010 year

<table>
<thead>
<tr>
<th>The most typical following regions</th>
<th>The most typical representatives of the middle group of regions</th>
<th>The most typical leading regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kemerovo</td>
<td>Kostroma, Penza, Smolensk, Vladimir</td>
<td>Belgorod, Moscow (city), Udmurtia, Stavropol, Tomsk, Vologda, Orenburg</td>
</tr>
<tr>
<td>Kursk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arkhangelsk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Krasnodar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pskov</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transbaikalia</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: own elaboration

It is important that membership function close to the maximum value of one does doesn’t obviously mean the best results in the innovative activity; it only means that the region is the typical representative of the corresponding group.

6. **Determinants of the regional structure and features of the groups**

Various aspects of regional development may be presented with corresponding indicators. Based on the available information a set of indicators has been constructed:

- regional domestic product per capita;
- mean monthly wages in regions;
- turnover of small and medium enterprises;
- manufacturing industry turnover;
- product proceeds

Mean values of indicators for each stratum should be calculated as a weighted means. The membership function values \( \mu_{ij} \) are used as weight coefficients.

It is important to recognize the reasons for splitting the whole population to discrete groups. It seems to be that in Russian Federation as such a reason may be considered the level of small enterprise development. And prominent difference in values of corresponding indicators supports this statement (Figure 4). Medium and especially small enterprise development is greater in more innovative regions, and the difference in small enterprise can be the real determinant of leading regions as a mean for creating and using innovations.
Viacheslav Sirotin and Marina Arkhipova

Difference in innovation activity provides the difference in economic development of the regions. In turn the level of economic development allows fostering innovations. Analyzing regional domestic product per capita (Figure 5) we can see increasing of its value along with the level of innovative development.


**Figure 4**: Turnover of enterprises, thousand roubles per inhabitant

**Figure 5**: Regional domestic product per capita in groups of regions

Regional domestic product in the leading group exceeds the corresponding level in the following one by more than 26 percent.

Greater level of economic development creates additional opportunities for improving of the population well-being. The difference in mean wages is more impressive than in regional domestic product: it is more than 36 percent (Figure 6).

Source: own elaboration

**Figure 6**: Mean monthly wages in groups of regions
Hence, we can see the evidence of that high level of innovative activity provides essential impact on economic development of regions, and it is strongly connected with medium and especially small enterprise development which seems to be the key factor of innovative development.

7. Conclusion

There is relation between innovative development and quality of life. All the countries with high value of the Global Innovative Index are the best in providing human development. Less innovation developed countries are not so homogenous, and they differ enough in both objective and subjective indexes of the population well-being. While the human development index rely mostly on historical background, cultural traditions and other general factors, the subjective index may be connected with the dynamic and achieved level of innovative activity. It is important to find additional evidence to this assumption on regional level in further research.

The proposal of substantial difference in innovative development in such a vast country as Russian Federation is supported by the model using fuzzy approach to classification of stratified objects. It shows that country includes three relatively homogenous groups that differ substantially from each other in costs and results of innovative activity. The profiles of the groups are different, but there are two kinds of indicators describing the groups. When indicators of small and medium enterprise development show the reasons of the difference in innovative activity of the regions, the indicators of general economic development and living standards of the population present the consequences of that difference.

Advanced methods of parametric and nonparametric classification permit to provide comprehensive analysis of the regions innovative development and technological progress. The progress in measuring additional indicators on regional level needs improvement of statistical base and providing up-to-date information.

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Knowledge Transmission Channels: A Comparative Study in Brazil and in Europe

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Abstract: The process of globalization and the change on technological paradigm have important effects in the modeling of new patterns of competition. In this context there is a consensus among specialized researchers that the collaborative learning processes in clusters are crucial for the configuration at the competitive advantage of the companies individually and to the group that forms the cluster. This paper aims at identifying and analyzing the knowledge transmission channels in textile and clothing clusters located in Brazil and in Europe. Primary data was obtained through interviews with key individuals. The collection of primary data was carried out based on a questionnaire with ten categories of indicators of knowledge transmission. Secondary data was also collected through a literature review and through international organizations sites. Similarities related to the use of the main transmission channels of knowledge are observed in all cases. The main similarities are: influence of suppliers of machinery, equipment and raw materials; imitation of products and best practices; training promoted by technical institutions and businesses; and cluster companies being open to acquire new knowledge. The main differences lie in the relationship between companies, where in Europe the intensity of this relationship is bigger when compared to Brazil. The differences also occur in importance and frequency of the relationship with the government, with the cultural environment, and with the activities of research and development. It is also found factors that reduce the importance of geographical proximity in transmission of knowledge, and in generating trust and the establishment of collaborative behavior. This was the reality found in the studied clusters, that currently go through a process of adaptation to the changes in the real world.

Keywords: industrial clusters, interorganizational learning, knowledge transmission channels, textile and clothing industry

1. Introduction

One of the characteristics of the economic and technologic model of the knowledge economy is the formation of global and regional network of manufacture and distribution, which promoted sensible changes in the way of competing, demanding proactive answers from firms such as the innovation capacity, what presupposes the creation or acquisition of new knowledge.

In this context, knowledge management in firms inside industrial remains a subject that requires deeper and specific studies about sharing and collective learning in firm groups (Guo and Guo, 2010; Larsson et al., 1998). Published material about this subject is mostly based in empirical research and regards difficulties from firms, of learning by means of interactions (Knight, 2002).

According to Guo and Guo (2010), the concepts of industrial clusters presented by Porter (1998), Giuliani and Bell (2005) observe the importance conferred to knowledge and learning, and state that clusters are characterised by geographic proximity, economic links and knowledge sharing between firms.

Authors as Baptista and Swan (1998) state that the diffusion of knowledge is one of the main reasons to distinguish successful clusters from the other agglomerated. In addition, since the first studies from Marshall it is sought to understand the knowledge flux impact in the generation of externalities emanating from joint action (Schmitz, 1999). In the recent literature research from Maskell and Malmberg (2007), Morrison et al. (2011), Giuliani and Bell (2005), and Guo and Guo (2010), draw attention to the importance of studies related to the knowledge transmission and to learning inside clusters.

Front to this context, this paper has as objective identifying and analysing the transmission channels of knowledge employment in clusters in Brazil and Europe. In order to achieve that, research in textile and...
clothing clusters was made in the Santa Catarina state, in Brazil (Cluster of Vale do Itajaí), in the northern region of Portugal and in Galicia, Spain (EuroClusTex), and in the industrial Italian district of Capri in the Emilia-Romagna region.

2. Theoretical foundation

2.1 Industrial clusters

According to the concepts of EURADA (1999) and Porter (1998), clusters are geographical concentrations of firms that are interconnected and specialised institutions in a field or particular sector. They also cover a collection of industries and entities vital for competition. It can be considered that clusters include sets of industrial firms, and institutions as universities, research centres, trade associations, normalisation organisations, technical laboratories among other institutions and suppliers that support the development of sector activities, also appropriating active community publics around, such as schools and universities, quality patterns and market transparency (EURADA, 1999; Porter, 1998; Porter and Kramer, 2011).

It can be considered that the cluster concept is more generic and has as characteristics being a geographical cut and it considers the relations of productive technical fluxes among firms, and underlines the search for statistic and dynamic externalities. It is also relevant to underline the concept of Italian industrial districts considered by authors as Becattini et al. (2003) and Casarotto and Pires (2001) as a social and territorial entity with a strong cultural involvement, social history and tradition history and that emphasizes on the flexible production and the dynamic externalities generation.

The dimensions relevant for analysis in clusters involve generally three instances: 1) techno-productive cooperation, which emphasises studies on operational efficacy and productive flexibility; 2) inter-organisational cooperation that involves coordination efficacy among firms and structural flexibility and; 3) the technological cooperation related to information exchange and innovative capability (Britto, 2002). Taking into consideration these dimensions, this paper aims towards studying the third instance: the technological cooperation, and it focuses in the collaborative learning analysis as factor of competition in clusters.

The participation in clusters generates scale economy, considering the set of firms, location economies, and external advantages resulting from the services offers, product specialisation, and distinct gains from the cooperation in the productive, inter-organisational and technological spheres (Britto, 2002).

It is stressed that the clusters may promote gains associated to collective efficacy, and be resultant from local external economies or from combined action of distinct firms. The obtained results from the collective efficacy derives from the standpoint that there is a broad scope for task division among firms in the cluster, as well as for the specialisation and innovation, elements essential for competition (Schmitz, 1999).

2.2 Transmission channels of knowledge in clusters

There is a wide literature regarding clusters stating that the geographical proximity propitiates privileged spaces for knowledge spreading, and deflagration of collaborative learning processes. However, the recent additions from Beaudry and Breschi (2003), Staber (2001), Roffoni and Zuzigan (2012), contest the importance of geographical proximity in knowledge transmissions, trust generation and combined action promotion.

The studies regarding the employment of knowledge transmission in clusters by Guo and Guo (2010) show that a variety of channels coexist, such as: the interpersonal relationships among the cluster companies; the relationship between companies and suppliers of specialised services, raw materials and equipment; the processes of imitation; the work force mobility; the relationship with universities and research institutions and organisational associations.

For Guo and Guo (2010) the knowledge transmission channels inside the clusters contribute for the development of competitive dynamic competencies, which are very important in environments where reinforcing competitiveness requires continued introduction of innovations in the market. According to these authors, the dynamic competencies can be generated through transmission channels of knowledge related to the mobility of the employees, cultural mechanisms and the particular relationship modalities that a network provides. Among the modalities it can be pointed the relationship between companies inside and outside the
network, such as universities and research groups, institutions of technical learning, the government, interpersonal relationships and relationship with the suppliers (Guo and Guo, 2010; Vilana and Monroy, 2010; Lundvall, 2009).

According to Rabellotti (1995) the interaction with the machine and equipment suppliers allows that the technological knowledge be transferred, being able to be formal or informal, and based in personal relations that endure for a long time.

The recruiting of employees from companies inside the clusters promotes information fluxes and tacit knowledge and can be configured as a knowledge transmission channel inside the clusters. When there is a flux in the competent work force between firms, a fast diffusion of new ideas happen. It is considered that the rotation of workers among firms also supplies a base for integration of the firms, since the workers are related with colleagues in other firms (Lundvall, 2009).

The cultural mechanisms that sustain the network and facilitate interaction between firms are also considered knowledge transmission ways (Vilana and Monroy, 2010). It is presupposed that the knowledge circulates through intra cluster relations among the firms, the government and other institutions.

According to Porter (1998), the geographical proximity stimulates the occurrence of relations amongst firms, facilitating the imitation practise and improvement of processes and products. The imitation configures itself as a traditional process of knowledge incorporation that originates incremental innovation of processes and products, adequate to peculiar occurrence cases where a raise in the offer is needed, in scenarios where product demand is not too exigent (Vieira; Romero, 2009). On the other hand, in order to cope with the new board of competition characterised by a new step of markets globalisation, which raises the competition level among firms, associated to the raising of exigency of customers and clients, be it in faster preference changes or in terms of product sophistication, the success of clusters cannot be based in traditional learning processes.

The knowledge transmission channels can be intentional or not. Under this perspective, Guo and Guo (2010) consider that the specialised literature prioritises the analysis of intentional channels, ignoring in a way contributions of informal or non-intentional channels. An exception is the empirical study of Dahl and Pedersen (2004) that points out the importance of informal contacts as promoters of knowledge spreading.

3. Method

Concerning the adopted technical procedures and the employed method the research is classified as a multi case study, supported by the bibliographic and documental research. Three clothing and textile industrial clusters were analysed: Vale do Itajai, in Brazil; EuroClusTex, a transnational cluster between northern Portugal and Galicia in Spain; and Carpi in the Italian region of Emilia-Romagna.

In the field research was prioritised the selection of people that had distinct views regarding the researched clusters, what lead to a selection of a broad range of respondents: employers, government members, and leaders of support entities of the textile industry and clothing industry in Brazil and in Europe.

The data collection was made through interviews with 29 key individuals. All interviewers were stimulated to approach the following subjects: a) the cluster structure; b) the advantages of participation in the cluster; and c) the changes in the competitive environment.

In the interview the researchers were aided by a questionnaire containing ten classification categories of a total of twenty five knowledge transmission channels selected from the researches made by Guo and Guo (2010), Villana and Monroy (2010), Lundvall (2009) and Rabelloti (1995). The knowledge transmission categories consider: (1) Relationship between firms; (2) Relationship with the suppliers; (3) Relationship with the Government; (4) Cultural environment; (5) Investigation and Development; (6) Human Resources recruiting; (7) Capacitation; (8) Collaborative development; (9) Best practises imitation; and (10) Codified knowledge. For better understanding of the interviewed the questionnaire was typed interrogatively, and the Likert scale was adapted to measure the efficacy of the communication channels, considering level 1 as not efficient and level 7 as very efficient.
The intensity of usage of the knowledge transmission channels researched was unfolded in high, medium or low as exposed in Table 1. To identify this variation was employed a simple average of attributed grades by the interviewed.

It can be observed that the perspective of the researchers, based in the speech analysis along the interviews, interfered in the determination of average grades attributed.

**Table 1:** Criteria for the fixation of the intensity of knowledge transmission channels usage

<table>
<thead>
<tr>
<th>Usage intensity / impact of the knowledge transmission channel</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Equal or superior to 6,0</td>
</tr>
<tr>
<td>Medium</td>
<td>Between 3,0 and 5,99</td>
</tr>
<tr>
<td>Low</td>
<td>Higher than 1,0 lower than 2,99</td>
</tr>
</tbody>
</table>

Source: elaborated by the authors (2014).

4. Results

Initially a brief description of each researched cluster was made, following a presentation and analysis of the research results about knowledge transmission channels.

4.1 Case characterisation

The textile and clothing cluster of Vale do Itajaí exists for more than a century. The Vale do Itajaí region is located in the Santa Catarina state, in the South of Brazil, has around 686,2 thousand habitants, 10% of the population of Santa Catarina, with 13,003,018 km² of extension. (FIESC, 2013). The firms that most employ in this region are the textile and the clothing. (FIESC, 2013). The organisational structure is heterogenic and the micro and small firms represent around 96% of all establishments. FIESC (2013) data point out that 9.853 firms of all sizes form the cluster, because it covers firms since the micro unities stage to the nationally widespread firms. It operates in many stages of the productive chain and employs 166.243 workers.

The EuroClusTex is a transnational cluster that pretends fundamentally in consolidating an already existing reality, that is related the binding between textile and clothing firms of Galicia in Spain and of the North of Portugal. The project aims to essentially increment the cooperation and provide visibility for firms located in these regions. In northern Portugal, there is a highlighted specialisation in the production/fabrication of textile and clothing, whilst in Galicia there is an expertise in the creation of brands and distribution grids. In this way are characterised as regions with distinct and complementary competencies. These characteristics together with the geographical proximity impulse an intense commercial exchange between these two regions, because many Galician firms, in special the Inditex Group, subcontract manufacturing firms located in the North of Portugal. The EuroClusTex comprises 8.200 firms that in 2010 produced 7.500 million Euros.

Carpi is one of the main Italian industrial districts of knitwear. It is located in province of Modena, in the Emilia-Romagna region, a well-developed area in the North of Italy. In Carpi it is underlined the presence of two firm typologies: the leader firms or final firms, and the subcontracted. The first are firms highly qualified in the critical authors that develop activities related to design, distribution and brand management of products in the mesh clothing. From 2000, it has been observed a reduction in the number of firms and jobs, and a shrink in the external market participation. Data from R&I (2011) show that in Carpi 1.109 textile and clothing firms act with 6.966 employees.

4.2 Knowledge transmission channels: Comparative analysis

In Table 2 are presented the average points from the ten classification categories of knowledge transmission channels selected.

In this manner, it is considered that the relationship amidst firms is low in Vale do Itajai (1,94), and medium in the EuroClusTex (3,19) and in Carpi (3,05). It can be stated that the companies in the European clusters are more prone to collaboration and conjunct action when compared to the Brazilian cluster. It was identified that the organisational objectives of entrepreneurs in business fairs organised by the organisational associations in the European cases favoured communication amidst firms. In the Vale do Itajai it can be underlined the almost
inexistent relationship or partnerships among firms. The research revealed that geographical proximity loses importance in the generation of trust and in the relationship promotion between firms.

Along the interviews it was verified that the informal relationship with the suppliers is a multifunctional broad of information. In the Vale do Itajaí cluster it can observed a high influence of raw material, machines and equipment suppliers in the processes of knowledge transmission. In the EuroClusTex (4,31) and in Carpi (5,80) the influence of these suppliers is smaller than in the Vale do Itajaí. These results show the importance of the strategic role of the suppliers as knowledge transmission channels and reveal that the textile and clothing firms are in a sector of distributed technology, and that innovation many times is not internally developed, but incorporated to productive processes with the buying of machines, equipment and raw material. It must be taken into account that the innovation related to acquisition of machines and equipment are broadly diffused. Currently, it is considered that in the studied textile and clothing firms there is not a big technological difference among leader firms of the market.

The influence of the government in the promotion policies is low in the Vale do Itajaí (2,10), and medium in the EuroClusTex (4,05) and in Carpi (3,10). It is underlined that in the three studied cases occurred a natural selection process that lead to bankruptcy of firms that were not ready to compete except with a low cost of factors. In this context, it can be considered that the public policies were not proactive front to the changes and raising of international competition. It can be observed that in the case of Carpi a strong inconsistency with the actual situation of the cluster and the literature about Italian industrial districts.

It was observed that the cultural environment in Carpi (3,80) and in EuroClusTex (3,90) is the most propitious for knowledge transference and collaboration amongst firms than in the Vale do Itajaí (2,75) cluster. Hence, it is noted that the cultural aspects may interfere in the generation of trust, as well as in the opportunity taking for conjunct action. This result refutes the research that suggest that geographical proximity stimulates collaborative behaviour.

The research revealed that the interest for knowledge produced outside the clusters is bigger, and that geographical proximity does not limit the access to knowledge. It was noted that the knowledge spreading among textile and clothing firms was raised and globally widespread through information and communication technology, through online clothing sales, and popularisation of blogs, photo logs and virtual magazines of fashion. The development of information and communication technologies altered the importance of geographical importance.

It can be pointed out the almost inexistence of Research and Development (R&D) departments in the firms of the clusters Vale do Itajaí (1,87) and Carpi (2,60). In the EuroClusTex (3,03) is the average presence of R&D departments. It is highlighted then the innovation vocation of the North of Portugal in the textile technical segment. With the research, it was observed that in the case of the Europeans there is an emergency of a special group of firms that start to aggregate value to product with development in the design services. In the Vale do Itajaí only big firms have R&D departments.

It was observed that in Carpi the difficulties of micro and small firms to develop R&D activities is recognised by the government of Emilia-Romagna, which develops since 2000 a strategic redirecting of the policies in order to promote competition through internationalisation of micro and small firms.

Regarding the mobility of the work force, in the EuroClusTex (3,63) the recruiting of human resources presents medium influence. In Carpi (2,80) and in the Vale do Itajaí (2,75) it is pointed out low influence of the work force mobility in the knowledge transference. These results are considered abnormal, being that the employees have tacit knowledge, which is not available in books or manuals, and that many times is the main asset of firms.

The influence of formation of human resources in the knowledge transmission is bigger in the European cases. It can be observed that in the EuroClusTex (4,00) and in Carpi (4,00) the formation practises are more frequent when compared to Vale do Itajaí (3,00). In all studied cases it can be observed that is very infrequent the formation promoted by clients, and that the formation promoted by firms and by knowledge centres, in special technological schools, present higher influence in the knowledge transmission processes inside the clusters.
Concerning the development of innovation partnerships in the Vale do Itajaí (1,93) and in Carpi (2,40) the R&D practises are low among firms, and between firms and universities. As for the EuroClusTex (3,40) the innovation partnerships are more frequent. Along this research was observed that in the case of the European clusters the institutions of technical formation contribute more to the processes of knowledge transmission than the universities. The lower influence of universities shows the non-usage of opportunities for creation and transference of knowledge and capacitation of dynamic competitive advantages. Although the literature shows that one of many ways to incentive innovation inside clusters is the interplay amongst firms, universities and technical institutions, and the result reveal the incapacity that these institutions have in answering to the market demands.

It was observed that it is common the imitation of products and the best practises in both the studied cases. This strategy occurs with a higher degree in the Vale do Itajaí (5,74) cluster than in the EuroClusTex (4,54) and in Carpi (4,00). Along the research, it can be stated that the imitation inhibits the motivation for knowledge sharing, as well as the encouraging of initiatives of collaborative development amongst companies in the same sector. In all cases product and processes imitation appears as one of the five most utilised methods of knowledge transmission. The imitation in Carpi registered lower intensity than in the other clusters, even though for the Italian Industrial District model the score (4,00) is significantly high. In general, it is considered that imitation is a modality of knowledge transmission that stimulates incremental innovation.

The research revealed that in all cases the influence of patents and licenses is low in the process of knowledge transmission. Along the interviews, it can be perceived that this low influence may be motivated by the high incidence of imitation among companies. It can be stated a higher influence of patents and licenses in the EuroClusTex (3,10) than in the Vale do Itajaí (2,06) and in Carpi (2,40).

**Table 2:** Average of macro categories of knowledge transmission channels

<table>
<thead>
<tr>
<th>Category</th>
<th>Vale do Itajaí</th>
<th>EuroClusTex</th>
<th>Carpi</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationship between firms</td>
<td>1,94</td>
<td>3,19</td>
<td>3,05</td>
</tr>
<tr>
<td>Relationship with the suppliers</td>
<td>6,00</td>
<td>4,31</td>
<td>5,80</td>
</tr>
<tr>
<td>Relationship with the government</td>
<td>2,10</td>
<td>4,05</td>
<td>3,10</td>
</tr>
<tr>
<td>Cultural Environment</td>
<td>2,75</td>
<td>3,80</td>
<td>3,90</td>
</tr>
<tr>
<td>Research Technological Development</td>
<td>1,87</td>
<td>3,03</td>
<td>2,60</td>
</tr>
<tr>
<td>Recruiting of human resources</td>
<td>2,75</td>
<td>3,63</td>
<td>2,80</td>
</tr>
<tr>
<td>Formation of human resources (HR)</td>
<td>3,00</td>
<td>4,00</td>
<td>4,00</td>
</tr>
<tr>
<td>Collaborative development</td>
<td>1,93</td>
<td>3,40</td>
<td>2,40</td>
</tr>
<tr>
<td>Adoption of processes and products from the competition – &quot;imitation&quot;</td>
<td>5,74</td>
<td>4,54</td>
<td>4,00</td>
</tr>
<tr>
<td>Codified knowledge</td>
<td>2,06</td>
<td>3,10</td>
<td>2,40</td>
</tr>
</tbody>
</table>

It must be underlined that the similarity of results from Carpi and EuroClusTex in relation to the knowledge transmission channels, and in special the degree of relative impact to relationship between firms and the cultural environment, shows transformation in the paradigmatic Italian Industrial Districts, which competition aims for the construction of strategic partnerships with belonging firms and not to the cluster. It can be stated that the Carpi cluster in the last twenty years was invaded by Chinese that feature cheap workforce and are highlighted in the intensive stages in workforce, especially in the confection segment. These new “Chinese-Italian” entrepreneurs although being located in the district do not have trust from the local businesspeople and in this case, it is evident that there is no Italian paradigm characterised by exuberant trust and cooperation anymore.

In general, it can be stated that in the studied cases the insignificant performance in the external market, and the lowering of firm numbers and jobs brought reflexes in the collaborative behaviour. However, in the European cases, it was underlined an increasing preoccupation with investing in innovation, in special aimed to creation of valuable brands associated to global distribution chains.

5. Conclusion

The reach of the objective shows that in both cases there are similarities and differences related to the degree of usage in the main knowledge transmission channels in clusters in Brazil and in Europe. The primary
similarities are the high impact in knowledge transmission channels related to: machine, equipment and raw material suppliers; imitation; and formation promoted by technical institutions and by firms themselves. Moreover, the most impacting difference aims for the relationship among firms takes part in higher intensity in EuroClusTex and in Carpi than in Vale do Itajaí. The same also occurs with the relationship with the government, the cultural environment and the research and development activities. It was observed noticeable unequal situations in the implementation of actions and collective projects aiming the development of dynamic factors of competition and opening of markets.

It was identified that the collaborative learning inside the studied clusters don’t depend only in geographical proximity, because it is also influenced by other factors as culture and the adoption of appropriate public policies that stimulate collaboration. This statement in relation to geographical proximity is shown evident in the results related to motivation for knowledge acquisition, human resources recruiting, collaborative development, relationship with the suppliers and imitation. It is stressed out that geographical proximity does not guarantees collaboration, nor generation of trust among firms.

The research pointed out that the intensity and efficiency of the usage of knowledge transmission channels, within clusters in Europe and in Brazil, influence in the competitive capacity in the cluster sphere as a whole and firms individually, and that in the studies cases the knowledge flux in channels that involve conjunct action and competitive dynamic gains is not high.

With the research, it can be stated that the global economic crisis of 2008 and the emergency of Asia that emerges as holder of cheap and qualified workforce caused changes in the competition patterns, which were not incorporated by most of the companies located in the studied clusters.

From the results of the research, it is suggested the making of studies to understand the knowledge flux and the processes of learning inside the clusters and in other modalities of productive agglomerated.

The real world shows that the ways of competition were altered and the factors that are determining the changes must be studied. It is pointed out that a smaller influence of the geographical proximity in the generation of trust and conjunct action be considered, but this does not determines the discharge of the analytical cut in productive agglomerations nor the disinterest for the continuity of researches.

References

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Dominant Business Models of Young Firms in the Renewable Energy Sector

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Abstract: This paper focuses on the behaviour of new technology-intensive firms (NTIFs) in the process of developing research-based renewable energy technologies, and introducing them into the market, thus contributing to the transition to a low carbon regime. We adopt a business model framework to study value creation by NTIFs, taking into account the context, where obstacles and opportunities impact the action and outcomes of the companies. The framework is applied to a group of 28 Portuguese NTIFs in several renewable energy areas, trying to identify the main business models adopted by them. Results reveal the existence of different business models in the exploitation of renewable energy technologies by these firms. They also reveal that companies adopting different business models perceive differently the context where they operate, namely in terms of obstacles and opportunities assessment. These results are expected to contribute to further knowledge about the business models, which are emerging in this highly innovative new sector, giving insights into the strategies deployed by NTIFs exploiting the new energy technologies associated with the regime shift, and thus contributing to strategy and policy formulation aiming at developing the renewable energy sector.

Keywords: new technology-intensive firms; business models; obstacles and barriers to innovation; renewable energy technologies

1. Introduction

Small firms exploring and/or creating in a successful way entirely new technology have to deal with the problem of succeeding in the commercialization of their product or technology. Survival and development of these companies depend as much of their knowledge, creativity and productive abilities as of their capacity to design and implement adequate strategies to enter and sustain a position in the market.

This is even truer for firms in renewable energy areas that are, most of them during a period, working out of the dominant technological trajectories, that is, the dominant technological regime. In fact, they face the inertia and hardness of a strong installed socio-technical system, made of a complex of dominant technologies, powerful incumbent companies, large and dramatically costly infrastructures, vested interests, historically built consumer preferences, out-dated policy options and installed routines (Unruh, 2000). In addition, the new technologies are usually cost ineffective at the start-up and early stages, when it comes to compare their price performance to the one of the dominant technologies they wish to substitute. In a way, they are confronted with the rival technologies dilemma pointed out by David (David, 1985).

We consider that the introduction of new energy technologies is closely connected with the creation of a variety of small technology-intensive firms that are the conveyors of these technologies and act as challengers to the status quo (Bergek et al, 2008; Hekkert and Negro, 2009). These new firms – which are often spin-offs -, exploit advances in several scientific and technological domains and take advantage of the opportunities created by the new policy framework. Although facing obstacles, they have benefited from an array of incentives to renewables and from the development of new markets (biofuels, energy efficiency, buildings certification, and so on).

In order to survive and thrive in their innovation undertaking, the new technology-intensive firms have to design and adopt an adequate business model (BM), whose pillars are the most important challenges they face: value creation and value capture. This paper adopts the BM framework (Zott et al, 2011; Klang et al, 2010, Teece, 2010, Chesbrough, 2010; Huijen and Verbong, 2013) to study value creation by NTIFs. In addition, it addresses how the companies perceive obstacles and opportunities and how this perception differs across firms adopting different BMs.

2. Business model: The concept and its operationalization

The business model concept appeared in the 1970s but it was not until recently that it gained momentum. The spread of the use of Internet permitted the creation of new modes of business, like e-commerce and stirred new forms of conceiving and carrying on business, that is, originated new business models.
More recently, the BM concept has been adopted by innovation studies, particularly when dealing with new complex technologies developed in parallel (or in niches), with the dominant regime. This means far more than putting together commercial and productive strategies, although the concept comprises both. Two recent comprehensive critical surveys (Zott et al., 2011; Klang et al., 2010) proceeded to a clarification of the domain, although recognizing that shortcomings and inconsistencies still subsist in the use of the concept.

The final definition proposed by Zott et al (2011:18-19) is the following: the business model is characterized as a new unit of analysis (closer to the firm or closer to the network); resorting to a holistic and systemic perspective; integrating activities (including boundary-spanning activities from the view point of the focal firm); and where the notion of value is central, both in regard to creation and capture. The main dimensions retained are then: value creation; value capture; organization of internal and boundary-spanning activities of the firm; product market strategy; and obstacles and opportunities faced by the focal business.

This approach is much in line with Teece (2010), who writes that a business model describes the “design or architecture of the value creation, delivery and capture mechanisms employed” (Teece, 2010: 191). Some aspects of Teece’s elaboration are to be retained, both contextual (the customer power has increased, it is not just a question of the shifts in the customers habits and practices, associated with the spread of the Internet; and intangible markets have grown) and internal (discovery, learning and adaptation are intrinsic to business models).

However, even if it still has a defective nature, the BM concept has become a strong heuristic device to study many new business phenomena like the one we are addressing in our paper. In fact, it provides an integrative framework of approaches and elements; it deals in an adequate way with the relationships between the (porous) current firm and its outside, via transactions, networks, outsourcings and under collaborative and competitive forms; it permits to understand the ways businesses had to adapt and transform to face on-going technological and societal major shifts (see Chesbrough, 2010).

In this paper we explore only the main dimensions of the business model: the creation of value, the remaining aspects being the subject of further analyses. Regarding value creation, a preliminary issue firms have to deal with is the definition of a value proposition, i.e., “the value created for users by an offering based on technology” (Chesbrough, 2010:355). That offering may assume several forms: a technology; a product; a service; a design; a technical solution; some form of technical assistance and maintenance. A second step consists of targeting a market segment and adopting a competitive approach regarding innovation, differentiation and pricing. Next, firms have to decide either to produce in-house the whole product (or service) to be released or to resort to external agents, via collaborations, outsourcings, or to market transactions to obtain complementary parts, components and specialized services. In a certain way, this is often not a matter of choice but due to circumstance. Particularly in the case of small innovative firms dealing with complex and novel technology, they have to specialize in specific segments of the production (or service) process or to remain upstream in the creation and development of technology(ies). In addition, these firms (and small firms in general) are constrained by holding a limited array of internal resources and skills, which propels them to engage realistically in formal and informal connections with selected partners to access the necessary resources. Before addressing the major issue of commercialization – since, as Chesbrough (2010:354) wrote, “the economic value of a technology remains latent until it is commercialized in some way” – these companies have to find financial resources and to design an effective organizational device, where, of course, human resources and leadership are of utmost importance. The transition to the downstream stage of commercialization consists of a survival test to the NTIFs. If they are not able to overcome this proof they will perish, no matter how good their technology is (Chesbrough, 2010). A recent paper addressed this issue in a comprehensive, systematic and thorough way (Conceição et al, 2012). Finally, the context has to be accounted for. It appears under three different forms: the obstacles and opportunities faced by the firms; the impact of policies; and the behaviour of customers, whose role has been transformed as mentioned above.

Drawing on these contributions, we have built an analytical framework that is briefly presented in Table 1. Here we articulate value creation with the analytical dimensions associated with it, decomposed into categories. Finally, we show how we operationalized this framework with a set of built variables used in the questionnaire applied to the firms analysed.
For operational purposes, we will define the business model through the combination of the two major attributes or analytical dimensions: offering definition and business strategy. Together they will define several types of BM, which we will then study empirically according to contextual dimensions such as obstacles and opportunities.

Table 1: Analytical framework of the business model

<table>
<thead>
<tr>
<th>Theoretical dimensions</th>
<th>Analytical dimensions</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value creation</td>
<td>Offering definition</td>
<td>Product, technology, services, design, solutions</td>
</tr>
<tr>
<td></td>
<td>Business strategy</td>
<td>Innovation, differentiation, pricing</td>
</tr>
<tr>
<td></td>
<td>Market segment targeted</td>
<td>Niche vs. broad market</td>
</tr>
<tr>
<td></td>
<td>Innovation strategy</td>
<td>New to the market /or new to the firm/or significant improvement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Product /service /process /commercial /organizational innovation</td>
</tr>
<tr>
<td></td>
<td>Knowledge approach</td>
<td>Nature of knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Access vs. creation of knowledge</td>
</tr>
<tr>
<td></td>
<td>Positioning in the value chain</td>
<td>Outsourcing vs. integration</td>
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<td></td>
<td></td>
<td>Specialization</td>
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<tr>
<td></td>
<td></td>
<td>Vertical alliances</td>
</tr>
<tr>
<td></td>
<td>Networks built</td>
<td>Importance of networks to the firms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nature of ties: informal or formal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resources accessed</td>
</tr>
<tr>
<td></td>
<td>Resources and competences mobilized (includes funding)</td>
<td>Human resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Financial resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Equipment, facilities, infrastructure</td>
</tr>
<tr>
<td></td>
<td>Organizational design</td>
<td>Forms</td>
</tr>
</tbody>
</table>

3. Method

3.1 Empirical setting and sample

In the last 20 years, Portuguese energy policy has been shaped by the European perspective with the clear goals of reducing energy dependency and improving energy efficiency, whilst respecting environmental concerns. Since the mid-2000s, several demanding targets for the share of renewables in energy production and consumption were put forward for the EU countries. The Portuguese government targeted the ambitious figure of 60% as the share of renewables in electricity production in 2020 (MEID, 2010).

In order to promote the diffusion of renewable technologies, the Portuguese government has used a varied set of policies and incentives: feed-in tariffs, priority access to electricity from renewable energy sources into the grid, fiscal incentives for adoption, public financing (through public investment or grants) and public competitive bidding (REN, 2011). As a result it is possible to observe a steady growth of the penetration of renewables in the country’s electricity production, which in 2012 reached 48% corresponding to the fourth higher position in the EU.

The above mentioned policy efforts towards the development and dissemination of renewables and the expansion of the renewable electricity production sector created a highly favourable environment for the creation of new firms exploiting advanced energy or energy-related technologies.

The empirical analysis of this paper draws on a sample of 28 Portuguese companies that are developing and commercializing renewable energy technologies or products. They are relatively young (75% were created between 2007 and 2010) and small: in terms of employment, the majority has 9 employees or less; in terms of turnover, the average of the sample is 1.2 million Euros, but most of the firms (78%) had a turnover under 1
Cristina Sousa and Isabel Salavisa

million Euros (78%). Four companies are not yet in the market, focusing their activity on the development and test of technology.

More than half of the companies export. The main markets are EU and Portuguese speaking countries. On average, the weight of exports on turnover is 22.5%, but for 18% of the companies exports represent 90% or more of the revenue.

In terms of origin of the company, 68% are spin-offs, either academic (43%) or corporate (25%). The development of the initial renewable energy technology was mainly made in collaboration with other organizations (32%), in-house (29%) or was originally developed in the parent organization and then transferred to the company. Only 11% of the companies referred that the initial technology was developed by a third-party organization.

A large share of the companies (89%) performs R&D activities, usually combining research (basic or applied) with development (including project or product feasibility or product performance evaluation). In terms of investment, the average percentage in R&D in the 2012 turnover was 43%. In terms of IPR, 43% of the companies have at least one patent application either pending or registered.

3.2 Data collection

Data were collected through detailed interviews with the companies’ founders or CEOs. The interviews were conducted between May and September 2013. They had an average length of 1.5 hours and were supported by a semi-structured questionnaire. The interviewees were asked to provide a brief history of the firm and then give detailed information on the companies’ activities and strategies, with emphasis in the processes of development and commercialization of technologies, products or services. Data collected through the interviews was complemented with an extensive search for documentary information on the firms.

3.3 Measures and techniques

The empirical analysis draws on a set of measures that capture three dimensions of the analytical framework (Table 2): offering definition, business strategy and obstacles vs. opportunities. Regarding the dimension “offering definition”, the firms were asked to specify their main current activity, selecting one of the following options: i) commercialize or licence technology; ii) develop and commercialize their own products; iii) integrate their own products with third-party products; iv) provision of services; v) commercialize third-party products/technologies. Based on this question, two different categories were considered: one includes the development and commercialization of own technologies or products; the other includes the remaining activities. Concerning the company’s business strategy, the respondents had to choose one of the following options: i) price-based competition; ii) quality/reliability-based competition; iii) technological innovation-based competition; and iv) design/project-based competition. The questionnaire addresses the obstacles and opportunities faced by the firms, using a seven point Likert scale. It includes one question to assess the importance of twelve obstacles and other to assess the importance of six opportunities.

Table 2: Description of the variables

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Variable</th>
<th>Description</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offering definition</td>
<td>Commercialize or license of technology</td>
<td>The main current activity is to commercialize or to licence technology</td>
<td>Binary 1=yes; 0=no</td>
</tr>
<tr>
<td></td>
<td>Develop and commercialize own products</td>
<td>The main current activity is to develop and commercialize their own products</td>
<td>Binary 1=yes; 0=no</td>
</tr>
<tr>
<td></td>
<td>Integrate own products with those of third-parties</td>
<td>The main current activity is to integrate their own products with other products</td>
<td>Binary 1=yes; 0=no</td>
</tr>
<tr>
<td></td>
<td>Provision of services</td>
<td>The main current activity of the company is to provide services</td>
<td>Binary 1=yes; 0=no</td>
</tr>
<tr>
<td></td>
<td>Commercialize third-party products/technologies</td>
<td>The main current activity is to commercialize third-party products/technologies</td>
<td>Binary 1=yes; 0=no</td>
</tr>
<tr>
<td>Business strategy</td>
<td>Price-based competition</td>
<td>The business strategy is based on price competition</td>
<td>Binary 1=yes; 0=no</td>
</tr>
<tr>
<td>Dimension</td>
<td>Variable</td>
<td>Description</td>
<td>Values</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td></td>
<td><strong>Quality/reliability-based competition</strong></td>
<td>The business strategy is based on the quality or reliability of products/services/technologies</td>
<td>Binary (1 \equiv \text{yes}; 0 \equiv \text{no})</td>
</tr>
<tr>
<td></td>
<td><strong>Technological innovation-based competition</strong></td>
<td>The business strategy is based on technological innovation</td>
<td>Binary (1 \equiv \text{yes}; 0 \equiv \text{no})</td>
</tr>
<tr>
<td></td>
<td><strong>Design/project-based competition</strong></td>
<td>The business strategy is based on the characteristics of the design/project</td>
<td>Binary (1 \equiv \text{yes}; 0 \equiv \text{no})</td>
</tr>
<tr>
<td></td>
<td><strong>Cost</strong></td>
<td>Importance attached to the relative cost of the company’s technology as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Technical risk</strong></td>
<td>Importance attached to the technical risk as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Market risk</strong></td>
<td>Importance attached to the market risk as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Regulation, fiscal and legal factors</strong></td>
<td>Importance attached to regulation, fiscal and legal factors as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Bureaucracy</strong></td>
<td>Importance attached to bureaucracy as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Reduction of incentives to the adoption of renewables</strong></td>
<td>Importance attached to the reduction of incentives to the adoption of renewables as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Non-acceptance of technology by public authorities</strong></td>
<td>Importance attached to the non-acceptance of technology by public authorities as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Non-acceptance of technology by investors</strong></td>
<td>Importance attached to the non-acceptance of technology by investors as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Non-acceptance of technology by the civil society</strong></td>
<td>Importance attached to the non-acceptance of technology by the civil society as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Conduct of large energy companies</strong></td>
<td>Importance attached to the conduct of large energy companies as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Access to credit</strong></td>
<td>Importance attached to access to credit as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Macroeconomic conditions</strong></td>
<td>Importance attached to macroeconomic conditions as an obstacle for the company’s business and the pursuit of its strategic goals</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>Technological change</strong></td>
<td>Importance attached to technological change as a source of opportunities for the company</td>
<td>Likert scale (7 \equiv \text{Extremely important}; 1 \equiv \text{Not important at all})</td>
</tr>
<tr>
<td></td>
<td><strong>New markets or segments</strong></td>
<td>Importance attached to the emergence of new markets or segments as a source of</td>
<td>Likert scale (7 \equiv \text{Extremely important})</td>
</tr>
</tbody>
</table>

**Obstacles**

**Opportunities**
4. Results

4.1 Business models

As mentioned above, we consider that BMs can be operationalized combining two dimensions related with value creation: the offering definition and the business strategy. A large share of the companies considers the development and commercialization of own technologies or products as their main activity (Figure 1). Regarding the business strategy, the choice of differentiation through innovation is the most frequent situation (Figure 2). None of the companies adopts a strategy based on price competition.

![Figure 1: Offering definition](image1)

![Figure 2: Business strategies](image2)
If we consider both dimensions simultaneously, we have six different possibilities (Table 3). Since only three companies are following a business strategy based on design/project differentiation and thus the number of cases falling in cells (3) and (6) is very low, we will exclude them in the remaining empirical analysis.

**Table 3: Business models**

<table>
<thead>
<tr>
<th>Business strategy Offering definition</th>
<th>Technological innovation</th>
<th>Quality/ reliability</th>
<th>Design/ project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development and commercialization of own technologies or products</td>
<td>BM1 10 companies</td>
<td>BM2 3 companies</td>
<td>1 company</td>
</tr>
<tr>
<td>Provision of services; integration of own products with third-party ones; commercialization of third-party products</td>
<td>BM3 4 companies</td>
<td>BM4 8 companies</td>
<td>2 companies</td>
</tr>
</tbody>
</table>

Therefore, four different business models emerge in these companies:

- Developing own technologies or products based on technological innovation – BM1
- Developing own technologies or products based on differentiation by quality/reliability – BM2
- Providing services, integrating or commercializing third-party products based on technological innovation – BM3
- Providing services, integrating or commercializing third-party products based on differentiation by quality/reliability – BM4

Table 4 shows the main characteristics of the firms in each BM. Firms adopting BM1 are young and small and often academic spin-offs. Most of them do not export, and in average exports account for 12% of their turnover. All companies perform R&D activities and this group exhibits the higher R&D intensity. Furthermore, companies tend to patent their technologies.

Companies adopting BM2 show different characteristics. They are very often corporate spin-offs and are older and larger than those adopting BM1. In fact, BM2 integrates the largest companies in the sample. All companies in BM2 export and exports account for nearly all their sales. Additionally, although all companies carry out R&D activities, its intensity is quite weak. Also the number of companies that patent their technologies is lower, compared to the previous group, although representing two thirds of total firms.

All companies adopting the BM3 are academic spin-offs. This group of companies exhibits the highest average age, but sales are still low. Half of the companies export although with a very modest expression. In fact, sales are oriented to the domestic market. The importance of innovation is reflected on the existence of R&D activities in all companies, with a strong intensity in terms of turnover, and on the hiring of PHDs.

**Table 4: Firms’ characteristics by business model**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>BM1</th>
<th>BM2</th>
<th>BM3</th>
<th>BM4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic spin-offs (%)</td>
<td>40</td>
<td>33</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Corporate spin-offs (%)</td>
<td>10</td>
<td>67</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>Age (average; years)</td>
<td>3.4</td>
<td>6</td>
<td>8.5</td>
<td>4.8</td>
</tr>
<tr>
<td>Employees in 2012 (average)</td>
<td>2.1</td>
<td>37.5</td>
<td>8.8</td>
<td>8.6</td>
</tr>
<tr>
<td>Turnover in 2012 (average; 10€)</td>
<td>62</td>
<td>6800</td>
<td>510</td>
<td>1599</td>
</tr>
<tr>
<td>Exporting companies (%)</td>
<td>40</td>
<td>100</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Exports in turnover in 2012 (average; %)</td>
<td>12</td>
<td>96</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Companies with R&amp;D (%)</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>R&amp;D expenses in turnover in 2012 (average; %)</td>
<td>86</td>
<td>3</td>
<td>48</td>
<td>15</td>
</tr>
<tr>
<td>Companies with patents (%)</td>
<td>80</td>
<td>67</td>
<td>0</td>
<td>38</td>
</tr>
<tr>
<td>Companies with PHDs (%)</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>13</td>
</tr>
</tbody>
</table>

BM4 group shows the lowest number of academic spin-offs. Companies are relatively young, but reveal the second largest average turnover. As in the previous group, half of the companies export, but the foreign market has a small expression. This is the only group in which not all companies conduct R&D activities. However, some patent their technologies and/or hire PHDs.
4.2 Business models and context perception

As expected, the results show that NTIFs adopting different business models perceive differently the context where they operate. Beginning with the perception of obstacles (Figure 3), the results clearly show the following differences between the four groups of companies:

- For companies in BM1, the comparative costs of their technologies, technical risk, regulatory, fiscal and legal fiscal factors, reduction of incentives, non acceptance of their technology by both public authorities and investors, and macroeconomic conditions are seen as the major obstacles. Relatively to other groups, technical risk is a more relevant obstacle, while market risk and the conduct of large energy companies are seen as less important.

- For companies in BM2, market risk is by far the most important obstacle, followed by macroeconomic conditions and, at a distance, by comparative costs, reduction of incentives, non acceptance of their technology by public authorities and access to credit. Relatively to other groups, market risk is a more relevant obstacle, while the non-acceptance of the company’s technology by investors or by the civil society is seen as less important.

- For companies in BM3, market risk, the conduct of large energy companies, non acceptance of their technology by the civil society, technical risk and macroeconomic conditions are perceived as the more important obstacles. Relatively to other groups, the non-acceptance of the company’s technology by the civil society and the conduct of large energy companies are considered as more relevant obstacles, while the relative cost of the company’s technology, the bureaucracy, the reduction of incentives to the adoption of renewables, the access to credit and the macroeconomic conditions are seen as less important.

- Companies in BM4 value more obstacles such as market risk, reduction of incentives, macroeconomic conditions, and regulation, fiscal and legal factors, while they attribute a low importance to the non acceptance by the civil society and technical risk. In comparative terms, they give more importance (relatively to other groups) to the following obstacles: regulation, fiscal and legal factors, bureaucracy, reduction of incentives to the adoption of renewables and macroeconomic conditions. Together with companies in BM2, they give much less importance to technical risk.

![Figure 3: Obstacles](image)

Results also reveal differences across BMs in terms of the perception of opportunities (Figure 4):

- For companies in BM1, the most important opportunities are technological change and the emergence of new markets, while public incentives and the conduct of large energy companies are perceived as neutral.
For companies in BM2, the most relevant opportunities are seen as the emergence of new markets and public incentives, while technological change and changes in the consumer behaviour are faced as neutral.

For companies in BM3, technological change is perceived as the most relevant opportunity, while regulatory aspects are attributed the least importance in creating opportunities. In relative terms, this group faces the emergence of new markets as a less relevant opportunity than the other groups.

For companies in BM4, the emergence of new markets is the most relevant opportunity. In relative terms, this is the group which attributes more importance to the conduct of large energy companies in creating opportunities.

**Figure 4:** Opportunities

5. **Conclusion**

This exploratory study based on a sample of 28 new technology-intensive firms (NTIFs) operating in new energy technologies is still at a preliminary stage. However, some conclusions and insights for future research may be drawn.

First, we have suggested an approach to the firms’ behaviour based on the business model concept. This framework permits to integrate a diversity of analytical dimensions that contribute to the understanding of value creation and value capture by the firms, embedded in a context moulded by policy and involving obstacles and opportunities. Therefore, it appears as a fruitful heuristic device, although it is generally recognized in the literature that it has to be extended and improved, through both theoretical and empirical work.

Using this framework, we were able to find the existence of four different business models in a group of firms in the Portuguese renewable energy technologies sector. These business models were built according to two major dimensions: the main activity of the company (i.e. the definition of its main offering, technology, product or service) and the business strategy (innovation oriented or quality oriented). With this typology we studied how firms perceive the obstacles and opportunities put to them.

We found quite contrasted patterns across the four business models, which seems to indicate that this kind of demarche is useful to understand how NTIFs act in the respective markets and therefore contribute to sustainable transitions.

Further research will integrate other dimensions regarding value creation and will address value capture, not considered in this paper. In addition, we will extend the sample and will explore more thoroughly the patterns observed, resorting to more sophisticated techniques.
Cristina Sousa and Isabel Salavisa

References


Optoelectronics in Scotland: Network Reconfiguration in a Sectoral System of Innovation

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Abstract: Optoelectronics (or photonics) has developed as a significant enabling technology central to the operation of a wide range of artefacts evident in defence, telecommunications, consumer electronics and medical devices. Optoelectronics technologies may be widely leveraged in these and other high-value sectors. Consequently, policy makers in several nation states and regions have been keen to build capability and capacity in optoelectronics activities. As in many other locations with a significant optoelectronics presence, Scottish firms tend to be geographically clustered. Chosen locations in Scotland tend to gravitate towards the ‘Central Belt’ area of the country. The paper explains reasons for the emergence of optoelectronics activity in these locations and accounts for the development of the sector from the fusion of a deep-seated science base in theoretical and applied physics with a strong engineering heritage. Optoelectronics activity in Scotland has been characterised using a sectoral systems of innovation approach which identifies key actors in the system. Among these, universities are identified as enduring contributors to knowledge production within the sector. These organisations provide bridging for research, development and subsequent innovation by firms. The Scottish sector has survived significant exogenous shocks in the opening decade of the 21st century and this heightened selection environment has resulted in a reduction in the numbers of local firms at either end of the optoelectronics value chain (component manufacturers and producers of end-user products and systems). This has prompted a reconfiguration of the local network with changes to the relationships and interactions of actors in the system. Policy adjustments have had to reflect these changes and respond to global trends in manufacturing and sourcing, especially related to developments in modularity and the production of intermediate goods. The role of the remaining system integrator firms in stimulating and maintaining the sector is highlighted. Reactive and proactive strategies of these firms and other actors within the cluster are driven by the imperative to plug knowledge gaps and engage with global markets. This has enhanced the sector’s connectivity to international optoelectronics value chains of knowledge and technology production.

Keywords: sectoral innovation; clusters; networks; optoelectronics; value chain

1. Introduction

The paper is structured as follows. The nature of optoelectronics and its development as a fusion technology are briefly described. The historical roots of the sector in Scotland are set out, with identification of a geographic clustering of activity. Given that the optoelectronics sector is characterised by technological intensity and specialisation with fragmented value chains at both local and international levels, the nature of innovation resulting from this multiplicity of user-producer interactions is of interest. In order to examine this, and following a summary of the wider innovations systems construct, a sectoral system of innovation approach is used to identify and explain activities within the Scottish optoelectronics sector. In the aftermath of a significant period of disruption in the global optoelectronics sector, the discussion moves to resultant dynamics in the Scottish optoelectronics value chain, and consequent adjustments to relational architectures and user-producer interactions.

2. Optoelectronics technology development and sectoral boundaries

Optoelectronic devices have emerged from the junction of knowledge in three distinct fields: quantum theory; the production of new materials; and the physics of semiconductors (Nosov, 2002). Optoelectronics is a set of technologies and activities which incorporates and combines core optical and electronic functions within artefacts ranging from components to complex product systems. The fundamental scientific principles of the technology are emphasised by Hendry and Brown (2006, p. 710) when they state that optoelectronics involves “…the manipulation of photons (light) and their interaction effects with electrons”. The terms ‘optoelectronics’ and ‘photronics’ are both evident and are often used inter-changeably. For example, De Martino et al (2006, p.11) state that… “photronics, also referred to as optoelectronics, may be defined as the ‘technology of generating and harnessing light and other forms of radiant energy whose quantum unit is the photon’”.

Sternberg (1992) was among the first to recognise the integral nature of optoelectronics. The wide range of sciences which underpin the sector coupled with the need for the development of skills that embrace and cross the disciplines of physics, chemistry, materials science and engineering, requires the presence and persistence of active knowledge systems. Given this ‘technology fusion’ (Kodama (1992), establishing a shared
view on the boundaries to the optoelectronic sector is a challenge. Hendry, Brown and Defillippi (2000, p.136) describe the nature of the sector as complex with diversified end-markets which accounts for the observed specialisation and fragmentation within the sector. These authors argue this has encouraged collaboration between small and large firms with the latter providing a degree of focus and co-ordination for the network functioning as final 'system integrators’. A further difficulty in researching the available data on optoelectronics lies in the range of classifications, technologies, applications and end-user products from these system integrator firms. Several sources (Miyazaki, 1994; Hendry, 1999; Hendry, Brown and Defillippi, 2000; DTI, 2006; and Sydow et al, 2007) have attempted to delimit these activities. Of these proposed taxonomies, the Miyazaki (ibid.) three level categorisation comprising: generic technologies and materials; key components; and end-user products and systems, is evident in much of the literature on the sector and has been adopted in this study.

3. Optoelectronics – historical roots and economic policy in Scotland

Scottish universities have made major contributions to fundamental developments in optical sciences and theories of electricity and magnetism which underpin optoelectronics (Marsh, 2002). Significant contributions include: scientific knowledge from the experimental work of Sir David Brewster (1781-1868); William Thomson (Lord Kelvin) at Glasgow University; the development of a dynamic theory for electricity and magnetism by James Clerk Maxwell (1831-1879); and the discovery by John Kerr (1824-1907) of electrically induced optical phenomenon, whereby strong electrical fields alter the molecular structure of glass. Scottish engineered optical heritage can be traced back to the 1890s with the production of optical range finders in Glasgow (Mathas, 2002) and links with the defence industries via the creation of the firm ‘Barr and Stroud’ of Glasgow. This selection of examples provides evidence of strong links between Scottish science, engineering and innovation which hints at a local and enduring system with the capacity for the creation and nurturing of technology fusions which have underpinned modern optoelectronics.

The loss of traditional industries from Scotland during the 20th century prompted an active search for new industrial settings to replace and upgrade value generation within the economy. Policies designed to embed new industries have been subject to widespread, but not universal, criticism as Scotland has tried to create indigenous value chains by attracting multi national enterprise (MNE) consumer electronics system integrator firms. Significant market turmoil in the key information and communications technologies (ICT) markets has caused readjustment of optoelectronics activity throughout global supply chains. Much of the present concentration in these high technology industries is associated with the ‘Central Belt’ area of Scotland. This comprises locations ranging from Dundee south and westwards to Inverclyde, the urban areas of Edinburgh, the new towns of Livingston, East Kilbride and Glenrothes plus Greenock and Glasgow. These historical and spatial settings have largely been maintained and reinforced over time as a consequence of policy instruments which have pursued network, cluster and system-like dimensions to the Scottish optoelectronics sector. The initial priority of optoelectronics policy in Scotland was directed towards the creation of local and complete vertically integrated supply chains (Sutherland, 2009).

4. Innovation systems

The ‘innovation system’ approach is a fundamental construct for describing, understanding and explaining the nature of innovation (Edquist, 1997). The primary intention of the approach is to identify actors, networks, institutions, dynamics and the overall performance of the system with regard to innovation. Interactions between actors and elements in the system (and the extent to which these interactions may promote innovation) are central, as are the evolutionary processes which may promote and sustain the system. The importance of social interaction for influencing economic activity (Granovetter, 1985) and the notion of user-producer interactions (Lundvall, 1988) provide the main mechanisms for innovation within the innovation systems approach.

4.1 Methodological and analytical constructs

Policy makers have engaged with the innovation system concept at a variety of spatial levels. These range from the supra-national (such as the European Commission and the OECD) to national, sub-national (regional) and local levels (where local economic development agencies have employed the innovation systems approach for various purposes). This level of approval has in turn resulted in a wide range of policy interventions designed to promote innovation. Such interventions are often directed towards network or system-like considerations. This diffusion of system-based policies and the consequent requirement for appropriate evaluation (Bellandi
and Caloffi, 2010) presents particular challenges to policy makers given the evolutionary and often complex nature of the system under consideration.

The wider system of innovation approach has been criticised for conceptual diffuseness and lacking in theory. In order to address some of these concerns Carlsson et al (2002) have set out methodological and analytical issues surrounding the innovation system approach. The innovation systems approach has fragmented into a number of concepts, comprising: national innovation systems (Freeman, 1987; Lundvall, 1988; Nelson, 1993); regional innovation systems (Cooke et al, 1997; Autio, 1998; Asheim et al, 2011); technological systems (Carlsson and Stankiewicz, 1991) and sectoral systems of innovation and production (Breschi and Malerba, 1997; Malerba, 2002). Given this family of concepts, scholars must identify the appropriate unit of analysis for investigation, and these selections remain contested within the literature. This paper has adopted the sectoral system of innovation approach as the entry point for the study.

4.2 Sectoral systems of innovation

Sectoral innovation systems are seen by Breschi and Malerba (1997) as an alternative way of thinking of industry-level innovation processes. A sectoral system of innovation is defined by Breschi and Malerba (ibid., p.131) as “...that system (group) of firms active in developing and making a sector’s products and in generating and utilizing a sector’s technologies; such a system of firms is related in two different ways: through processes of interaction and co-operation in artefact-technology development and through processes of competition and selection in innovative and market activities”. Malerba (2002, p.248) then provides a somewhat broader definition of sectoral systems of innovation (and production) as “a set of new and established products for specific uses and the set of agents carrying out market and non-market interactions for the creation, production and sale of those products”. Carlsson et al (2002, p.236) state that it is possible in principle “to view a national system of innovation as the aggregate of a set of technological, sectoral, or regional systems”. Given these definitions (and the afore-mentioned multiple product lines and applications which feature optoelectronic technologies as being central to their operation) a case is made for using the sectoral innovation systems analytical construct in the examination of innovation in optoelectronics activities. In essence, a ‘knowledge field’ has been adopted as the focusing device (after Bergek et al, 2008) for investigation of the sector within the spatial domain of Scotland.

4.3 Primary data gathering for the study

Interviews were conducted with actors selected from across the optoelectronics sector, comprising: policy makers; trade associations; academics; entrepreneurs; research directors; and strategic managers of firms of different scales of operation within Scotland ranging from spin-put firms to large MNEs. The purpose of the interviews was to establish the characteristics of innovation in the optoelectronics sector within the region. The themes of the survey drew on the extent to which actors engaged in innovation and the extent and type of interactions with other actors in the system that were seen as enablers of innovation. The dynamics of the network relationships were also explored following the afore-mentioned market turmoil in global value chains.

5. Dynamics in the Scottish optoelectronics sector

The recent context of optoelectronics activities and events associated with exogenous change and structural adjustments to practices in production have had significant impact on network relations. As evidence of this, an investigation into the scale and heterogeneity of Scottish optoelectronics firms by Sutherland (2009) identified a trend during the first decade of the 21st century of an increased contribution from small and medium-sized enterprises (SMEs) coupled with a decline in the presence of large MNE firms. That study also produced evidence of a reduction in economic contribution by the sector within Scotland. The structure of the remaining discussion draws on framework components proposed by Malerba (2002) which set out the basic elements of a sectoral system of innovation coupled with the Bergek et al (2008) approach in examining key processes, or ‘functions’, for analysing innovation systems.

5.1 Products

Products which feature strongly within the Scottish sector include lasers, displays and sensors. These artefacts can be leveraged in a wide number of intermediate and finished products ranging from commercially-available devices such as mobile phones through to complex products for industrial markets. Final system integrator
firms within Scotland operate in defence, telecommunications, computer and medical sectors as well as astronomical instruments and measurement devices.

5.2 Knowledge and learning processes

Universities play a key role in knowledge production supporting the core science of optoelectronics technologies. The sector has developed research and educational opportunities that are closely aligned to the knowledge base of the sector. Scottish universities have also developed club goods and complementary assets which may be accessed by other actors in the system. Large firms are considered to have greater capacity to initiate and support any external optoelectronics research activity which may be conducted by universities. Given that many of the available policy initiatives are targeted at SMEs, research establishments are often led to working with SMEs under more pressured conditions and university actors claim that such projects often do not cover costs. Firms report the loss of a tier of knowledge at the component level due to the collapse of this part of the local value chain. With respect to the resulting gap in local component design and production, this has prompted the remaining actors to engage in the active search and scanning of sources of technical knowledge outwith the cluster.

For MNEs, a desire to centralise and thereby concentrate global knowledge assets in fewer locations is evident and actors across the local system express concern that Scotland may not be able to attract, retain and sustain these system integrator capabilities. Given that decisions are taken centrally by MNE headquarters offices, regardless of what is happening in local clusters, this is widely perceived as a potential threat to the Scottish system. Knowledge heterogeneity in the network is evident and actors perceive the need to link these sources of knowledge together in order to create and support innovation. This heterogeneity is viewed as an opportunity to make novel connections which may deliver significant value in the future. As a consequence of increased complexity in artefacts, the sector’s knowledge requirements are believed to increase with time. Firms report some fuzziness in being able to delineate distinct phases of R&D, and, in such cases, regular and incremental interventions tend to characterise the pace of knowledge development in the sector. Actors that provide knowledge bridging within the system are gaining in importance.

5.3 Actors

Scottish actors which bridge between research and industry by providing activities in the 2 to 5 year space between research and the market include: The Strathclyde Institute of Photonics; the Photonics Innovation Centre at St Andrews; and the Scottish Microelectronics Centre at Edinburgh University. These university-supported organisations have remained as important providers of research and technical advice and are valued as enduring features of the Scottish system. The presence of an active trade association (the Scottish Optoelectronics Association) is pivotal in identification of market opportunities for the sector and also promotes connectivity between actors within the system.

Entrepreneurial activity and experimentation have been evident, particularly with the development of scientific entrepreneurs enabled by the prevailing supportive appropriability regimes in universities located in the Scottish Central Belt. There are a variety of these entrepreneurial developments with several being strongly linked to production of display technologies. Large firms have significant influence over the optoelectronics value chain in Scotland and their involvement in the complete product development cycle is a key driver of activity. The pool of large firms in the Scottish sector has diminished and those remaining are predominantly in defence markets. These defence markets can be considered to have some degree of protection from market forces, however, they are subject to political decision-making and have also undergone changes with the restructuring of defence research and supplier networks. There is evidence of local search for expertise from these large defence system integrator firms with respect to research, development, instrumentation and maintenance. These firms are also called upon to support the development of training and skills development in the optoelectronics workforce in Scotland. In the past there has been a significant mobility of the workforce circulating within defence firms in the cluster. This pool of knowledge and expertise is observed to spillover into SMEs in both defence and non-defence activities.
5.4 Mechanisms of interaction

Fragility has been exposed in the Scottish optoelectronics sector that may be linked to initial policy ambitions to deliver complete local value chains. These policy imperatives have had to adjust to the realities of increased levels of global interaction as a consequence of the creation of intermediate goods and modularity in ICT products and services. This dynamic has changed user-producer engagement within the system. Regional network interactions within the cluster continue but there is an increased imperative to link to non-local and international networks. These new connections reflect the evolution of firms and their innovation strategies in response to external challenges.

Policy discussion cuts across a range of issues which impinge upon: firm creation; location decisions; growth; innovation; and value chain configuration. Indeed policy initiatives have been specifically designed to have consequences for the clustering of firms and the optoelectronics value chain within Scotland. There is no consensus from actors within the system on the degree of success of policy initiatives in Scottish optoelectronics. The Scottish Co-Investment Fund was identified by interviewees as being of particular relevance with regard to supporting firm creation and development. From the SME perspective, European funding was viewed as being bureaucratic and time consuming to initiate. There was acknowledgement that these programmes could act as gateways to collaboration but the extent to which funding filtered through to SMEs was considered to be low. Involvement and regular engagement with the economic development agency, Scottish Enterprise, is seen as important by SME firms to maintain and support the sector for the long term.

Firms report more formality appearing in relationships between actors in the system, particularly relating to intellectual property discussion and negotiation. There is recognition that relationship-building is desirable and important in order to sustain connections, particularly as a means of negotiating and overcoming technical problems. Informal links are also in operation in parallel with the more formal activities. Informal links bring ideas for potential projects which may be instigated through more formal arrangements in the future. Given the recent turmoil in the sector, small firms are increasingly engaging in an evaluation of prospective customers. In effect these firms are conducting due-diligence to assess the likely longevity of users and collaborators in order to justify allocation of resources towards relationship-building.

Small firms report increased levels of collaboration for innovation. SMEs believe that large system integrators are more conservative with respect to collaborations and may not be attuned to changes in frequency and type of collaborations. The facilitation of these collaborations by science-industry bridging organisations is seen as an important driver of innovation. In general, an overall ‘want’ to collaborate is evident and this is reinforced by the design of policy instruments which encourage and require multi-actor programmes. The majority of the firms interviewed had multiple collaborations in place at any one time with international collaborations seen as being particularly desirable as they offered the potential to access sources of new knowledge. However, these relationships were frequently viewed as problematic due to the intensity and complexity of legal negotiations relating to intellectual property issues and the ‘fair’ apportionment of any benefits flowing from innovation.

5.5 Processes of competition and selection

Changes to the climate of technological opportunities prompted by the shocks to the ICT market caused a rapid adjustment to supply chains with corresponding impacts to the local optoelectronics value chain. In particular, those firms and activities associated with component production, as set out earlier in this paper, and other early stage activities in the value chain saw significant shake-out of firms within that part of the system. Post-disruption, there is evidence of SME firms overcoming difficulties of scale to engage with large international firms. Such relationships are highly valued by Scottish firms as they permit access to key resources outwith Scotland which are not present in the cluster. The global optoelectronics sector is shifting from a vertically integrated pattern to an outsourced chain. Connection with, and management of, this chain has become an essential consideration for incumbent firms in the Scottish sector.

The dynamics in the sector are evident in a number of trends. The afore-mentioned decamping from Scotland (and the UK) of major players, predominantly system integrators, has been particularly pertinent to ICT markets and confirms the dynamic and global nature of the sector and the lack of embeddedness of MNE firms
with the Scottish cluster. Allied to the relocation dynamic of MNE firms there is also evidence of firms closing - either in a controlled manner or going into receivership. Merger, acquisition and disposals have been apparent as a response to the recent selection environment. Cost-reduction is a current driver for innovation in optoelectronics, particularly if linked to telecommunications and consumer electronics markets. For example, the integration of devices onto single chips (System on Chip (SoC) technology) is emerging as one area demonstrating immediate cost advantages.

5.6 Institutions

Increasing complexity embodied in devices and processes such as SoC is being paralleled by increasing complexity in relationships between actors. The impact of this development on firms is that design, manufacturing processes and device issues cannot easily be separated-out as has been the case in the past. The significance for firms is that they have to engage with other actors in the system to plug any knowledge gaps. Complexity of retaining intellectual property rights in outsourced models is evident as a consequence of these extended value chains. The desire to protect the actor’s intellectual property has ramifications for feedback completeness, with some firms reluctant to provide suppliers with knowledge that could enhance the products and services of the supplier firm. This may limit directed innovation flowing from relevant improvement analysis and indicates that user-producer interactions (which are deemed as central to the innovation systems approach) may not necessarily provide a stimulus for innovation.

6. In conclusion

Innovation in the Scottish optoelectronics sector can usefully be described using a sectoral system of innovation construct. The sector has developed in Scotland by building on historical capabilities in optics, physics and engineering in order to successfully underpin a diverse set of practical applications. The sector has been subject to global exogenous shocks and this has resulted in a shake-out of firms within the local system, particularly in the part of the sector which is strongly linked to the production of components. This has had consequences for network relations within the Scottish cluster and these are increasingly internationalised and more transactional in nature. Asymmetries in network relationships are evident, and policy arrangements have had to adjust to reflect the reality of supra-national value chains of production. A reduction in the number of large local system integrator firms in ICT markets means that the focus of Scottish optoelectronics firms must increasingly require engagement with global markets. This driver, coupled with the widespread desire of firms to grow companies of high value, is widely perceived to create an imperative to identify, sustain and further develop international connections. Interactions for innovation also feature an international dimension, while retaining networks of local interaction in re-configured clusters.

References


Case Study on Financing and Business Development Processes in
Technopreneurship

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Abstract: Technology-oriented innovations are the key to improving sustainable competitiveness within the European Union (EU). The success of a technology-oriented company depends on its ability to develop new technologies, products and services to enter new markets. The starting point of any business or organization is the precise definition of its business processes that lead to an efficient implementation of technology-oriented innovations. These innovations are then transferred into products and services to achieve an early economic success. There are various processes that have to be identified starting with an idea, its realization, the corresponding funding and finally its commercialization. They are affecting not only these processes entrepreneurs and innovators, but also other stakeholders (i.e. inventors, innovation managers, coaches, mentors, business angels, investors, etc.). All these parties contribute to the strengthening of innovation and competitiveness in the individual enterprise in particular and last not least in the entire EU. Europe benefits from its innovative strength, its efficiency in implementing new ideas and its scientific knowledge compared to other economic regions in the world. A growing development of technology innovations strengthens labor markets and thus the entire society benefits from technological innovations. According to a survey of the European Commission on the innovation performance of member states, there are still major differences within the EU countries, despite the fact that there have been many measures to improve the innovation strength. While countries like Sweden, Germany, Ireland and Luxembourg are at the top of the rankings, countries like Bulgaria, Romania, Latvia and Poland are ranked on the last places. This raises the question: How can an assimilation of all EU countries on a high innovation level be achieved? A detailed analysis proved that it is necessary to improve the Technopreneurship processes based on cross-uniform models. Furthermore, the consistent definition and formalization of innovation processes enable all EU countries to develop technology-based innovations efficiently and quickly. With respect to this question, this case study analyses the financing and business development processes in Technopreneurship. The aim of this case study is to analyze these processes in selected countries and to compare Germany (as a leading innovator in the EU), Bulgaria (as one of the EU’s modest innovators) and Switzerland (non-EU country, but ranked as one of the innovation leaders). The starting point for the development of these uniform cross-models is a comprehensive status quo analysis of the processes in the respective countries. Therefore, two major roles are considered: firstly, the roles of technology-oriented entrepreneurs and secondly, the roles of investors. The case study focuses on the three main financing phases of start-ups and young companies: the seed, A and B phase. With selected scenarios, we analyze challenges in technology-oriented innovation developments and their different approaches and processes in the three aforementioned countries. Based on these results we are able to present precise definitions, models and optimization capabilities of EU-wide Technopreneurship processes. Finally, we are able to derive consistent process models from these scenarios, that enable optimal assessments and evaluations whether to realize innovative ideas or not.

Keywords: technopreneurship, technology oriented entrepreneurship, process modeling

1. Introduction

Despite many measures to improving EU wide innovation, there are still large differences within the EU member states (see Fig. 1). While countries such as Sweden, Denmark, Germany and Finland are at the top of the rankings, countries like Bulgaria, Latvia and Romania are ranked in the final places as modest innovators.

Regarding Europe as a whole, Switzerland confirmed its leading position as strongest leader in innovation. Moreover, Switzerland regularly exceeds all other EU member states. Therefore, an important issue is the question of how an assimilation of all EU countries on a high innovation level can be achieved. Particular challenges come from technology-driven innovations that are far beyond the average of ordinary innovations. With respect to this, the following case study analyses the financing and business development processes in Technopreneurship. Furthermore, we focus on the following questions:

- Are there clearly defined financing and business processes in technology-based innovations in the early stages?
- Are all participants in innovation development processes able to manage their tasks?
How do such innovation processes look like (i.e. in Germany as one of the EU’s innovation leader, Bulgaria as one of the modest innovators and Switzerland as non-EU country, but with the top position as an innovation leader)?

What measures can be used to build a comprehensive and unified model for a faster and more efficient innovation development for all EU countries?

![Figure 1: Innovation performance of the EU member states (European Commission 2013)](image)

With respect to these questions, we focus on financing processes that depend on business processes of technology-oriented innovations in the seed phase. Every young company or startup aims at convincing investors from the potential of its basic business idea. In the early stages, this might be both, Business Angels and Venture Capitalists, whereas bank financing is not worth considering. The roadmap from the development of an idea to a complete product or service demands complex processes (i.e. financing, implementation of technology strategy, product development, marketing, business development, etc.). These processes must be formalized, modeled and optimized. All these processes involve many actors (Technopreneurs, Mentors, Coaches, Business Angels, Venture Capitalists, etc.). On the one hand, all these actors have a common goal: the fast and efficient transformation of the ideas into products and services in order to achieve profit. On the other hand, this requires a certain flexibility, organization, management and structure. With a detailed knowledge of the corresponding processes, they can be implemented and managed more flexible and more efficiently (i.e. the development of a technology and product strategy, the financing, the management of organizational and contractual challenges, the development of a marketing strategy, etc.). Young companies and startups can only achieve this, if all stakeholders know their processes and are able to manage them. Therefore, clearly defined innovation processes promise more concrete economic benefit. Yet, there are no formalized or even defined models for the above-mentioned processes that involve all stakeholders. Existing solutions and platforms such as (Klein 2014), (Arlt 2014) or (Griepentorg 2014) offer only a passive support in form of searchable document collections. We consider this as not timely and no longer sufficient in times of EU wide challenges. Thus, the objectives of our case study are as follows:

- Creating the foundation for a comparative analysis of financing processes from investors in different EU countries (i.e. Germany, Switzerland and Bulgaria)
- Analyze, formalize and model innovation processes that enable a constructive and fast transformation of technologically-oriented innovations into products and services to enable an adequate and quick market introduction
- Evaluate these models for to enable investors to assess, decide and eventually realize respective funding schemes

2. Definition and problem formulation

Technology-oriented innovations are crucial for economic and social growth in the EU. Even on a national level, it is a big challenge to implement the numerous existing ideas into products or services (BMBF 2010). In addition to this, founding an enterprise goes through different stages of financing (see Fig. 2).
Figure 2: Financing stages of an enterprise foundation

This case study distinguishes the following stages:

- Seed stage
- A stage
- B stage
- Exit stage

**Seed Stage**

The start-up stage also called “seed stage” is the first stage of a newly founded enterprise. This phase ends after entering the market and the transition of the enterprise into a significant growth phase (A stage). It usually takes between 1.5 to 2 years. Innovations from Technopreneurship usually need high investment volumes for their development and the subsequent market introduction. This is a challenging task, as most Technopreneurs in the seed stage still do not have a marketable product but often only just a prototype or an idea. Furthermore, the have only little or no strategic or business management know how. This leads to a very high supporting effort for external coaches and others. Thus, these facts show that there is a much greater uncertainty for investors regarding the success of technology-based innovations in the seed stage. Finally, due to these risks and the high complexity and uncertainty, the financing of technology-oriented start-ups in the seed phase proves to be complex and difficult.

There are many financial instruments for Technopreneurs that are used depending on the various financing stages of the company’s development. In the literature, cf. (Gantenbein 2013) (Geyer 2010) (Middelberg 2013) (Walter 2014) it is often stressed that Venture Capital (VC) investors are willing to invest only in the expansion phase (A stage). In recent years, a successful and prominent VC model called “fond-dependent venture capital companies” (VCG) next to Business Angels, etc. was established. This is a special financial instrument for Technopreneurs in the seed stage. A famous VCG-fund is the “Venture Capital Fund” (VCF) where investors can indirectly participate in young companies. Investors are banks, large companies, governments and insurance companies (Schwarzmann 2013). In contrast to private seed investors, the technology and the level of innovation of the technology are very important. Therefore, VCF is willing to finance innovations that still have a high technological risk, but often include a high potential in return. This means that these technology-based innovations can be developed more timely and on a broader basis towards their market introduction. In addition to the financial support, VCF also offers coaching with technological and business management expertise from dedicated experts with an extensive network.

**3. Study setup**

The following case study is not a representative market analysis of VC companies, but a parameter-oriented selection of a few exemplary VCGs for the profile-oriented process modeling. We chose two public-private fond-dependent VCG and a private VCG for our case study based on their innovation process structure. We applied various methods to collect the respective data. Firstly, we conducted interviews with relevant investors. Secondly, we investigated and analyzed the structure and the organization of the VC companies. We
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analyzed how the VCGs in the selected countries (Germany, Bulgaria and Switzerland) differ from each other and in which processes or tasks they are similar or even equal. Therefore, we collected the following parameters:

- Financing phases: as the case study focuses only the seed stage
- Investment volume: as high-tech enterprises need greater investment volumes in general
- Countries: Germany, Bulgaria and Switzerland
- Industry: Information Technology, Nanotechnology, Automation and Electronics, Life Sciences, Clean Technologies
- Application Documents: what documents are required from Technopreneurs for the first pre-selection when they apply for a certain financing scheme
- Assessment of Applicants: what are evaluation criteria whether to finance a Technopreneur or not
- Support for Applicants: how are Technopreneurs supported after a financing confirmation

Now, after defining the setup of our case study, the following section presents its implementation and afterwards we present its results.

4. Study implementation

Table 1: Comparison of VCGs in BUL, GER and CH

<table>
<thead>
<tr>
<th>Criteria</th>
<th>VC-Germany</th>
<th>VC-Switzerland</th>
<th>VC-Bulgaria</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCG</td>
<td>public-private</td>
<td>private</td>
<td>public-private</td>
</tr>
<tr>
<td>Fond-dependent</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Financing stages</td>
<td>Seed stage</td>
<td>Seed, A and B stage</td>
<td>Seed stage</td>
</tr>
<tr>
<td>Investment volume</td>
<td>500 K€ - 2M€</td>
<td>500 K€ - 3 M€</td>
<td>30 K€ - 200 K€</td>
</tr>
<tr>
<td>Countries</td>
<td>Germany</td>
<td>Worldwide</td>
<td>South-East Europe</td>
</tr>
<tr>
<td>Branch</td>
<td>High-Tech</td>
<td>No specific / open to all</td>
<td>Information Technology</td>
</tr>
<tr>
<td>Application documents</td>
<td>Business plan</td>
<td>Presentation: prototype, first customer</td>
<td>Presentation: (if exists) prototype</td>
</tr>
<tr>
<td>Assessment of applicants</td>
<td>Technology, market and team</td>
<td>Market potential and team</td>
<td>Market potential and team</td>
</tr>
<tr>
<td>Support for applicants</td>
<td>Coaches, Workshops, Networking</td>
<td>Coaches, Workshops, Networking</td>
<td>Coaches, Workshops, Networking</td>
</tr>
</tbody>
</table>

After we obtained all relevant data, the next step was to identify and analyze the innovation processes of the corresponding VCGs. The aim was to find out if there already exist defined processes, how they work and how they are managed. Afterwards, we formalized, documented and analyzed the processes. Finally, we modeled and compared the processes in “Business Process Model and Notation” (BPMN) models. The following scenarios give a short overview about these models.

Financing Process: VCG Germany

The investment manager receives the application documents (business plan) from a Technopreneur. He then examines the potential of the business idea and the prototype (if one exists). If he is not convinced, he declines the application. However, if the idea is convincing him, he and the Technopreneur prepare a “term sheet” together. This term sheet includes the general conditions for the following contract negotiations. After both parties signed the term sheet, the investment manager investigates and evaluates the idea in more detail. This is often done with additional internal and external experts in a peer review procedure. If an external expert declines the idea, then a financing by the VCG is not possible anymore. However, after the positive evaluation of the idea, it is presented to a finance committee that checks if the idea fits into the investment portfolio of
the VCG and it checks the expert evaluation again. Then again, after a negative assessment, the financing is declined, but after a positive evaluation, the investment contract negotiations begin. This is a long process as various people are directly involved and a common agreement between all VCG-stakeholders has to be achieved. After the negotiation rounds are closed and after all parties signed the financing agreement the Technopreneur receives the agreed funds. The first financing stage is closed as soon as the developed product or service has entered the market.

**Financing Process: VCG Bulgaria**

In Bulgaria, a registration form usually is required in the form of a questionnaire by the investors as well as an idea and (if available) a prototype. These documents are then forwarded to the investment manager. He checks the documents and a committee decides whether the application is eligible or not. A negative decision results in a rejection of the application, a positive decision leads to a Due Diligence (DD) process. However, this is not a classical DD process, it is a workshop with internal and external experts who consider the idea and its potential in more detail. This DD process results in a recommendation for the VCG. After this recommendation, several workshops with the applicant are held. These workshops aim at getting to know the team, the Technopreneur and the investors in more detail as well as considering the idea from different angles. A committee meeting that decides whether the DD process and the workshops convinced themselves or not follows this. Again, in a negative case, the financing is rejected and in the positive case, a term sheet between the parties is negotiated. Subsequently, the committee decides on the financing and the level of funding. If the decision is negative, the applicant receives a rejection and in the positive cases the contract negotiations between the VCG and the Technopreneur start. This results in a participation agreement that all parties have to sign. With the signing of the participation agreement, the funds are available for the applicant and the development of the enterprise can continue.

**Financing Process: VCG Switzerland**

In Switzerland, they focus mainly on financial conditions of startups. Therefore, the application documents are aligned respectively:

- Proof of technical concept in form of a market ready prototype
- Proof that the market entry has already taken place via one or more reference customers
- The basis for a financing decision is not made by an evaluation of the technological potential but on potential revenues and social skills of the applicants

5. Study results

The case study has shown that there is a great need for an optimization of the financing process in all three countries. The implementation of the entire financing process demands a remarkable amount of time. It takes a long time for Technopreneurs from the financing application to the respective commitment or rejection and the actual payment. Moreover, the study has shown that innovation processes, especially the presented financing process, are not considered as business processes in the usual sense (i.e. Business Process Model and Notation, Enterprise Process Chains (EPC) or activity diagrams in Unified Modeling Language (UML)).

The following example illustrates these challenges:

**Application process:** There are many people in the application process involved (i.e. founders, investors, investment managers, assistants, etc.). Thus, many documents, messages, meetings and workshops need to be managed and organized. It takes a tremendous amount of time until these tasks result in a commitment or a rejection for the applicant. We therefore recommend to define, to model and to automate this process as much as possible. An optimization example could be the following:

**Optimization example:** In the application phase, there is usually a point at which the Due Diligence process and the meeting with the respective applicant can be parallelized. After a commitment for the financing of a certain Technopreneur, there is no compelling reason to arrange these two tasks sequentially. It is now obvious that such optimization approaches are able to accelerate the entire process tremendously.

The following BPMN illustration shows the process before its optimization.
The highlights of our case study are as follows:

- In Technopreneurship solely focusing on the financial aspects of innovations is not sufficient
- There has to be a balance between technology strategy and product development on the one hand and market and sales concept on the other hand
- The evaluation of innovations can not be based only on economic factors, but also the potential of the technology and its strategy must be considered
- The innovation processes of the investors (see above) must contain the above-mentioned aspects (i.e. technology strategy, etc.)

6. Conclusion and outlook

The comparison of the three innovation processes shows, that there are just minor differences when we only consider the control flow, i.e. the sequence of the corresponding activities in the modeled processes. However, regarding the technological background of the single process steps, there are significant deviations. Thus, on the one hand, countries like Germany or other leading EU countries support their process steps with technical systems such as document management systems (DMS), predefined text building blocks or document templates supported by versioning and access rights. On the other hand, innovation processes of countries like Bulgaria or other modest innovator ranked countries contain a tremendous amount of manual tasks with many people involved. Our study showed that there is a great process optimization potential not only for the bottom ranked but also for the top-ranked countries. The first step towards an assimilation of all EU countries on a high innovation level is the definition and formalization of innovation processes such as presented in this work. Secondly, the EU countries must be enabled to implement the processes on a technical level. For this technical implementation, we propose a service repository embedded in a Cloud Computing environment. Therefore, we consider the above-mentioned technological systems (DMS, document templates, etc.) as services offered by various providers across the entire EU. Moreover, these services describe their functionalities semantically.

![Diagram of application process before optimization](image1)

**Figure 3:** Application process before optimization

Whereas the following process model illustrates the same process after its optimization.

![Diagram of application process after optimization](image2)

**Figure 4:** Application process after optimization

The highlights of our case study are as follows:
in plain text and with technical meta data (i.e. in-/output parameters, throughput, response time, etc.). Furthermore, this service repository contains an ontology to automatically classify the services according to their descriptions. Finally, the process models (like the one we illustrated above) are searched for key words that match corresponding concepts in the ontology. Thus, we are able to propose appropriate services for every process step and to implement the entire innovation process with adequate technical services. Finally, this case study motivates such a service repository that not only supports single process steps but the entire process. Thus, not only a technical integration, but also an integration from the business and from the process perspective could be achieved. Last not least, the usage of such a proposed process management platform will foster the development towards a continuous process optimization and reengineering for all countries in the EU. Besides, the semi-automatic composition of services to a complete innovation process encourages service providers from all EU member states to provide high-quality services and to compete with other service providers. In the end, this approach is twofold: firstly, it creates an EU wide market where service providers compete against each other’s and secondly, due to formalized and optimized innovation processes, this competition raises the entire innovation level of all EU member states. However, at the moment we consider the conceptualization and the implementation of such a repository platform as a task for the future work.

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Attitudes and Entrepreneurial Intention of Portuguese Secondary Students

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Abstract: Entrepreneurship emerges as a key factor in job creation and is crucial for socioeconomic balance in the region or the country. Entrepreneurship is an effective alternative, either through the development of existing businesses or by creating new ones. It should also emphasize that the entrepreneurial ability of a society is a collective well that should be preserved and cultivated. The situation of global economic crisis has been reflected in the different economies, particularly in the declined of employment to unimaginable heights. In order to counteract this negative cycle, it becomes imperative to stimulate, maintain and cultivate an entrepreneurial attitude cross, from the youngest to the current managers, to promote the creation of new business and develop existing yet. Looking for answers about the policies and mechanisms available for the creation of new businesses and the existence of an entrepreneurial attitude in a given region are of vital importance in promoting entrepreneurship. Portugal has experienced troubled times, with marked destruction of jobs and businesses affected by the economic and financial crisis, as well as by restructuring undertaken by the government, especially after the financial rescue that Portugal was subjected. Faced with a strong future scenario of high unemployment, what attitudes and entrepreneurial intentions reveal young Portuguese students? This research work focuses on secondary students from Oliveira de Azemeis, a city and municipality in northern Portugal, heavily industrialized in several business areas and with important references on employment size and internationalization capability. Taking as a starting point a survey with 308 students, all pre-university students, the paper presents and discusses the results obtained on various issues such as entrepreneurial behavior of students’ parents, the attitude towards self-employment and perceptions of entrepreneurial intention. Results indicate a moderate entrepreneurial behavior of student’s parents. In general, the attitudes towards self-employment are lower and the analysis identified differences considering the attitudes items. The data analysis also tested and identified differences considering gender, age, course type (regular or professional), school and self-employed parents. The analysis of intention identified 48.4% of students with entrepreneurial intention, and 51.6% with no intention. Statistical tests identified an association between intention and school and between intention and self-employed parents. Finally, the analysis identified significant differences concerning attitudes by intention group. The results give a contribution to the theme of Entrepreneurship through the investigation of the entrepreneurial attitudes and intention of young adults (pre-university).

Keywords: entrepreneurship, secondary students, attitudes, intention, Portugal

1. Introduction

Portugal is currently involved in a major global economic crisis, with deep reflection on its economy. The side effects of such situation, especially in unemployment numbers, makes it imperative to stimulate, maintain and cultivate an entrepreneurial culture shared by all, from the youngest to current managers, to create new business and developing existing ones. Given this economic context, entrepreneurship emerges as a key to creating jobs and wealth and socio-economic balance of the country. The priority should be the stimulus and encouragement of knowledge and behaviors of individuals. Depending on the nature of their location or organization, it is important to take advantage of existing opportunities or strengths, converting each individual in an entrepreneur.

At the World Economic Forum (European Commission, 2009) many politicians argued that the promotion of entrepreneurship should happen early in the life of individuals and governments should direct their efforts to develop the education of entrepreneurial skills in young people. Since Portugal has sought to implement programs to encourage entrepreneurship in different educational degrees, how the young Portuguese realize the theme of entrepreneurship? What attitudes have and what is the entrepreneurial intention of the Portuguese young people who are entering adulthood?

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This research work focuses on Portugal, specifically in Oliveira de Azeméis, a city and municipality in northern Portugal, heavily industrialized in several business areas and with important references on employment size and internationalization capability. Being the entrepreneurship an indicator of the potential recovery of an economy, it is important to acknowledge the young entrepreneurship potential. The research aims to analyze the effects of this dynamic among secondary students finalist, especially the strength of their attitudes and entrepreneurial intentions.

This article is organized into five sections, besides the introduction. Section 2 examines the determinants of entrepreneurship. Section 3 presents the results of the study designed to understand the Portuguese secondary students' entrepreneurial attitudes and intention. Finally, Section 4 presents the main conclusions.

2. Determinants of entrepreneurship: Some insights

Entrepreneurship is a study area of great importance and relevance to the development of society. Given its great potential is, since the 90s (XX Century), the subject of many scientific, economic and psychological investigations (Obschonka et al., 2010). Currently this relevance is even greater given the steady increase in social and economic challenges faced by today's societies, including the definition of new paradigms, the need for innovation with creative approaches and new ways of operating. Entrepreneurship fosters the creation of new jobs and is critical to economic growth in society, helping to reduce poverty (Amoros and Bosma, 2014). Consequently, its promotion and development is seen perceived as vital to the success of modern societies (Audretsch, 2007).

However, entrepreneurship has many peculiarities; it is not an exact science to be implemented, but rather a way of thinking to be developed. Entrepreneurship as a way of thinking emphasizes the opportunities instead of threats and barriers, and it is this ability to identify opportunities that requires first and foremost the study of entrepreneurial intentions of individuals (Krueger et al., 2000). Much of the complexity and considerable breadth in the study of entrepreneurship is precisely in understanding the motivations that lead an individual to undertake. Several authors (Draghici et al., 2014; Gurel et al., 2010; Morrison, 2000; Obschonka et al., 2010) have studied these motivations, sharing the approach of the study of the relevance of personal characteristics in motivation for entrepreneurship. For example, Gurel et al. (2010) studied the influence of these personal characteristics in the intention of creating a new business as well as the influence of the family of individuals and the moderating effect of education.

In the particular case of the family, is recognized the influence of parents in the training and motivation of children, so that is an important factor to consider in the study of entrepreneurship. The literature identifies several studies on the topic of the entrepreneurial family (see for example Gurel et al., 2010; Laspita et al., 2012; Schmitt-Rodermund, 2004; Wang and Wong, 2004). Laspita et al. (2012) analyzed the implicit mechanism for transmission of entrepreneurial intentions within families. The transmission of entrepreneurial intentions among generations of families is complex and involves more than just one generation, not limited only to the influence of parents, but also to the grandparents. The duration of the family's influence will depend on the gender of the sons (male children have a greater pressure to follow in the footsteps of their parents).

Another feature that is studied is the parenting style available in the family. Schmitt-Rodermund (2004) argues that the authoritarian parenting style promotes self-efficacy and high expectations to possess entrepreneurial skills. This is because the behavior of authoritarian parenting is associated with autonomy, leadership, self-confidence and locus of control, and this will help young people develop a sense of care and independence, which are very important qualities for a future entrepreneur.

Importantly family is not only a framework for the entrepreneur, but also a concrete help on new business that the entrepreneur wants to open. Raijman (2011) defines the family as a support network for the entrepreneur who is manifested in at least two ways. The first would be that the family makes up a force of unpaid work, and this would reduce the initial costs when opening a business. The second way would be that as there is a sharing of resources among family members, it would facilitate the survival of the business in its early stages.

Attitudes have been a key concept in explaining human behavior. Attitudes can be defined as beliefs which predispose an individual to respond positively or negatively to something, such an action, a product or even a
job or career. Following the theoretical advances in the research field of attitudes (see for instance the Theory of Planned Behavior of Ajzen) in the entrepreneurship context, attitude research can be a useful basis for the identification of entrepreneurial intention. Liñán et al. (2011) concluded that attitudes were formed as a result of socialization processes in younger individuals. The combination of favorable perceptions and work experience obtained will lead a potential entrepreneur to act.

At the World Economic Forum (European Commission, 2009) many politicians argued that the promotion of entrepreneurship should happen early in the life of individuals and governments should direct their efforts to develop the education of entrepreneurial skills in young people. Younger individuals are more likely to have new ideas, greater ease of having to deal with technology and have more education than their parents (Amoros and Bosma, 2014). Moreover, young people tend to have fewer responsibilities as they do not need to pay their own bills and work, giving them specific characteristics of an entrepreneur, such as being less cautious and less risk averse. It is important to business success created by a young entrepreneur. The survival of small businesses in their early years is difficult, and in particular for young entrepreneurs survival rates are still lower compared with the rates from companies controlled by older entrepreneurs (van Praag, 2001). However, the developments of young people who survive the initial phase have a higher growth potential than older individuals. According to Halabisky et al. (2012) an analysis of the companies that survived the first three years revealed that those run by individuals less than 30 years had an average growth rate of 206%, while companies run by people with more than 40 years had a rate of 114%, i.e. almost half. It is observed so that young entrepreneurs are subject to greater risk, but also the greatest rewards.

The GEM 2013 global report (Amoros and Bosma, 2014) confirm the importance of strengthening youth entrepreneurship. In turn, studies of the International Labour Organisation (ILO) indicate that young people are three times more likely to be unemployed compared to adults. Allied to this, in many developing countries, there is a demographic trend of increasing young population, and how many sectors of the economy are stagnant due to the global financial crisis, it is necessary that alternatives to conventional labor market, i.e., work will be encouraged by behalf of others, such as entrepreneurship (Amoros and Bosma, 2014). It also appears that the perception of the viability of self-employment in the European Union decreases with age (European Commission, 2009), which is a factor that strengthens the entrepreneurial potential of young people. From the above we can see the importance of the study of entrepreneurship and the need to identify more amenable and willing to develop this "spirit" enterprising individuals.

3. Data collection and analysis

This paper presents the results from a survey named Empreende K-12 designed to understand the entrepreneurial attitudes and intentions of secondary students. Questionnaires were administered among Oliveira de Azemeis secondary students enrolled in two different courses. The first, the regular, has a curriculum more oriented to the pursuing of studies at the university level. The second, the professional, has a vocational preparation. Students were approached during classes to respond to the survey. A total of 308 usable questionnaires were returned and used for the data analysis.

The students’ genders distribution is balanced, with 57.5% of female students, compared to 42.5% male. Age ranges from 16 to 24 years, with a mean of 17.43 years and a standard deviation of 0.876 years. After, each respondent was classified in one of two age groups: 1) 16-17 years; 2) equal to or greater than 18 years old. During the survey, it was also recorded for each respondent the type of course and school. The type of course considers two categories: 1- regular (it means that it has further study) and 2 - professional (it means that it preferably is a vocational preparation). The summary of respondents’ background is presented in Table 1.

<table>
<thead>
<tr>
<th>Characterization</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>177</td>
<td>57.5%</td>
</tr>
<tr>
<td>Male</td>
<td>131</td>
<td>42.5%</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-17 years</td>
<td>209</td>
<td>67.9%</td>
</tr>
<tr>
<td>18... years</td>
<td>99</td>
<td>32.1%</td>
</tr>
<tr>
<td>Course Type</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Respondents profile
The survey included a question about the entrepreneurial behaviour of students’ parents: “Do you grew up in an entrepreneurial family?” (Adapted from Laspita et al., 2012). The options presented and the respective results were summarized in Table 2.

Table 2: Entrepreneurial behavior of student’s parents

<table>
<thead>
<tr>
<th>Characterization</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>regular secondary school</td>
<td>174</td>
<td>56.5%</td>
</tr>
<tr>
<td>secondary vocational education</td>
<td>134</td>
<td>43.5%</td>
</tr>
<tr>
<td>School</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary School Ferreira de Castro</td>
<td>154</td>
<td>50.0%</td>
</tr>
<tr>
<td>Secondary School Soares Basto</td>
<td>102</td>
<td>33.1%</td>
</tr>
<tr>
<td>Basic and Secondary School of Fajões</td>
<td>52</td>
<td>16.9%</td>
</tr>
</tbody>
</table>

A new variable was defined to measures the experience of “parents self-employed” by coding the “yes” answers as 1-yes; otherwise 0-no. Thus sample was divided into two groups: students with entrepreneurial parents (35.4%) and no (64.6%).

The following is an analysis of entrepreneurial attitudes and intention of secondary school students. In addition to the descriptive analysis of the responses to each item, was tested the existence of significant relationships or differences considering the characterization variables such as gender, age, type of travel, school and self-employed parents.

The attitude towards self-employment considered ten items adapted from Kuckertz and Wagner (2010) (four statements) and Carayannis et al. (2003) (six statements). Each respondent was asked to indicate their level of agreement with the statements presented (Likert scale with 5 levels ranging from 1 – “I totally disagree” to 5 – “I totally agree”. The analysis of responses is summarized in Table 3.

The Table 3 presents descriptive statistics of the responses to different statements. The median values between 2 and 3, and the mean values below 3, indicate that students have low levels of agreement (the only exception for mean is the statement 10 (“Entrepreneurs have a good image...”) with a value higher than 3).

Table 4 and Table 5 present the mean values considering the characterization variables (gender, age group, course type, school) and the existence of self-employed parents. When analyzing the mean value by gender it appears that male respondents tend to agree more than females (even in negative statements). The same trend is identified for age group, with the 18 years or older group agreeing more than the 16-17 years group. The analysis by course type also reveals a higher level of agreement for professional courses (Table 4).

Table 3: Entrepreneurial attitudes

<table>
<thead>
<tr>
<th>Statement</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would rather be my own boss to have a secure job;</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>2.83</td>
<td>1.13</td>
</tr>
<tr>
<td>I prefer to form a new company to be the manager of an existing one;</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>2.22</td>
<td>1.13</td>
</tr>
<tr>
<td>I can only make good money if I am my own boss;</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>2.72</td>
<td>1.02</td>
</tr>
<tr>
<td>In business, it is preferable to someone having the initiative to create</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>2.84</td>
<td>0.94</td>
</tr>
<tr>
<td>their own employment (be an entrepreneur) than being an employee in a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>large company or state company;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The success of someone who creates their own job (an entrepreneur) is</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>2.63</td>
<td>1.09</td>
</tr>
<tr>
<td>strongly determined by “luck” (-);</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrepreneurs are egotistical (-);</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>1.98</td>
<td>1.03</td>
</tr>
</tbody>
</table>
### Table 4: Entrepreneurial attitudes (mean) by gender and age group

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Gender</th>
<th>Mean</th>
<th>SD</th>
<th>Age group</th>
<th>Mean</th>
<th>SD</th>
<th>Course type</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would rather be my own boss to have a secure job;</td>
<td>Male Mean</td>
<td>2.96</td>
<td>2.74</td>
<td>16-17 years</td>
<td>2.71</td>
<td>1.95</td>
<td>18 years or more</td>
<td>2.69</td>
<td>1.90</td>
<td>2.70</td>
<td>2.01</td>
</tr>
<tr>
<td></td>
<td>Female Mean</td>
<td>2.18</td>
<td>2.03</td>
<td>Mean</td>
<td>2.61</td>
<td>2.26</td>
<td>Mean</td>
<td>2.56</td>
<td>2.28</td>
<td>2.71</td>
<td>2.57</td>
</tr>
<tr>
<td>I prefer to form a new company to be the manager of an existing one;</td>
<td>Male Mean</td>
<td>2.28</td>
<td>2.18</td>
<td>Mean</td>
<td>2.13</td>
<td>1.89</td>
<td>Mean</td>
<td>2.69</td>
<td>1.90</td>
<td>2.69</td>
<td>2.76</td>
</tr>
<tr>
<td></td>
<td>Female Mean</td>
<td>2.03</td>
<td>1.93</td>
<td>16-17 years</td>
<td>2.71</td>
<td>2.11</td>
<td>18 years or more</td>
<td>2.70</td>
<td>2.26</td>
<td>2.74</td>
<td>2.99</td>
</tr>
<tr>
<td>The success of someone who creates their own job (an entrepreneur)</td>
<td>Male Mean</td>
<td>2.68</td>
<td>2.59</td>
<td>Mean</td>
<td>2.53</td>
<td>2.28</td>
<td>Mean</td>
<td>2.69</td>
<td>1.90</td>
<td>2.69</td>
<td>2.76</td>
</tr>
<tr>
<td></td>
<td>Female Mean</td>
<td>2.57</td>
<td>2.31</td>
<td>16-17 years</td>
<td>2.53</td>
<td>2.28</td>
<td>18 years or more</td>
<td>2.56</td>
<td>1.92</td>
<td>2.56</td>
<td>2.71</td>
</tr>
<tr>
<td>The training is more important than personality as a success factor in</td>
<td>Male Mean</td>
<td>2.82</td>
<td>2.65</td>
<td>Mean</td>
<td>2.53</td>
<td>2.28</td>
<td>Mean</td>
<td>2.69</td>
<td>1.90</td>
<td>2.69</td>
<td>2.76</td>
</tr>
<tr>
<td>the initiative to create their own employment (entrepreneurship);</td>
<td>Female Mean</td>
<td>2.32</td>
<td>2.12</td>
<td>16-17 years</td>
<td>2.53</td>
<td>2.28</td>
<td>18 years or more</td>
<td>2.56</td>
<td>2.19</td>
<td>2.56</td>
<td>2.71</td>
</tr>
<tr>
<td>Entrepreneurs are egotistical (-);</td>
<td>Male Mean</td>
<td>2.07</td>
<td>1.92</td>
<td>Mean</td>
<td>2.53</td>
<td>2.28</td>
<td>Mean</td>
<td>2.53</td>
<td>2.28</td>
<td>2.53</td>
<td>2.28</td>
</tr>
<tr>
<td></td>
<td>Female Mean</td>
<td>1.89</td>
<td>1.72</td>
<td>16-17 years</td>
<td>2.53</td>
<td>2.28</td>
<td>18 years or more</td>
<td>2.53</td>
<td>2.28</td>
<td>2.53</td>
<td>2.28</td>
</tr>
<tr>
<td>Entrepreneurship deteriorates family life (-);</td>
<td>Male Mean</td>
<td>2.03</td>
<td>1.93</td>
<td>Mean</td>
<td>2.53</td>
<td>2.28</td>
<td>Mean</td>
<td>2.53</td>
<td>2.28</td>
<td>2.53</td>
<td>2.28</td>
</tr>
<tr>
<td></td>
<td>Female Mean</td>
<td>1.90</td>
<td>1.72</td>
<td>16-17 years</td>
<td>2.53</td>
<td>2.28</td>
<td>18 years or more</td>
<td>2.53</td>
<td>2.28</td>
<td>2.53</td>
<td>2.28</td>
</tr>
<tr>
<td>Entrepreneurs have a positive image in society.</td>
<td>Male Mean</td>
<td>3.36</td>
<td>3.12</td>
<td>Mean</td>
<td>3.18</td>
<td>3.19</td>
<td>Mean</td>
<td>3.18</td>
<td>3.19</td>
<td>3.18</td>
<td>3.19</td>
</tr>
<tr>
<td></td>
<td>Female Mean</td>
<td>3.12</td>
<td>3.06</td>
<td>16-17 years</td>
<td>3.18</td>
<td>3.19</td>
<td>18 years or more</td>
<td>3.18</td>
<td>3.19</td>
<td>3.18</td>
<td>3.19</td>
</tr>
</tbody>
</table>

### Table 5: Entrepreneurial attitudes (mean) by school and self-employed parents

<table>
<thead>
<tr>
<th>Attitude</th>
<th>School</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would rather be my own boss to have a secure job;</td>
<td>Fajões</td>
<td>2.85</td>
<td>2.83</td>
<td>2.83</td>
<td>2.83</td>
<td>2.86</td>
<td>2.78</td>
<td>2.86</td>
<td>2.78</td>
<td>2.86</td>
<td>2.78</td>
</tr>
<tr>
<td></td>
<td>Ferreira de Castro</td>
<td>2.33</td>
<td>2.20</td>
<td>2.20</td>
<td>2.20</td>
<td>2.22</td>
<td>2.23</td>
<td>2.22</td>
<td>2.23</td>
<td>2.22</td>
<td>2.23</td>
</tr>
<tr>
<td></td>
<td>Soares Basto</td>
<td>2.73</td>
<td>2.77</td>
<td>2.64</td>
<td>2.72</td>
<td>2.72</td>
<td>2.72</td>
<td>2.72</td>
<td>2.72</td>
<td>2.72</td>
<td>2.72</td>
</tr>
<tr>
<td>I prefer to form a new company to be the manager of an existing one;</td>
<td>Fajões</td>
<td>3.06</td>
<td>2.77</td>
<td>2.85</td>
<td>2.88</td>
<td>2.77</td>
<td>2.77</td>
<td>2.77</td>
<td>2.77</td>
<td>2.77</td>
<td>2.77</td>
</tr>
<tr>
<td></td>
<td>Ferreira de Castro</td>
<td>2.60</td>
<td>2.50</td>
<td>2.83</td>
<td>2.54</td>
<td>2.78</td>
<td>2.78</td>
<td>2.78</td>
<td>2.78</td>
<td>2.78</td>
<td>2.78</td>
</tr>
<tr>
<td></td>
<td>Soares Basto</td>
<td>2.12</td>
<td>1.94</td>
<td>1.98</td>
<td>2.04</td>
<td>1.87</td>
<td>1.87</td>
<td>1.87</td>
<td>1.87</td>
<td>1.87</td>
<td>1.87</td>
</tr>
<tr>
<td>The success of someone who creates their own job (an entrepreneur)</td>
<td>Fajões</td>
<td>1.96</td>
<td>1.94</td>
<td>2.03</td>
<td>2.02</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
<td>1.90</td>
</tr>
<tr>
<td></td>
<td>Ferreira de Castro</td>
<td>2.33</td>
<td>2.38</td>
<td>2.47</td>
<td>2.32</td>
<td>2.54</td>
<td>2.54</td>
<td>2.54</td>
<td>2.54</td>
<td>2.54</td>
<td>2.54</td>
</tr>
<tr>
<td></td>
<td>Soares Basto</td>
<td>2.33</td>
<td>2.38</td>
<td>2.47</td>
<td>2.32</td>
<td>2.54</td>
<td>2.54</td>
<td>2.54</td>
<td>2.54</td>
<td>2.54</td>
<td>2.54</td>
</tr>
</tbody>
</table>

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Among the three schools is more difficult to identify a trend of responses, although it appears that the Secondary School Ferreira de Castro presents a lower level of agreement than the other two schools. At the level of self-employed parents, the analysis suggests that students without entrepreneur parents are those with higher levels of agreement, except in the negative statements 5, 8 and in the positive statement 10 (Table 5).

To evaluate differences between respondents, the analysis used two nonparametric tests. The Mann-Whitney U-test was used to test differences related with gender, age group, course type and self-employed parents. The Kruskal-Wallis test was used to evaluate differences among the three schools. Test results reveal that:

- statement 1 (“I would rather be my own boss to have a secure job”) presents differences for age (U=8450.0, p<0.01) and group course (U=9790.5, p<0.05);
- statement 2 (“I prefer to form a new company to be the manager of an existing one”) has differences for age (U=8874.0, p<0.05) and course (U=9915.5, p<0.05);
- statement 4 (“In business, it is preferable to someone having the initiative...”) showed significant differences for gender (U=10130.0, p<0.05) and course (U=9780.0, p<0.05);
- statement 5 (“The success of someone who creates their own job (an entrepreneur) is strongly determined by “luck””) has significant differences for self-employed parents (U=9646.0, p<0.10) and schools (Chi-square=5.780, p<0.10);
- statement 6 (“Entrepreneur are egotistical”) showed significant differences for gender (U=10280.5, p<0.10) and age (U=8599.0, p<0.05);
- statement 8 (“Entrepreneurship deteriorates family life”) showed significant differences between gender (U=10202.0, p<0.10), age (U=8518.0, p<0.05), course (U=9821.5, p<0.05);
- statement 9 (“The training is more important than personality as a success factor in the initiative to create their own employment (entrepreneurship)”) presents differences for age (U=8592.5, p<0.05);
- statement 10 (“Entrepreneurs have a positive image in society”) showed significant differences for gender (U=10187.0, p<0.10) and self-employed parents (U=9547.5, p<0.10).

The intention was measured by two questions. The first asked students “What you intend to do after you finish secondary school?”. The second was adapted from Laspita et al. (2012) and asked respondents “Have you ever considered seriously starting your own business?”. Interestingly, 61.4% of respondents assume that intend to continue studies against a total of 38.6% that intends to enter into active life, whether in search of employment, creation of an own business or help in the family business. Nevertheless, 51.9% of respondents assume never having thought about creating their own job and only 1.9% is already starting the process of creating an own job. Results are presented in Table 6.

Table 6: Entrepreneurial intention of students

<table>
<thead>
<tr>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>What you intend to do after you finish secondary school?</td>
<td></td>
</tr>
<tr>
<td>Continue my studies</td>
<td>189</td>
</tr>
<tr>
<td>Look for a job</td>
<td>107</td>
</tr>
<tr>
<td>Create my own job</td>
<td>7</td>
</tr>
<tr>
<td>Help my parents in their business</td>
<td>5</td>
</tr>
<tr>
<td>Have you ever considered seriously starting your own business</td>
<td></td>
</tr>
<tr>
<td>No, never</td>
<td>160</td>
</tr>
<tr>
<td>Yes, but abandoned the idea</td>
<td>71</td>
</tr>
<tr>
<td>Yes, I intend to be my own boss in future</td>
<td>71</td>
</tr>
<tr>
<td>Yes, I’m already starting the process</td>
<td>6</td>
</tr>
</tbody>
</table>
After a cross-analysis of the responses to the two questions, we identified 98 students who answered never having thought about creating their own job and intend to continue their studies and 61 students who answered never having thought about creating their own job and intend to look for a job. Thus, we defined a new measure of intention encoding these responses as 0-No; otherwise 1-Yes. Thus sample was divided into two groups: students with no entrepreneurial intention (51.6%) and students with entrepreneurial intention (48.4%). To determine whether there was an association between intention and the characterization variables such as gender, age, type of travel, school and self-employed parents, the analysis included Chi-Square Tests which found a dependency between intention and school (X²(2)=7.197, p<0.05) and between intention and self-employed parents (X²(1)=4.885, p<0.05).

In addition it was decided to use the intention to explore the existence of differences in attitudes. Figure 1 illustrates the mean value of the attitudes statement for the two entrepreneurial intention groups (students with entrepreneurial intention and students with no entrepreneurial intention).

**Figure 1**: Attitudes mean profile by entrepreneurial intention

The Mann-Whitney U-test identity significant differences for the two intention groups concerning:

- statement 1 ("I would rather be my own boss to have a secure job") (U=9329.5, p<0.01);
- statement 2 ("I prefer to form a new company to be the manager of an existing one") (U=9830.5, p<0.01);
- statement 3 ("I can only make good money if I am my own boss") (U=8349.5, p=0.000);
- statement 4 ("In business, it is preferable to someone having the initiative...") (U=10076.5, p<0.01);
- statement 10 ("Entrepreneurs have a positive image in society") (U=9711.5, p<0.01).

**4. Conclusions**

Since entrepreneurship is a key factor in promoting innovation, productivity and employment opportunities, the theme has a prominent place on the political agenda of many countries. Research has demonstrated that adolescence is a critical time for the entrepreneurial trajectory of an individual and therefore it is important that the issue is being debated and presented to young people before they enter adulthood.

The relevance of this work is the result of the massive destruction of employment and Portugal, affected by the economic and financial crisis companies, as well as by the recent restructuring carried out by the Portuguese Government in the light of the bailout that Portugal was subjected. The current crisis in Portugal has side effects in Oliveira de Azemeis a very industrialized Portuguese city. The increase of unemployment requires special attention to entrepreneurial attitudes of younger, especially the students who are now
finishing their secondary studies. How entrepreneurship is perceived? What entrepreneurial attitudes and intentions these young people have?

Taking as a starting point the survey with 308 secondary students, attending a regular or professional and with an average age of 17.43 years progress, the results identify the existence of some critical factors. On the one hand, 35.4% of students claimed to have entrepreneurial parents, which is a number that seems moderate. However, the analysis of attitudes reveals disturbing results, with similar concordance levels for the positive and the negative statements. It was expected that the positive statements lead to higher concordance levels and the negative statements lead to lower agreement, which did not happen. One possible explanation may be the youth of the students. Being the majority with less than 18 years, self-employment is not an immediate concern. The school has one important voice for the formation of attitudes and should promote the relevance of entrepreneurship.

Tests to the attitude mean by gender, age group, course type, school and self-employed parents. Results identified differences concerning all variables. For example, the three schools revealed differences among them, which may corroborate the role of the school in the attitude formation. These differences may be explored in future research.

In turn, the entrepreneurial intention was measured by integration of two questions and allowed to divide the sample into two groups: students with entrepreneurial intention and entrepreneurial students without intention. It was found that the intention depends on the school and the existence of entrepreneurial parents. In addition, it was decided to use the intention to explore the existence of differences in attitudes. Results confirmed that there were significant differences in positive statements.

The results presented require careful interpretation. The low levels of attitude enrolled in the study may not display the effort that has been made by the Portuguese government in creating entrepreneurship promotion programs among the student population. One possible explanation may be related to the youth of the respondents, and the existence of a culture that causes parents to unfold in care in ensuring young people the best possible conditions. As a result, this protection may be contributing to these young adults become careless and unconcerned with the actual situation of the country and its future. This investigation is still at an early stage, but in future it might be interesting to include in the survey a variable that measures the students' desire for independence and its effect on attitudes and entrepreneurial intentions.

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Participant Learning Objectives and the Potential of Extracurricular Business Plan Competitions

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Abstract: Extracurricular university-based Business Plan Competitions [BPCs] assume a popular status in universities globally (Florin et al, 2007; Pittaway et al, 2011; Russell et al, 2008). Such competitions are assumed an entrepreneurial learning tool for those who participate, allowing the development of necessary entrepreneurial competencies (Hegarty, 2006; Russell et al, 2008). This principally attributable to their experiential nature and the opportunities afforded to the participant to engage in entrepreneurial activity within the competition context (McGowan and Cooper, 2008). However we lack appreciation of how learning motivates BPC participation from a participant perspective, notably the particular learning objectives which participants may have before participating and whether these are achieved through their participation. To explore this, the current qualitative paper draws insights from the participants of a regional university based BPC in the North-East of England. Participants were interviewed at the start and end of participation. Such an approach allowed the researcher to depict not only the learning objectives which may have guided their participation, but also capture whether these objectives were achieved through the competition experience. It was found that participants entered the competition perceiving there to be a competency ‘gap’ between the current statuses of their venture and where they wanted and were expected by others to be. The competition participation experience thus enlisted as a means of lessening this gap and gaining the competencies needed to take themselves and their venture forward. Competitors largely felt they had achieved their learning objectives and also appreciated that the competition had allowed the identification of further gaps in their competency base which would need to be addressed. These findings suggest a need to start dialogues with participants about what their learning objectives are so as to devise a means of supporting attainment of these through the competition.

Keywords: business plan competition; extracurricular; entrepreneurship education; competency based approach

1. Introduction

This paper sheds light on a popular form of entrepreneurship education, the extracurricular Business Plan Competition [BPC]. Whilst today there is rarely a university without such a competition as part of their broader entrepreneurship education portfolio (Florin et al, 2007; Russell et al, 2008) the BPC prevails as an under-researched mode of entrepreneurship education. Akin to entrepreneurship education more generally (Streeter and Jaquette, 2004), the promotion of entrepreneurship through entrepreneurial competency development, has served as the rationale which drives BPC provision (Hegarty, 2006; Russell et al, 2008). The BPC has consequently found itself positioned as an advantageous mechanism for entrepreneurial learning (Roldan et al, 2005; p329) principally on the assumption that they promote ‘real world’ experiences facilitated through allowing their participants to engage in practical aspects of entrepreneurial endeavour (Bell, 2010; Jones and Jones, 2011; McGowan and Cooper, 2008). It is such learning opportunities which can equip participants with the competencies required to make their start-up successful (Russell et al, 2008; Bell, 2010; Randall and Brawley, 2009).

There may be a propensity to assume that BPCs can develop entrepreneurial competencies, operating on the assumption that the integration of learning opportunities will allow learning and that the competitor wants such learning. Potentially taking for granted that participant expectations and organizer objectives converge (Schwartz et al, 2013). However, whether learning features as an objective for those participating is not currently established, more broadly this might be considered attributable to a lack of attention regarding why people choose to enter a BPC (Roldan et al, 2005). If participant objectives are not understood then it is difficult to appreciate the potential of the competition to fulfil any participant expectations (Schwartz et al, 2013). This issue is compounded by scant empirical evidence regarding the outcomes of the BPC (Gailly, 2005), particularly from the perspective of those competing (Russell et al, 2008; Schwartz et al, 2013). Such issues remaining unaddressed lead one to query how participants can be assisted to learn through the BPC, if we do not know if, or what, participants hope to learn and whether this is achieved.
In responding to a clear need to draw upon the understandings BPC competitors have about their experience of BPC participation, and representing what is often a neglected or taken for granted voice. This paper aims to explore how learning features as an objective for the BPC participant and whether any learning objectives are achieved through participation and how the different elements of the competition experience facilitate this. This qualitative paper draws upon in-depth interviews conducted with competitors of a regional university-based extracurricular BPC, both at the commencement and completion of their participation experience. Interviewing the competitors at the start of their participation allowed the appreciation of any learning objectives the participant had upon entry and how they envisaged the competition would allow attainment. Interviews three months later at the completion of their participation allowed appreciation of if and how the competition had allowed objectives to be met.

The remainder of this paper is organised as follows. In the next section, the rationale as to why the BPC might be suggested a tool for learning are critically explored, grounding this within a competency based approach to entrepreneurship education. After offering an overview of the qualitative approach adopted to capture the participant’s perspective of their participation in a regional university, empirically grounded findings of how learning featured as an objective and outcome of this participation are presented. These findings are then discussed in relation to the extant literature and implications for the ongoing promotion of the BPC considered.

2. Background literature

The Rationale for Perceiving the BPC as a Learning Mechanism

Advocation of a competency based approach to entrepreneurship education has gained momentum in recent years. Its remit being to provide and develop within in its participant, the skills, knowledge, attitudes and attributes perceived conducive to entrepreneurial activity (Ertuna and Gurel, 2011; Graevenitz et al, 2010; Pittaway et al, 2011). It is not just opportunities for the acquisition of competencies which are important but also the chance for application, albeit within the context of attempted or actual venture creation process (Harte and Stewart, 2010; Jones and Iredale, 2010; Nabi and Holden, 2008). This necessitating entrepreneurship education encompasses active, experiential and hands on learning-by-doing activities which allow the individual to vicariously experience entrepreneurship in authentic contexts (Cooper et al, 2004; Honig, 2004; Kirby, 2004). Extracurricular entrepreneurship education is deemed particularly competent in this respect (Pittaway et al, 2011). The BPC endures as one of the most popular forms of extracurricular provision (NCEE, 2013) and by extension an ever present feature on university campuses (Jones and Penaluna, 2013). Rather than primarily a mechanism for awarding start-up capital, the BPC has increasingly been positioned as a way of promoting entrepreneurial learning and competency development amongst those participating (Bell, 2010; Hegarty, 2006; Russell et al, 2008).

A venture proposition is traditionally a prerequisite for entry to a BPC (Chapman and Skinner, 2006). Therefore BPCs are suggested to offer their participants ‘an experience as close as possible to that of the ‘real world’ of a start-up’ (Sekula et al, 2009; p793) furthermore affording them valuable entrepreneurial experience (Dean et al, 2004; McGowan and Cooper, 2008; Russell et al, 2008). The BPC is thus suggested as a ‘hard to beat’ vehicle for entrepreneurship (Roldan et al, 2005; p329) whereby participants are able to ‘test’ their venture and themselves (Warshaw, 1999; p80) through skills workshops, team building, mentoring, feedback and networking opportunities (Jones and Jones, 2011; Russell et al, 2008; Schwartz et al, 2013). These activities are suggested to fill the gap between the participant’s idea and a commercially viable business plan (Russell et al, 2008). But are also considered to encourage competitors to acquire, develop and perfect team working, leadership, communication, research, financial, pitching, networking, marketing, presentation and project management skills (Hegarty, 2006; Roldan et al, 2005; Russell et al, 2008). Whilst also facilitating less tangible entrepreneurial attributes such as self-awareness, self confidence and risk taking propensity (McGowan and Cooper, 2008; Randall and Brawley, 2009; Hegarty, 2006; Russell et al, 2008).

Symptomatic of a more general lack of attention as to why one might choose to participate in a BPC (Roldan et al, 2005), we lack understanding about whether learning features as an objective amongst those competing and indeed any specific skill and knowledge needs they have. Despite the assumed importance of understanding these requirements, so that initiatives such as the BPC can focus upon and be relevant to satisfying these needs (Wilson, 2008). Achieving such alignment is considered tantamount to the effectiveness
of provision, heightening participant motivation and perceived capability to continue pursuit of entrepreneurial activity (Hannon et al, 2005; Herrmann, 2008).

The impact of BPCs in general is far from transparent (Shwartz et al, 2013), an observation which extends to appreciation of any learning which may feature. Perhaps because as like in entrepreneurship education more generally preoccupation with judging the effectiveness in terms of the, often inconclusive but more tangible, number of start-ups yielded (Graevenitz et al, 2010). Moreover neglecting those outcomes may be reflected in the less tangible competencies that may have been acquired and/or developed (Streeter and Jaquette, 2004).

Despite the emphasis on the ability of the BPC to allow competencies to be developed, we lack an appreciation of this from the perspective of the participants who are deemed to be acquiring them (Russell et al, 2008; Schwartz et al, 2013). This is compounded by the dominance of an organiser perspective, attention given to why they have been motivated to offer competitions and what they perceive the benefits of such provision to be for the university. Notably boosted university development (Roldan et al, 2005) through facilitation of links with wider communities and technology transfer (Chapman and Skinner, 2006). Consequently the participants perspective and ‘voice’ is often underrepresented, or when evident, usually only reflected in anecdotal sound bites after participation (McGowan and Cooper, 2008). As the outcomes of the competitive aspect of the BPC are known at this stage, this is not conducive to understanding what the participant hoped to get from their participation. Particularly as such attention is often just levelled at those who have won and who likely have a different but no more legitimate experience than their counterparts not in receipt of a prize. It is therefore important to remove the winner bias from research in order to understand what the learning benefits are to participants regardless of where they place (Hegarty, 2006; Russell et al, 2008; Torres, 2004). Exploring the experiences of participants at the start and end of their participation is a potential way of understanding their learning objectives and whether these are achieved through the participation experience (Harmeling, 2011; Honig, 2004).

There may be elements of the BPC which are counterproductive to participant learning. Notably the presence of a competitive aspect in the learning environment (Hegarty, 2006), which could potentially stimulate insecurities that necessary competencies are not held. Bell (2010) also cautions that the learning opportunity offered by the BPC is less accessible to those not pursuing investment. Quite critically there is also a need to consider the focus and emphasis placed on the business plan. The presence of which presume this to be conducive to further entrepreneurial competency acquisition and development. This is questionable given growing reservations levelled at the business plan and business planning as a learning tool and moreover an activity within the start-up of a venture (Bridge and O’Neil, 2013; Bridge and Hegarty, 2013; Dew et al, 2009; Jones and Penaluna, 2013).

3. Approach

The current study embraces an interpretive perspective, this being accommodative of exploration of what the BPC experience means to its participants and how these meanings change as a result of participation. Adopting an in-depth qualitative methodological approach allowed these participant experiences to be accessed and portrayed (Leitch et al, 2010). Most specifically regarding how they perceived, described, felt about, made sense of and talked about this experience and why this was the case (Basit, 2003; Patton, 2002). Individual participant meanings were considered key to understanding how learning needs featured as an objective for participating in a BPC and whether these were met through the competition. This decision was also reinforced by the idea that learning can be beneficially explored using qualitative data (Denzin and Lincoln, 2003), given that such perceptions are highly personally subjective (Gephart, 2004).

The site for the current research was BizComp, a regional extracurricular BPC which draws competitors from five universities located in the North East region of the UK. Taking place over a 3 month period, BizComp is a multidisciplinary competition which is open to current students and recent graduates of these universities. Although the competition welcomes entrants who have an existing business, those with a business idea and no previous business experience are not precluded from entering. The entrant is required to submit a one page summary of their venture at the commencement of the competition process, before submitting a full business plan at the end of the process. The competitor is required to pitch their venture on three occasions throughout the process, once as part of a ‘practice-your-pitch’ event, once as part of the final judging panel and once as part of a grand finale event. The competition is judged on the basis of the business plan and the pitch in front
of the judging panel. There are three award categories, a general business award, a creativity award and an overall award. Each award is accompanied by a financial prize. Prizes are also offered to a runner-up in each category.

A purposive sampling technique was employed to draw a sample from the database of those participating in the 2013 BizComp competition. As it was deemed that any one of the competitors could be considered information rich about objectives for entering a BPC and any outcomes of that participation (Patton, 2002). This technique yielded an eventual sample of 7, the profile of which is noted in table 1. The sample size was deemed necessary to gaining rich in-depth detailed insight from a smaller number of individual participants, which has often been lacking or compromised in the small literature base pertaining to the BPC. This sample size also enabled the researcher to devote extended periods of time with each individual participant over a prolonged period, valuable given the data collection technique employed.

Table 1: Participant profiles

<table>
<thead>
<tr>
<th>Participant Name</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sam</td>
<td>A computing games programming graduate, who entered the competition with a venture which develops games and apps for delivery on mobile platforms. Venture was established in December 2012.</td>
</tr>
<tr>
<td>Bea</td>
<td>Postgraduate student studying for an MA in PR. Entered the competition with a PR company which she developed as part of her studies.</td>
</tr>
<tr>
<td>Suzie</td>
<td>Produces Luxury handmade teacakes. Came up with the idea in December 2012 when she realised on a placement in the enterprise department of her university that you do not need a ‘save the world’ idea to start a business. Currently finishing a PhD in chemistry.</td>
</tr>
<tr>
<td>Adam</td>
<td>Entered the competition with a venture which offers packs of university essentials to new students. Has been running the company alongside his undergraduate studies in Economics and Politics but about to commence a graduate scheme.</td>
</tr>
<tr>
<td>Kat</td>
<td>A 3rd year Drama and Photography student who entered the competition with a performing arts company.</td>
</tr>
<tr>
<td>Mel</td>
<td>Entered the competition with a PR and Marketing company, targeted at bands, DJs and nightclubs. Started the company in June 2013 whilst undertaking an MA in Public Relations.</td>
</tr>
<tr>
<td>Dan</td>
<td>A 3rd Year Economics undergraduate, who has developed a software system for healthcare to deal with physiotherapy. Still pre-trading.</td>
</tr>
</tbody>
</table>

In-depth interviews were undertaken with participants at two stages, pre and post entry. This was achieved through utilising what Charmaz (2003; p318) terms a ‘sequential multiple interview’ technique. This technique allowed data to be collected alongside the time span of the actual process of the competition being studied (Rae, 2000; Lindgren and Packendorff, 2009). Henceforth participants were interviewed when their BPC experience was current negating the need to rely solely on retrospective accounts. The interviews were designed to be conversational in nature and guided by a topic guide. The emphasis of such an interview beneficially enabled the participant to describe what they hoped to get and did get from participating in BizComp in their own voice and from their own perspective. Each of the 14 interviews conducted lasted between 45 minutes and 1 hour. Interviews were transcribed verbatim and this served as the raw data for analysis. This data was then analysed thematically.

4. Findings

Following a thematic analysis of the first stage of data, three key learning objective themes which had guided entrance to the BPC were identified.

- The competition as a learning experience
- The competition as a means of addressing a perceived gap in competency base
- The competition as a means of identifying further gaps in competency base

These themes were then applied to the data yielded at the second stage of data collection, chiefly to address whether these objectives had been achieved through the competition experience.

To observe the integrity of participant voice, discussion of the empirical data in relation to the extant data is offered in the proceeding discussion section.
5. Pre - participation

The Competition as a Learning Experience

A main concept that all participants discussed was the idea of the BPC as a potential learning experience. Each participant considered that learning had to some extent incentivised their BPC participation. This was bound up with their view that their venture start-up is in itself a learning experience, rendering it vital that they seek out and pursue all potential opportunities for learning.

As a new business I think it’s important to be learning all the time, because there is so much that I do need to learn. [Kat]

The BPC was consequently viewed as another experience from which to potentially facilitate much needed knowledge and skills as part of their commitment to continued pursuit of their venture. The prize attached to winning the competition heavily incentivised participation amongst all participants. However many felt that the potential learning which could be facilitated through aspects of the experience to be more worthy of their attention than the winning. Specific aspects including feedback advice and networking opportunities which they hoped would be afforded through the process were deemed as particularly advantageous to facilitating such learning.

It would be nice to win, but I think it’s more about the experience and getting the information and the feedback. It’s more about all the people you’ll get to talk to and get advice from [Sam]

Numerous participants suggested that their previous experiences of participating in extracurricular competitions and also advice from those who have participated in BizComp had highlighted it as a valuable learning opportunity. Participants hoped to yield similar value from the current competition.

The Competition as a Means of Addressing a Perceived Gap in Competency base

A second theme to emerge through analysis of the data was the idea that the competition as an experience could help to provide competencies currently deficient. Some participants felt competing in BizComp particularly important because of their lack of prior business experience. This added to their sense of uncertainty about their current competencies, consequently they were particularly conscious that they may be lacking or need to improve the skills and knowledge needed to move forward with their venture.

We’ve never had any kind of connection with business, that’s why we entered the competition because we need those business skills [Bea]

I don’t come from a business background. I did Young Enterprise when I was in sixth form, that’s nothing really, just like sticking some cards together. I haven’t done a business degree so this is all completely new to me [Suzie]

This was particularly pronounced with regards to what participants considered to be essential business competencies such as setting goals and targets, market research, financial planning, understanding tax considerations, how to invoice, pitching and presentations. Participants perceived lack of a business degree or previous experience hindered them in this respect. Consequently they envisaged that the BPC, through expecting demonstration of such competencies, would allow them to address and remedy any such deficiency. This was strongly felt with regards to what was felt to be the daunting prospect of producing a business plan.

I feel like the business plan, we do feel like nervous of it. It’s a massive big step up for us. But we are going to get the guidance and stuff, all we need [Mel]

Having to pull a business plan together for the competition means we have to do it anyway, things we would have, kind of, put off or we wouldn’t think about [Bea]

The ability to produce a business plan was a competency which was felt to be highly prized and necessary, but which may have been overlooked because energies had been expended on venture implementation. The competition was thus perceived as a means of being supported in production of a ‘solid plan’ which would help take their venture forward and grant them legitimacy.

There was an overwhelming sense amongst participants that they were looking to the competition to instil essential confidence in their abilities to move forward with endeavour of venture start-up. Participants looked
to those in the competition who have specialist expertise and knowledge to provide this confidence through offering advice and guidance.

When I had looked into it I just thought it’d be fantastic to get some advice from, obviously, professionals that have been there and done that. So I just went through and entered it [Sam]

By extension participants envisaged that as a new venture you can never get enough support and so the competition would be invaluable in this respect.

The Competition as a Means of Identifying Further Gaps in Competency Base

A third theme that analysis of the BPC competitors experiences revealed, was the notion that competition might allow the identification of further gaps in their existing competency base.

Being challenged on ones business venture and being able to appreciate how their venture may be perceived from the outside is deemed by participants to be pivotal to its continued development. Thus the opportunities for this and associated feedback within the competition were considered a way of pinpointing weaknesses in themselves and their venture

It [the competition] will actually help in the way that it’ll identify, perhaps, where you are weak by exploiting the business plan or by exploiting your personality, or those sorts of things. The feedback that you’ll get from that process will then probably help in a way to point where you do need to improve, and you can go away and improve in those parts [Adam]

It’s just more people’s opinions. I’m going to get asked more questions when I’m there. Hopefully, I will be able to answer them but there will, I’m sure, be some really hard ones that will make me think that I need to re-dress that, or they’ll bring up things that, maybe, I wouldn’t have thought about before. [Kat]

As the above quotations exemplify, it is anticipated that such feedback might give rise to aspects which might beneficially be addressed following participation to improve their offering. But also a way of learning whether the venture is deemed a viable prospect.

It’d be great to receive even just some recognition that they felt, from their expert point of view, that the business had credit and was going places. [Adam]

6. Post - participation

The Competition as a Learning Experience

All participants found competing to be a valuable experience with respect to their learning

It has been a really good, positive learning experience that we can take a lot away from. [Mel]

The importance of the support gained from their own institution whilst competing was deemed a favourable aspect of their participation. This support was considered to scaffold the learning opportunities provided by the competition experience

They were extremely helpful with the business plan, sending it forward and back a few times, and they would look at things and help you, and with the pitch, as well, they had us in twice, practising the pitch. They were, I think, really great. [Kat]

I think most of the help came from my university careers service rather than the competition. I think in previous years they have had mentors but they didn’t have that this year so I don’t know how that would have affected what I would do for the competition. [Suzie]

As Suzie notes a lack of formal mentoring opportunities within the competition may explain why the participants own institution assumed a supportive function. Participants did feel however that this allowed them to appreciate the support their institution could offer their venture going forward, with many of them planning to capitalise upon this.
Kayleigh Watson, Pauric McGowan and Paul Smith

The competition allowed learning opportunities which were not anticipated prior to participation, particularly the opportunity to learn from the experiences and advice of fellow competitors so as to gain pointers for their own venture

I guess sort of learning also about how other people in my position are going about starting up their businesses, that was something again that I haven't had a huge amount of contact with people my age doing it [Adam]

For Dan advice from a fellow participant allowed a potential new opportunity to explore beyond participation

One of the most important things that I've learnt is that I can use motion capture on my product. And all the things that sort of relate to that in terms of what I can do to improve my product. So, there is that, which is obviously very important moving forward. [Dan]

Participants maintained that the outcome of their participation was more about the learning experience as a whole than winning or losing

I feel like we got so much out of it, like it’s been a massive learning curve for us. Although we haven’t won, we still took so much away from it. [Mel]

Business Planning Competitions, I think are a really good way of preparing you for what you’ll need to have anyway, for your business so really, you come away with the tools that you need to progress in the future [Kat]

All participants felt that they could [and would] leverage similar value from other competitions going forward.

The Competition as a Means of Addressing a Perceived Gap in Competency Base

There was a strong sense in the data of the competition as a means of remedying the competencies participants had previously felt deficient in. Competitors believed that BizComp supported them in developing competencies that they entered needing, most notably how to produce a business plan,

The whole process was kind of supporting you through starting up your own business and I think I got most out of that and also how to write an initial business plan because I didn’t have a clue how do stuff like that’ [Suzie]

We had to do a business plan which we weren’t very good at, but then getting all the help from everyone so now we’ve actually got a business plan, which we need anyway [Bea]

Competitors who did not already have a business plan found it useful that the competition necessitated they confront this. The support provided for this to be produced also often allowed them to think through what was informing their plan, particularly the financial assumptions. Furthermore because they were questioned on the financials as part of the final judgement of the competition, there was a sense amongst participants that they really needed to learn what they were talking about.

The competition experience also assisted in the development of competencies such as how to pitch to potential investors, present their venture in accessible terms to a large number of people and network effectively. Often necessitating the participant to undertake tasks which were unfamiliar and out of their comfort zone

I’ve done quite a bit of public speaking in the past, but only to rooms of about ten to fifteen people. And so, to be able to stand up and do that pitch in front of 150 or so, 100, I’m not quite sure how many were there on the actual evening, but quite a few, that was definitely something that was a learning curve for me. I hadn’t come across that before and dealing with it was a massively new experience. So I’ve definitely come away with confidence on the back of that as to, well, you know, it’s like ticking off, I’ve done that before so I can try and do my best again [Adam]

The networking part of it was fairly new to me, having to maintain composure at all times and trying to remember everyone that has come up and you’ve spoken to, or to remember their name, I think in a way that has been huge as I’ve never been a big fan of, “Okay, now I’m going to network” and that sort of thing. [Kat]
Kayleigh Watson, Pauric McGowan and Paul Smith

Participants considered that such aspects of the experience afforded them a confidence which would be useful when approaching similar scenarios in the future. Some participants already identifying contexts where such competencies could be applied

We’ve learnt not to be scared of public speaking as its not actually that bad’ [Bea]

It’s given me a lot more confidence to get up and talk in front of people, which will help us when we’re networking. We’ll probably try and do some studio introductions and things at the local networking events now. [Sam]

It is perhaps understandable that the development of such competencies were less pronounced amongst participants who had been establishing their venture for some time, previously pitched for investment or already produced a business plan. Such participants however found the competition a good opportunity to refine such competencies.

For some the competition enabled an appreciation of and confidence in the competencies already held and thus highlighted that they were not lacking a particular competency they maybe thought they were

We’ve learnt that we’re quite good at presenting things, which we didn’t think we were, but then the feedback has said that we were. People have said that it is a good concept and that the niche that we’ve got is a good niche. So it’s nice to know that it’s not just a waste of time. [Bea]

The Competition as a Means of Identifying Further Gaps in Competency Base

The competition allowed the identification of gaps in the participant’s competency base which may not otherwise have been anticipated until faced with a more high-stakes situation

We got so much out of it, so I think we have progressed with our business more than we would have done, because I think we’ve found things that we couldn’t do, or we needed to find out how to do, that we probably wouldn’t have come up against until it was too late. [Bea]

The feedback received throughout the process was highlighted as particularly useful in allowing such appreciation. There was a strong sense amongst participants that this would help them to consider how they could improve their business plan, particularly with regards to communicating their offering in accessible terms, highlighting necessary detail which might have been missing and financial forecasting. These were aspects which there was not scope to improve in the competition but which participants were committed to addressing going forward.

Some participants however found their feedback disappointing in some respects

It would have been very helpful to have had a couple of judges who were well-versed in our industry just to get a bit more feedback on the actual direction of the business and things. Because while they could help with the business plan, they didn’t really understand the market we were selling to or the customers we were working with. [Sam]

Whilst not meeting expectations, this was also perceived to limit the value of the feedback as a signpost to learning.

To complement feedback received, competitors used their own reflections of their experience to look at how they need to improve competencies particularly with respect to pitching and networking. Improvements noted included putting more of their personality into their pitching style, how to present financials, being fully prepared when pitching, knowing their numbers, being efficient in networking situations and better time management when pitching.

7. Discussion and conclusion

This research lends strong support to the idea that the BPC can serve as a perceived learning tool. Learning serving as both an objective and outcome of BPC from the perspective of those competing. Such participation is highlighted as a way of remedying perceived gaps in ones competency base whilst also identifying new gaps which need to closed for them to progress successfully with their venture start-up. In the next paragraphs, the findings to emerge from both stages of data collection are collated, discussed and related to the existing literature on BPCs. The implications of this research then outlined.
The research has demonstrated that the BPC can be viewed a learning experience amongst those participating, both before and after participation. Like for Sekula et al (2009) and Bell (2010) the competition served as vital source of experience, particularly for those without a business background either practically or educationally. This could be deemed an advantage of competitions open to entrants from a range of disciplines. Whilst it has been suggested previously that competitors often have a circuit of BPCs which they use to leverage financial resources for their start-up (Bell, 2010), the findings of this research suggests the same may be pertinent with regards to learning. Competition participation serving as a past and future source of learning deemed critical to their development while starting-up. Whilst financial prizes attached incentive BPC entrance, this does not override the participants sense of there being learning to be gained just by participating. Moreover financial prizes are considered a complementary bonus of this learning experience (Shwartz et al, 2013; Watkins, 1982). The findings highlighted the potential difficulties of BPCs open to entrants at varying degrees of start-up. The competition thus serves as less of a learning experience for some of the competitors (Bell, 2010), notably those who had progressed beyond the very early stages of venture creation.

Consistent with the findings of Russell et al (2008) the competition facilitates the acquisition of business competencies, particularly with respect to business planning, pitching and networking. This deemed both an objective and outcome of participation. Being expected to demonstrate these competencies within the competition context is helpful in this respect (Jones and Jones, 2011). Accordingly competition activities cater for the competencies which participants perceive they lack but need to develop to be able to proceed with their venture start-up (Sekula et al, 2009), whilst also providing important self confidence that this start-up is feasible (McGowan and Cooper, 2008). It is beneficial that participants see a context for post-competition application of competencies developed in the start-up of their venture (Sekula et al, 2009). This pertinent with regards to business planning. Whilst there has been growing concern that this is counterproductive to learning (Bridge and O’Neil, 2013) and thus overemphasised in the BPC context (Dean et al, 2004), BPC competitors still feel they need to be able to produce a business plan and see the BPC as a context supportive of them developing such a competency.

Like found in the research of McGowan and Cooper (2008) and Roldan et al (2005) opportunities to learn from others in the competition was pronounced in the experiences of BPC competitors studied. Such opportunities, particularly through feedback, allow the participant to learn how their venture is perceived from those who are experienced (Bell, 2010). This moreover allows the identification of any further gaps in competencies which need to be addressed going forward. It is important to note however the potential for participants to learn from feedback can be curtailed by a lack of industry-specific expertise amongst those judging and providing feedback.

8. Implications

Whilst it cannot be assumed that learning always features as a primary incentive for BPC participation, the data from this study indicate this to be so. The benefits of this study are that it provides a more detailed understanding about what some of the primary learning objectives of those competing in a BPC are and how these achieved through the competition experience. Such understanding allows these objectives to be considered within the framework of the competition design. Continued exploration of participant learning objectives and whether these are achieved, through utilising the participant perspective, is therefore necessary so that competitions can be deigned to be relevant in meeting those objectives.

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Towards an Effective Model of Technology Transfer From Polish Public Research Organisations

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Abstract: The intensification of globalisation processes, and the development of information societies has led to the increased demand for technologies, which help organisations build and maintain their competitive advantage, both on the national as well as the international market. The transfer of technologies is beneficial for both research organisations commercialising their intellectual property, and companies in which research results are implemented. The advantages the technology transfer brings to the R&D and business sectors, therefore directly contribute to the improved level of a country’s innovation performance and competitiveness. There are different approaches to technology transfer depending on the type of actors involved in this process (whether these are only business entities or whether technologies are transferred from the R&D sector to industry), and different models of technology transfer are applied. In the article the authors focus on technology transfer from a research organisation to a business enterprise. The focal point of the article are Polish PROs which, particularly those with the status of National Research Institutes, are an essential element of the Poland’s National Innovation System (NIS) and play a crucial role in knowledge and technology transfer processes. Through the execution of research that is in line with the research directions specified in national and European strategic documents (i.e. Country’s Development Strategy 2020 or Europe 2020), PROs contribute to the development of Poland’s innovation performance and boost economic competitiveness. However, the Polish socio-economic conditions these organisations operate in, despite substantial and significant changes which have taken place in the organisation and management of knowledge and technology transfer processes, are still not fully favourable to the commercialisation of the results of research conducted at Polish research institutes. Based on literature review and the analysis of international case studies and best practices in technology transfer, the authors propose a technology transfer model for a Polish research institute. The model is based on the outcomes of the analysis of good practices conducted for, among others, the Max Plank Society, the Fraunhofer Society, the VTT, the TNO, the MIT, the Oxford University, and the ETH Zurich, but takes into consideration the unique socio-economic conditions the Polish PRO functions in. The model will be practically applied and verified at the Institute for Sustainable Technologies – National Research Institute (ITeE-PIB) in Radom, Poland on the example of Strategic Programme “Innovative Systems of Technical Support for Sustainable Development of Economy” financed from the EU structural funds in the period 2010-2015.

Keywords: technology transfer, PRO, technology transfer model, technology transfer mechanism, technology transfer structure

1. Introduction

In the era of knowledge-based economies the role of knowledge and technology transfer significantly grows, as through enhancing cooperation between the parties involved in the sharing of know-how and the exchange of practical experience, these processes are of crucial importance to the innovation performance and the economic competitiveness of a country. As the results of the analyses of both scientific publications and expert reports conducted by the authors of this paper indicate (Siegel et.al 2004; Trzmielak 2011; Matusiak and Gulśński 2011; West 2012; European Parliament 2012; Mazurkiewicz and Poteralska 2013, Wnuk 2013a,b), knowledge and technology transfer are complex, time-consuming and costly processes whose outcomes are often uncertain, and there are a number of challenges all stakeholders involved in these processes are likely to face. Though nowadays a lot of attention has been paid to the issues of knowledge and technology transfer and commercialisation, the diffusion of research results is still not at a satisfactory level both in the developed and developing economies. The European economy, for instance, still seems to be based on old paradigms, in which insufficient emphasis is put on the market orientation of research results (Matusiak and Gulśński 2011). Despite the fact that Europe has great experience in the execution of both basic and applied research, the ability to transfer its results to commercial use in the form of new technologies, products or services is still much lower compared to the EU’s main competitor - the USA. In the States, however, the problems of ineffective practical implementation of research results are also a common phenomenon, and even such renowned R&D centres as the NASA battle with ineffective transfer of knowledge and its material results (NASA 2012). In Poland, despite numerous socio-economic changes and reforms in the Polish R&D sector,
which were first triggered by the economic transition process in 1989, few fundamental changes could in fact be noticed as far as the practical application of research results is concerned (Wnuk 2014).

No universal technology transfer models (TT models) can be found in literature, and the models used in one socio-economic context cannot be easily emulated in other settings, therefore an in-depth study on innovation models seems to be a necessity as it will help to verify what factors and elements decide on the success and effectiveness of a technology transfer process, particularly the one taking place between R&D centres and businesses.

In the article, the authors analyse different types of innovation models discussed in literature and following that review present selected international case studies of technology transfer models applied at Public Research Organisations (PROs) and universities worldwide (i.e. the Max Planck Society, the Fraunhofer Society, the VTT, the TNO, the MIT, the Oxford University, the ETH Zurich). Subsequently, based on the outcomes of the case study analysis, a model of technology transfer tailored to the needs of a PRO operating in Polish socio-economic conditions is built.

2. Technology transfer models: Overview

Technology transfer is defined as the movement of know-how, research results and innovations from one organisation to another (Rogers 1972; Johnson et al.1997; Mazurkiewicz 1999; Sosnowska et al. 2003, Matusiak 2011). This is a process which is at heart of economic growth and a foundation on which both developed and developing countries can build their progress (Mansfield 1975). The focus of a technology transfer process is the dissemination of information regarding scientific and innovative practice to individual organisations to help them manage the challenges of using that information to create change within their work settings (Backer 2000), add value to their operations, and therefore boost their competitiveness.

Technology transfer encompasses a complicated process involving the complexity of both the technology and the market as well as the complexity of interactions between the transferor and the beneficiary originating from many different sources (Saad et al. 2002; Lee et al. 2010; Gudek 2013). It therefore requires the use of different models that could facilitate the effective planning and practical implementation of technologies, and help to manage and overcome the barriers that impede the transfer process.

Ramanathan (2000) and Jagoda (2007) divide technology transfer models into two main categories: (1) qualitative models and (2) quantitative models. As defined by Jagoda (2007) qualitative technology transfer models “have as their objective the delineation of activities involved in managing TT and the elicitation of factors and issues that can influence the success and/or effectiveness of TT”, whereas quantitative models “aim at quantifying parameters of significance in TT and analyzing them with a view towards minimizing goal incompatibility between the transferors and transferees of technology.” The technology transfer literature mainly deals with qualitative models, which is mainly due to the fact that the transfer decisions are not purely objective and therefore cannot be easily quantified (Madu et al.1998), however quantitative models, though much scarcer, are also present. They usually have the form of either linear or non-linear planning, programming and forecasting models, which facilitate decisions on which technologies to invest in and transfer (Madu 1989; Liu 1993; Jafarieh 2001).

In this paper, the authors concentrate on qualitative technology transfer models.

Depending on their focus, qualitative technology transfer models can be further divided into technology transfer process-oriented models and transferor-transferee interaction models (Sazali et al. 2009). The first of them focus on the stages of the innovation lifecycle and the sequence in which the transfer takes place. They include the following types of TT models (Rothwell and Zegveld 1982; Chesborough 2003; Tidd, Bessant and Pavitt 2005, Godin 2005):

- linear: technology push and market pull models,
- non-linear: integrative (coupling) and open innovation models.

Transferor-transferee interaction models, on the other hand, emphasise communication between the technology developer and the technology beneficiary and incorporate additional factors which have impact on the effectiveness of the transfer process (e.g. quality of research, organisation and management of the
transfer process, etc.), and include e.g. the Gibson and Slimor Model (1991) or the Rebentisch and Ferretti Model (1995), to name just a few.

3. Technology transfer models in practice: Selected case studies

3.1 Sample selection methodology

In the course of their study, the authors analysed 8 case studies in TT from international PROs and universities. The methodology of sample selection was a two-stage procedure. First, based on the analysis of The Global Competitiveness Report 2012-2013 countries characterised by the highest level of competitiveness and innovation performance were selected. The list included the following countries: the USA, the UK, Switzerland, Germany, Finland, and the Netherlands. After that, the global PRO and university rankings were analysed, as a result of which institutions in the first 10 in each ranking were chosen, and the final list of institutions for further analysis was drawn. The rankings the authors took into consideration included the Shanghai Ranking 2013, the European Research Ranking 2012, and the Forbes Ranking of America’s Top Colleges 2013. As a result, the following research institutions (both PROs and universities) were selected:

- the Massachusetts Institute of Technology (MIT);
- the Stanford University;
- Oxford University;
- the Swiss Federal Institute of Technology in Zurich (ETH Zurich);
- the Fraunhofer Society;
- the Max Planck Society;
- the Technical Research Centre of Finland (VTT);
- the Netherlands Organisation for Applied Scientific Research (TNO).

The analysis of case studies encompassed the review of documents (e.g. annual reports, technology transfer regulations, guidebooks and procedures, etc.) and the analysis of web pages, and statistical data concerning commercialisation of research results in these organisations (e.g. commercialisation mechanisms used (i.e. sale, licensing, spin-off)).

3.2 The models

Though frequently criticised for their numerous limitations and misrepresentations which make them no longer sufficient and appropriate to account for the complexities of the technology transfer processes, particularly in the context of fast growing global economies (e.g. Chesborough 2003; Siegel et al. 2004; Bradley et al. 2013), the analyses of the 8 above listed international case studies show, that traditional linear models are still commonly applied at PROs and universities worldwide (Figure 1).

![Figure 1: Technology transfer model applied at institutions selected for analysis](image)

Source: Authors

A linear model (also known as the “process model”) sets out a linear, step-by-step process, which begins with the discovery, followed by the disclosure of innovation, its assessment, protection, promotion and commercialisation (Siegel et al. 2004). In the case of a technology push model the transfer process is driven by internal research, whereas in the case of a market pull model – by external market demand. These two models can be incorporated when the internal and external tacit knowledge of both researchers and business partners is used simultaneously (Sandmeier el al. 2004).

In the process TT models applied at the institutions analysed, the researchers are obliged to disclose the results of their results to the technology transfer office (TTO) which then takes control over the commercialisation process. Once the invention is disclosed, the rights are transferred onto the parent institutions (PRO or university) and then IPR is protected (patented in all the cases analysed). Following that,
the market demand is analysed, the commercial potential of the invention assessed, and the product valuated. At the next stage of the transfer process the market is segmented and the marketing campaign tailored to the character of the innovation and the industry branch is launched, as a result of which the potential end user is selected, the commercialisation mechanism chosen, and the negotiations with the transferee initiated. Once the contract is signed, the shares are divided between the parent institution and the author of the invention.

Though the process models applied at the PROs and universities analysed do not significantly vary in terms of their stages, there are however discrepancies between the functional models that are in place. The following two models emerged from the case study analyses conducted by the authors of the paper (Figure 2 and Figure 3).

![Functional model I](image)

Source: Authors

**Figure 2:** Functional model I

Functional model I is implemented at the MIT, Stanford University, Oxford University, the Max Planck Society, the ETH Zurich and the VTT, whereas the Fraunhofer Society and the TNO utilise model II.

In both models a TTO is established to commercialise the results of research conducted at the individual research units of the parent PRO or university; the difference is such that in the case of the first model, this body is responsible for the management and execution of all transfer processes, regardless of the types of TT mechanisms selected, while in the latter case, the TTO commercialises research results only by means of the establishment of spin-off ventures. In this model, commercialisation by means of external licensing lies in the hands of the administrative bodies of the research institution. In all the cases analysed the TTO is a for-profit entity. What is also interesting, is the fact that in the case of i.e. the Oxford university or the VTT, the TTO is divided into separate legal entities which are responsible for different dissemination and commercialisation activities (e.g. promotion, networking, IPR protection, licensing, spin-off creation). At the Fraunhofer Society, on the other hand, three different types of support centres function within each research department and

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1 A functional technology transfer model aggregates important actors and activities and describes relationships between them.
provide help on R&D-industry research project generation, development of final commercial products or promotion of inventions.

4. Conclusions from case studies: Lessons learned and recommendations for a technology transfer model from the Polish PRO

The review of the selected 8 case studies indicated certain similarities as far as the organisation of the transfer process and TT mechanisms and structures are concerned. In all cases analysed the following regularities were observed:

- Linear TT model,
- Application of numerous incentives promoting entrepreneurial behaviour and facilitating commercialisation of research results,
- Clear commercialisation and IPR laws and TT guidebooks,
- Various channels of non-commercial TT – e.g. know-how and personnel exchange, execution of government and industry commissioned research projects or joint execution of research projects with the representatives of the business and the industry sectors,
- Two commercial transfer mechanisms favoured: licensing and spin-off,
- TTO as the transfer executor.

In all cases analysed, the success of the TT models applied is based on strong industry orientation and connection, highly institutionalised character of the transfer process, decentralised innovation commercialisation process management, substantial autonomy of the individual department of the PRO or university, or units affiliated to it, and the for-profit character of technology transfer support structure – the TTO established as an independent organisation for technology transfer employing technology transfer specialists, lawyers, economists and market analysts, which significantly increases effectiveness of the commercialisation process and thereby increases the level of innovation and competitiveness of the 8 research institutions in question.

Polish research organisations encompass academic science and research centres (e.g. universities, polytechnics, and the Institutes of the Polish Academy of Sciences) and PROs, particularly research institutes both with and without the status of National Research Institutes, whose organisation of work and statutory activity significantly vary. Studies and analyses concerning the transfer of technologies between Polish science and business sectors are mainly focused on the organisation and effectiveness of this process taking place between academia and industry, with little or even no attention being in fact paid to the complexity of the transfer of technologies from research organisations of non-academic character, i.e. PROs. The profile and mission of these organisations, as above stated, differs from the profile and mission of universities. Additionally, their activity and functioning is also governed by different legal regulations, and there also are significant differences between these two pillars of the Polish R&D sector as far as the organisation, management, and effectiveness of technology transfer processes is concerned. The success of knowledge and technology transfer from Polish universities, remains low due to many human-related (i.e. personality, motivation, knowledge, drive) and non-human (i.e. legal regulations, structure of organisation, internal policies, infrastructure, bureaucracy, lack of close interactions between the R&D and business sectors) factors.

In the case of Polish PROs, the effectiveness of knowledge and technology transfer processes is higher, yet not satisfactory either, as these organisations are still limited by legal regulations, funds and structural and organisational stagnation. Additionally, Polish PROs frequently have problems with the following:

- creation of ties with SMEs, which very often are not interested in innovative activity, as well as big companies, which have their own policy concerning their competitiveness and innovativeness, unfortunately most frequently based on imported technologies;
- effective promotion, marketing and implementation of research results;
- entry to the mass market dominated by large international companies.

Keeping in mind the important role PROs have in Poland’s National Innovation System (NIS) and taking into consideration the fact that they are far more focused on the direct needs of the market than universities, it seemed justified to direct further analyses and research at the development of a complex technology transfer
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model particularly for this type of research institutions. Such a model\(^2\) was proposed by the authors of this paper (Fig. 4). The model is based on the outcomes of their analyses of literature review and the conclusions drawn from the analysis of the aforementioned eight international case studies, but it is tailored to the needs and requirements of PROs functioning in Polish socio-economic conditions. The authors assumed that the model would have a form of an operational system, which would directly facilitate the process of making strategic decisions in the management of a technology transfer process, lead to reducing the number of barriers to technology transfer, and therefore indirectly boost the effectiveness of practical implementations of innovations. The model will be practically verified at the Institute for Sustainable Technologies – National Research Institute in Radom, Poland, the authors represent.

When building the model the authors assumed the following:

- The model is built for a PRO developing innovative technologies intended for practical application in industry;
- The model takes into consideration the micro and macro environment of the PRO;
- The model assumes that transfer guidelines and IPR and commercialisation regulations are implemented at the PRO;
- The model incorporates methods, tools and procedures which help to overcome significant human-related and non-human related barriers to innovation commercialisation.

The model also assumes the establishment of a strictly technology transfer oriented structure (TTO) that would be entirely responsible for the execution of the commercial transfer of research results, whereas the transfer of know-how would be undertaken by the individual departments of the PRO. The model also stresses the importance of knowledge management, monitoring of knowledge and technology transfer processes, and technology and risk assessment, which all should be jointly conducted by the researchers and the employees of the TTO throughout the entire process of innovation development and practical implementation. This

\(^2\) The model constitutes the scope of Ms Urszula Wnuk’s PhD dissertation (work in progress)
procedures should be in place in order to help mitigate the materialisation of technical, financial and market risks associated with the transfer of technologies to economic practice.

The model has an open structure and the inclusion of additional elements is possible. The structure of the model is composed of the two following layers:

- Institutional (in which the institute, TTO and intermediary organisations, as well as government bodies dictating national innovation directions and regulating innovation commercialisation issues, are embraced),
- Procedural (encompassing the Institute’s technology transfer procedures supported by the original IT tools facilitating commercialisation of innovations developed at the ITeE-PIB (e.g. a complex technology assessment system, the Technology Platform, or the knowledge transformation and technology transfer monitoring system applied at the individual stages of technology development and dissemination processes).

An important element of the model proposed by the authors are the methods, tools and procedures which help to overcome significant human-related and non-human related barriers to innovation commercialisation. The first of them is a complex technology assessment system which is particularly focused on three aspects of a new technology - the level of its implementation maturity, its commercial potential, and the level of its innovativeness (Mazurkiewicz et al. 2010; Belina et al. 2013). The system allows comparative analyses of the results of individual assessments, which all support strategic decisions concerning the future of a given technology, help determine the opportunities and constraints to its industrial application, give feedback on whether further development of a given solution should be pursued or abandoned and the commercialisation process initiated or not, and support decisions concerning the selection of preferred commercial and non-commercial knowledge and technology transfer mechanisms. Equally important is the incorporation of a technological platform, which helps to reduce communication and cultural risks between the PRO and the industry, facilitates cooperation and networking between the R&D and the business sector, and stimulates the flow and exchange of knowledge and experience therefore minimising the gap between the two environments and mitigating the risk of communication breakdown and the lack of understanding between these two actors of the transfer process. Additionally, the Platform facilitates the commercialisation of research results, as within it activities associated with the promotion of innovative product and process solutions, the creation of effective structures and mechanisms of transfer of innovations and the assessment of the effectiveness of these structures are conducted. The presence of this platform in the TT model proposed enables greater involvement of intermediary organisations in the transfer process and closer, i.e. more open cooperation with other PROs, universities and enterprises.

“Scientific work executed in the Strategic Programme “Innovative Systems of Technical Support for Sustainable Development of Economy” within the Innovative Economy Operational Programme”

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Model of Corporate Accounting for Sustainable Development

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Abstract: The concept of sustainable development was first discussed and gradually implemented at the macro level in response to the accelerating problems with the consumption of non-renewable resources, increasing environmental pollution and global problems of the world that are locally unsolvable. Nowadays, the concept of the sustainable development is considered a phenomenon of the 21st century, as the current consumption and production patterns are, at least in the long term, considered unsustainable. Nowadays, enterprises often implement voluntary environmental tools, create and subscribe to codes of ethics in environmental and social areas they affect, and lastly accept the principles of corporate social responsibility. The paper presents the results of research in the field of corporate accounting for sustainable development based on the integration of economic, environmental and social aspects of corporate performance as one of the key factors of competitiveness and business success. This paper analyzes the concept of sustainable development at the micro level in the context of economic, environmental and social terms of the 21 century. The primary objective of this paper is a constructive proposal of solution of the theoretical problems that arise during the implementation of tools that help to manage the business in accordance with the principles of sustainable development, and to propose a model of corporate accounting for sustainable development.

Keywords: sustainable development, efficiency, environmental and social aspects, accounting for sustainable development

1. Introduction

"There is one and only one social responsibility of business – to use it resources and engage in activities designed to increase its profits so long as it stays within the rules of the game, which is to say, engages in open and free competition without deception or fraud."

Milton Friedman

During the development of the humankind, the population has undergone a number of "global revolutions". After the “shepherd – predatory” period when man lived in the harmony with nature, the man went through the agricultural revolution, which led to the first artificially created environment and ecosystems. The Industrial revolution caused significant environmental pollution and changes in social relations of society and family, and is followed by the revolution of information, during which today's so-called "knowledge society" crystallized. In connection with the development in many countries, we talk about the nowadays demographic revolution, which has already been experienced by the majority of the developed countries. However, the developing countries are now only going through it and in some, especially the less developed ones, the demographic revolution is at its slow start. Some authors are of the opinion that nowadays is the time of the ecological revolution that is not only reflected in the discussed concept of sustainable development, but also in the more frequent use of voluntary environmental protection instruments and non-financial reports.

2. The problem definition, paper objective and the scientific methods used

Constantly accelerating business and trade development affects both the environment - various ecosystems including human population - and the social aspects of their lives. A number of studies and surveys (United Nations - Promoting Sustainable Production and Consumption, 1999; EurActiv - Sustainable Consumption and Production in the EU, 2008; OECD - Promoting Sustainable Consumption, 2008; University of Cambridge - Sustainable Consumption and Production, 2010; World Bank - Environmental Crisis or Sustainable Development, 2010; UNEP - the future We Want, in 2012, and many more) state, that the current structure and scope of production and consumption is unsustainable from the perspective of the near future. So far, there is no consistent approach in the area of tools for measuring and managing sustainability, their usefulness in individual companies is different and it makes it difficult for a mutual comparison.

There is a wide range of different concepts in the area of performance measurement and management, approaches and methods varies from elementary calculations of ratios, through financial analysis or comparison of data across time series models to complex performance assessment. To measure and evaluate the performance, it’s not only financial indicators, but the non-financial, often qualitative aspects reflecting the current trend of business in accordance with the principles of sustainable development that are more frequently used lately. The creation of new concepts for measurement, evaluation and reporting of non-
financial aspects related to sustainable business gradually affects the classical models of performance measurement and management (e.g. modified methodology of Balanced Scorecard in the area of sustainable performance, or methodology of compilation of EVA, respectively EVAS, which takes the aspects of sustainability into account) (Krechovská, 2013).

This paper aims to illustrate a model of corporate accounting for sustainable development. The search retrieval presents and summarizes the findings related to the concept of sustainable development at the enterprise level and the implementation of them into business processes (environmental accounting, social accounting, and non-financial reporting). The scientific and research part is mainly based on modelling. As a first step, the basic assumptions for the necessary simplification are set, and then a model for sustainable development of corporate accounting at the microeconomic level is designed.

3. Accounting for sustainable development from the perspective of the corporate sector

If the company defines sustainable development as its strategic objective, it must address the question of how to measure the sustainability of the enterprise, how to achieve it actually and, finally, how to manage it effectively. It is necessary to collect, record, analyze and disseminate relevant information about the environmental and social performance and their impact on the economic performance of the company. It is necessary to adapt the whole financial system to these needs as it should render the economic consequences of environmental and social aspects of the business (Kovanicová, 2010).

Past economic development failed to provide ecologically sustainable and social just development to all people of the world. It is necessary to realise that sustainable development is concerned with economic organisation in the first instance (Bebbington, 2000).

3.1 Environmental accounting

Deals with the identification, collection, estimation, analysis, reporting and transfer of:
- information on material and energy flows,
- information on environmental costs and
- further quantified information, which are the basis for decision-making within the enterprise.

The problem arises when the company’s environmental department detects only a small fraction of the total environmental costs and lacks accurate information about the impact of environmental effects on the financial position of the enterprise and its profit. The problem is not in the amount of information, but rather in the ability to separate the part that relates to the environment. Environmental accounting system monitors and evaluates information expressed in financial and managerial accounting in monetary units as well as data on material and energy flows. It is all monitored and evaluated in mutual connection and the aim is to increase efficiency in the use of materials and energy, to mitigate the impact of business activities on the environment, to reduce environmental risks and to improve management organization (Hyršlová, and others, 2002).

The savings can be achieved primarily by more efficient use of materials and in understanding the fact that waste is expensive and not because of the costs of removal, but mainly for the acquisition cost of the wasted material. The environmental management accounting approach is based on the basic premise that all purchased materials must leave the company by physical necessity either as a product or as a waste (non-product output). However, the waste is a sign of inefficient production. Therefore, when calculating the environmental cost, it’s not only the cost of waste disposal taken into account, but the cost of material that leaves the company in the waste stream and the cost of processing the discarded material as well (CEU, and others, 2004). More on environmental, social and sustainable accounting issue can be found in paper called Environmental accounting, Managerialism and Sustainability: Is the planet safe in the hands of business and accounting? (Bebbington, 2000).

3.2 Social accounting and social audit

Social accounting and social audit are related to the understanding of the impact of the company on the society and back, while there is the unifying aspect of "sustainability". It’s not only "the inside" of the company (the link between environmental, social, cultural and economic aspects), but also its behaviour and its relation to the outside, which has implications for the general public and the Planet itself.
The essence of social accounting is reporting, publishing and measuring the activities that the organization performs and understanding the stakeholders’ expectations from its future development. This ultimately leads to more effective achievement of the objectives. One of the tasks of social accounting is to collect and publish information through reports on sustainable development and corporate social responsibility. The basic characteristic of social accounting is a mutual dialogue with the stakeholders as well as the consideration of their informational needs.

3.3 The system of the accounting for sustainable development

The purpose of the system of the accounting for sustainable development is „to collect, record, analyze and disseminate comprehensive information about the environmental consequences of economic and social activities” (Bennett and others, 2006).

An enterprise that follows the principles of sustainable development and implements them in its strategic objectives, have to answer the three basic questions:

1) How to measure the corporate sustainability?
2) How to set the specific goals?
3) What procedures to use to achieve the set goals?

When introducing the systems of corporate accounting for sustainable development, we face a number of problem areas and so far, the unified solution doesn’t exist. One of the problems is the issue of integration of the three dimensions of sustainable development. The term "triple bottom line accounting" (accounting with three roots) (Elkington, 2008) is used in corporate accounting on economic, social and environmental issues. However, the concept of triple bottom line corporate accounting, although it is a step towards the recognition of the social and environmental impacts and opportunities for businesses, does not emphasize the interrelation of these three fundamentals.

The accounting for sustainable development (at the corporate level) might be defined as a system that deals with collecting, recording, analyzing and transferring the information on:

- environmental and socially induced financial impacts,
- environmental and social impacts of the economic system,
- relations between environmental, social and economic aspects in business (Hyťšlová, 2009).

The accounting for sustainable development might be considered as a system of corporate accounting divided into categories according to the users. Financial accounting for sustainable development is a system that provides information related to the environmental and social aspects to internal and external users. It represents a major part of the external reporting on sustainable development and allows us to present the responsibility for environmental and social issues to the general public and other interested parties.

Financial accounting, which incorporates each aspect of sustainable development, includes, in comparison with traditional accounting, extra monitoring and analysis of environmental and social performance. The transition from the traditional financial accounting to accounting and financial reporting for sustainable development, requires certain adjustments of the content as well as an extent of the primary statements: the extension of the profit and loss report with the views of external costs and benefits related to environmental, social and economic aspects that are not traditionally considered; further expansion of the balance sheet assets that are related to sustainability and “shadow” liabilities (Kovanicová, 2010)

The managerial accounting for sustainable development is a tool to support decision-making processes of the business and is focused on the future and meets the information needs of the management. It also broadens the scope of interest out of corporate management for environmental and social aspects of business and their economic context. Managerial accounting for sustainable development can be applied mainly in:

- the management of resource efficiency and the search for cost savings opportunities,
- the performance comparison and the search for best procedures,
- the link between the set sustainable performance level and the financial opportunities,
the management of social and environmental risks,
- the modelling of environmental and social costs,
- the improvement of the staff awareness of the benefits of sustainable development (Hyršlová, 2009).

As the conclusion of this chapter, it is necessary to mention different opinions and views on the issues of accounting for sustainable development and its importance in business management. The article "Getting to the Bottom of Triple Bottom Line" from authors Norman and MacDonald brings some interesting ideas. The article examines the legitimacy of the requirements demanded from businesses and arising from the acceptance of business in accordance with the requirements of sustainable development. Five objections related to the accounting model of sustainable development and its validity are formulated and discussed further in the article.

- "Objection to measurability" - many aspects of environmental and social dimension cannot be measured and reported objectively.
- "Objection to aggregation" – the individual indicators of environmental and social dimensions cannot be aggregated in a sensible way and thus evaluated as a whole in terms of environmental and social performance.
- "Objection to convergence" – the relation from the following statement has not been proved “the measurement of the social performance leads to the improvement of the social performance which is followed by the profit increase in the long term”.
- "Objection of corporate accountability"– obligation to act or at least improve its environmental and social responsibility is not codified anywhere neither is logically justifiable.
- "Objection of transparency"– the enterprises are not obliged to publish any information beyond legislative requirements regardless of the perception of their responsibility towards society as a whole (Norman and others, 2003).

The new approach how to measure corporate sustainable value added that can be used in practise is described by Frank Figge and Tobias Hahn. Sustainable value added is defined as value added less external environmental and social cost plus relative sustainable value added. This approach considers also opportunity costs and measures both, efficiency and effectiveness (Figge & Hahn, 2003).

4. Model of corporate accounting for sustainable development

Today, there is a number of significant changes (e.g. the environmental area - climate change, increased pollution, lack of natural resource; in the economic area - financial crisis, expenses growth) that impose high standards on businesses and non-profit organizations, especially in the field of accountability for the activities they carry out. Enterprises are therefore realizing the importance of the balance between its economic, environmental and social priorities. In order of successful development, they implement the principles of sustainable development into their business processes (management, cooperation with stakeholders - suppliers, customers, local communities, planning and the course of production, marketing and sale of products).

When choosing and setting the benchmarks for measuring and assessing the sustainability of business, it is necessary to respect the balance of the assessment of individual areas of sustainability. It is not necessary to assume that the different spheres of sustainable development value the same for stakeholders in the process of the evaluation of the performance. The economics is always important by the very nature of the business principles. The environmental and social aspects represent other criteria for the assessment and their significance differs among various stakeholders.

Business in accordance with the principles of sustainable development brings three basic elementary questions: What, how and for whom to measure and evaluate?

4.1 Business activities in relation to the principles of sustainable development

The first question that an enterprise must answer is its own perspective - “WHAT TO MEASURE AND REPORT?” The goal of every business entity is to increase the property value of its owners and it’s reached by its activities. The activities are generally presented by the transformation of inputs to outputs. The nature and
Jitka Zborková and Lilia Dvořáková

course of this transformation differs within individual companies and depends on the type of business, the industry, the form of ownership and legal form of business.

Basic business activities, converting inputs into outputs are shown in the following table assuming their basic structure is similar throughout the different industries. Elementary activities include mainly supply, production and sale. Another, secondary category includes activities typical for industrial companies, such as operations, human resources, financing, science and research. Each of the businesses functions includes sub-activities with their own inputs and outputs.

To achieve corporate sustainability objectives, it is necessary that the economic, environmental and social aspects are identified at each level of the business activities. Consequently, it is necessary to determine the specific economic, environmental and social indicators for each area.

After the company identifies its own economic, social and environmental aspects of its activities, it is necessary to determine the elements that will be measured, managed and evaluated for each pillar of sustainable development. Sigma project offers one solution, which is determined by these five basic perspectives:

- Natural resources – the environmental pillar,
- Human resources - the social pillar,
- Social capital (relationships and structure) - the social pillar,
- Financial resources - the economic pillar,
- Investment capital - the economic pillar;

Natural resources are considered final and represent the limits of the system. Human resources, social capital and investment capital are the basic components of the company and its activities and their size does not indicate only the performance within the company but also, externally, towards its stakeholders. The financial capital is of a key importance and is necessary for the survival and the success of the company and the capital value depends on the values of other elements (BSI, 2006).

However, this concept does not take the question of knowledge, knowledge management and innovation into account, and these are, in the opinion of the author, issues of an important role in sustainable development. In case we do not consider the natural resources as limiting, but understand the current status and level of knowledge as a limit, we can’t consider the size and the scope of natural resources as the limits of the system.

4.2 Measurement and evaluation of sustainability of the enterprise

After the company answers the question of "what to measure" (processes, activities, elements of sustainable development), it is necessary to resolve the question of "HOW TO MEASURE?". The answer to this question must reflect all pillars of sustainable development and reflect on each of the areas and guarantee their regular monitoring and evaluation.

4.2.1 Environmental aspects of business

The production efficiency was first monitored in the 70’s of the last century, but most of the companies concerned only the economic efficiency. Efficiency is generally understood as a variable that refers to maximal value while minimizing the use of resources. In most cases, the economic evaluation of efficiency takes the achieved effect into account together with the expenses. When understanding the efficiency ecologically we can compare, for example, the reduction of the environmental impact per unit cost and if the decrease number is of the desired amount of even greater, we can call it the eco-efficient solution. The term eco-efficiency was first used by the Swiss industrialist Schmidhein in his book called The Changing Course, which was published in 1992. Currently there are several definitions and perspectives on the eco-efficiency concept. This leads to the fact that this concept has been interpreted in many ways and there is no consensus among experts when setting the objectives and targets in this area. (UNEP, 2003).

Firstly, when understanding the eco-efficiency, the approach of “doing more with less” was applied, however, later it has changed into the “more from less” approach. These days, the eco-efficiency is understood as "more
from AND with less" while there is synergy of both the inputs and the outputs. “From less“ shows the ability to produce using fewer natural resources (inputs) and "with less" is a production with less pollution (outputs).

The eco-efficiency indicators are currently quite commonly reported and there is a number of frameworks and models that deals with them and their reporting. World Business Council for Sustainable Development has prepared its own eco indicators concept that looks into the way of their implementation, reporting and measurement. Eco indicators are based on eight fundamental principles and further divided into two categories. The eco indicators in the first category are the general ones that should be universally recognized by all kinds of businesses, while the second group consists of sector-specific indicators that are used and recognized by specific businesses or sectors. Both the eco indicators groups are based on eco-efficiency formula which combines the economic and ecological aspect of the product and in general, it has the following structure. Each part of the fraction may include a number of diverse aspects that should ultimately offer a comprehensive view of eco-efficiency of the particular business. It is apparent, from the formula, that the eco-efficiency growth may be achieved either by the growth of the product value or reduction of the environmental impact. In addition, it is recommended to report and present supplementary indicators (Verfaille, and others, 2000).

\[
\text{Eco - efficiency} = \frac{\text{Product value}}{\text{Environmental Impact}}
\]

Product value:
- Quantity of the product
- Turnover net

The impact on the environment:
- Energy consumption
- Materials consumption
- Water consumption
- Greenhouse gas emissions
- Ozone layer depletion

Additional indicators:
- Financial indicators
- Acidification
- The amount of produced waste

The companies reporting the eco – indicators should not only report the general eco indicators as well as those sector-specific, but should publish its environmental profile too and confirm at the same time, that the report has been verified by an external body.

### 4.2.2 Social aspects of business

The socially responsible businesses are those businesses that voluntarily take environmental and social aspects into account and incorporate them into their strategies and activities, such as:

- Health, safety and overall benefit of employees, customers and business partners;
- Motivating staff training and development opportunities;
- The employment of disabled
- Attentiveness to natural resources that companies use in their activities;
- Criteria to be applied when making investment decisions and selection of the supply chain.

Apart from large companies, even small businesses participate in socially responsible activities but usually, they do not fully recognize the value and the potential of their processes and activities (EC, 2011). Constantly increasing pressure in the global business environment leads to a voluntary commitments and effort to respect and fulfill the expectations of the stakeholders, not only for the purpose of creating the values, but it is a prerequisite for higher competitiveness of the business. That can be achieved either directly, for example via
the growth of sales from satisfied customers, or indirectly, through a positive impact on the image and reputation of the company.

One of the major problems in measuring, evaluating and managing corporate social performance is related to the lack of understanding of the concept of "social" and inconsistent use of terms – the output, the outcome, the impact and the effect.

4.3 Sustainability from the point of view of different user groups

“The business of business is business.”
Milton Friedman

The last elemental question that remains to be solved is "WHO TO MEASURE AND REPORT THE SUSTAINABILITY FOR?" the answer to this question tells us a lot about the goals and tasks of measurement and evaluation. Contemporary management theories of the control take the requirements and expectations of different groups of stakeholders into account. The cooperation with stakeholders leads to a closer understanding of their interests and the consequent mutual dialogue, which is beneficial to both parties. It is important to understand that each business communicates with its stakeholders in some way (marketing, business relationships,).

The involvement of stakeholders might be considered as a method of evolving communication with the public, customers, employees, business partners and third parties. First, it was mainly one-way communication between the company and its stakeholders; the main task was the presentation of business results and the reduction of potential risks. Currently, this communication is more of a dialogue which is focused on finding a solution. Active involvement of stakeholders helps to eliminate the discrepancy between the business-oriented approach and socially responsible business, as it should lead to long-term value growth. Although this concept is particularly demanding in terms of time, the implementation of the effects should be beneficial. The aspects that contribute to higher economic performance are primarily:

- Involvement of stakeholders might help to solve problems.
- Involvement of stakeholders increases trust in the company.
- Stakeholders are potentially important partners.
- Involvement of stakeholders can improve the image of the company. (Ansett and others, 2011).

Stakeholders might be divided according to a number of different criteria; one of the well known divisions includes the distribution of the primary stakeholders (shareholders, investors, employees, suppliers, customers,) and secondary (lobbyists, competitors, civic associations,). However, it is necessary to divide stakeholders according to their significance and to specify the range of corporate social responsibility of subject to the group. It seems appropriate, from the business’s perspective, to divide them according to whether or not they have an impact on society through its product (Kužel, 2005).

4.4 Model of corporate accounting for sustainable development

The proposed concept of business in accordance with the principles of sustainable development answers the three basic questions mentioned above and closely debated on the theoretical basis:

- **WHAT TO MEASURE?** An enterprise must determine its key activities and their impacts in the environmental and social areas, and then further evaluate them. It is necessary to set the elements of sustainability for each area of sustainable development, which will be measured and evaluated through the selected criteria.

- **HOW TO MEASURE?** The choice of the appropriate criteria and indicators that inform about the economic, environmental and social aspects of both, the key activities as well as individual elements of the enterprise sustainability.

- **WHO TO MEASURE FOR?** The system must be configured to provide not only information needed for decision-making within the company, i.e. for the financial manager, production manager and quality manager, but to also to provide information to relevant stakeholder groups.

The following figure gives context to these elements - what, how, for whom.
The first element of the model - "What to measure and report?" is given by the business process that transforms inputs into outputs. Inputs are represented by financial resources (own funds, loans, profit), material resources (assets, supplies,) and qualitative resources (knowledge, know-how, staff). The resources of the company in terms of its size and quality are determined by costs in the broadest sense - the direct costs as well as overhead and sunk costs. The business process is determined by the company's activities, their structure, size and quality that affect the formation and the amount of waste material, non-product output and wasted sources. Outputs of the company reflect their level of quality, which should be achieved in relation to sales.

The second element - "How to measure?" of the above model is presented by the selection of the criteria and evaluation methods for individual pillars of sustainable development. For the process of the transformation of inputs – the business process - it is necessary to set the associated economic, environmental and social aspects that are reflected in the amount and structure of capital, natural and human resources.

The third element - "Who to measure for?" is distinguished according to the possibilities of the stakeholders to influence the product. From this perspective it is possible to include the business partners as the direct stakeholders on the inputs, employees and customers on the outputs as well as the owners of the company and investors.

5. Conclusion and discussion

The concept of sustainable development is currently a concept that cannot be ignored by businesses, as it reflects both the current threats affecting them and the potential opportunities that can be made use of. Nevertheless, it is necessary to respect the main objective of the business, which means bringing benefits for its owners. Regardless of whether the company wants (and is economically able to) pay to charity, philanthropy, or other voluntary activities, which may result in a positive impression in the eyes of the general public, it is essential that the business is able to satisfy the interests of their owners. The positive economic result is simply needed - at least in the long term.

One of the trends that significantly affect businesses in the 21st century is the growing importance of non-financial and in many cases intangible, i.e. qualitative elements. Currently, in the 21st century, businesses face
new threats and opportunities that may be critical for their survival, the existence and development, but their projection is often impossible when using traditional financial indicators. The growth of the competition, globalization and deregulation of the economy lead the companies to the search of the new competitive advantages.

- Technical research and development - improving usability of the product or reducing costs.
- Design of the product - original design of the products.
- Production trademark – creation of the symbol for products and services often related to their environmental or social aspects.
- Relationships with customers - more stable income
- Franchise type of business model associated with lower risk and faster market access and stable income (Svačina, 2010).

Currently, there is a sufficient number of methods, tools and indicators for the assessment of individual business areas in accordance with the principles of sustainable development. The objective of the accounting for sustainable development is mainly to provide relevant information from all areas of its pillars. It is important that this information is presented in respect to the financial performance of the company provided that the comparability and consistency is kept. From this perspective an American model seems interesting. SASB - Sustainability Accounting Standard Board was founded there, which deals with issuing accounting standards for sustainable development, focusing on individual industrial sectors. The presentation and reporting of the required information is planned as mandatory for all openly traded companies. It is necessary that the broader, not only financial, information are defined and required. The mandatorily published information should be determined in cooperation with professional organizations and businesses representatives, their presentation and reporting must be specified at the legislative level to ensure comparability and consistency of information.

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PhD Research Papers
Environmental Stimulants of Creativity for Operatives and Non-Creative Workers

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Abstract: Competing with low cost production from developing countries is difficult for European companies as well for companies from other developed countries. Innovations can be one of their best competitive advantages in this fight. This may be the reason why innovation and creativity management is such a popular topic today. Many papers and research examining innovation management can be found describing conditions to support creativity of employees and ways to enhance their innovation potential. Despite the fact that well-known works of Amabile or Ekvall were discussed and developed in many other works, there is a lack of information whether these conditions have the same effect also on operatives and non-creative workers. In big industrial companies, operatives represent large part of company’s employees and they are close to the manufacturing process. For these reasons, they are able to come with innovative ideas (especially with regards to process innovation) that could not be seen by knowledge workers, officers and executives. Although companies mostly recognize this potential, there is nearly no academic evidence of potential specifics of factors enhancing creativity and innovative work behaviour of operatives. The main objective of this paper is to refer about quantitative questionnaire research among operatives and non-creative workers in big Czech business companies during autumn 2013. This research focused on the importance of work environmental stimulants and obstacles described by Amabile. It is to find out whether these work environmental stimulants lead to process innovation among operatives or not and which of these stimulants are the most successful in achieving this goal. It is also to find out if the work environmental obstacles hinder process innovation among these employees. The collected data were analyzed by means of regression analysis and only small evidence was found for environmental stimulants and obstacles. The Poisson model was then used to verify the final model with only one Amabile’s environmental stimulant accepted and statistically verified.

Keywords: stimulants of creativity, obstacles of creativity, process innovation, non-creative workers

1. Importance of creativity and innovation

Drucker says that although companies work in two time periods – today and in the future - they have to remember that the future is being formed today. (Drucker 1992; Barták 2008: 144) Innovate products used to be a real competitive advantage in the past. But nowadays it is a necessity. Company has to be creative, innovative, flexible, cheap, fast and offer high quality just to get on the market. (Kiernan 1998: 43)

Because of informational boom and technical advance as well as cultural evolution, the world is becoming more and more complex. (Runco 2004: 658) There are many changes throughout markets (copying is very quick and nearly perfect, (Tid, Bessant and Pavitt, 2007: 7) fragmentation of markets, innovation cycles fastens, (Kotler and Trias de Bes, 2005: 22-31; Košturiak and Cháľ, 2008: 5-13) saturation of advertising, digital technology, increasing number of patents and trademarks (Kotler and Trias de Bes, 2005: 22-31), changes of life-style, hunger for emotions and adventure, disloyal customers (Košturiak and Cháľ, 2008: 5-13)) and we can conclude that competition is harder than ever before. (Kotler and Trias de Bes, 2005: 31)

In this situation, creativity is very important because it is a useful response to these changes. (Runco, 2004: 658) Although it is very difficult to innovate in this environment (companies have to innovate their products only for a small amount of disloyal customers and their products will be copied very soon), without creativity in every part of their activities a company would become obsolete. It is true for products and services as well as for production, delivering of goods, technologies, marketing and so on. (Robins and Coulter, 2004: 59) For these reasons, continuous innovation is crucial for organizations. (De Jong and Den Hartog, 2009: 23)

Amabile (1996a) understands creativity as production of novel and useful ideas in any domain. She highlights that the idea has also to be appropriate to the goal, correct and valuable. Creativity by individual or teams is the starting point of innovation. Innovation is the successful implementation of these creative ideas within an organization. (Amabile, 1996a)

The term of innovative work behaviour can also be found in literature. It is defined as an individual behaviour that aims to achieve the initiation and intentional introduction of new and useful ideas, products or process within a work role, group or organization. (Farr and Ford, 1990 in De Jong and Den Hartog, 2009: 24) It differs
from creativity itself because it also includes the implementation of these ideas and creativity can be understood as a crucial component of innovative work behaviour. (De Jong and Den Hartog, 2009: 24)

Amabile also defines entrepreneurial creativity as implementation of novel, useful ideas to establish a new business or new program to deliver products or services. (Amabile, 1996a) She also specifies that the idea may relate to:

- The products or services themselves
- Identifying a market for product or services
- Ways of producing or delivering the products or services
- Ways of obtaining resources to produce or deliver the products or services

This is very similar to Schumpeter’s distribution:

- Production of a new product (or an existing one in higher quality)
- Introduction of a new manufacturing process
- Use of a new material or a semi‐finished product or a source of it
- Obtaining a new market
- Changes in management and organization of production. (Jáč, Ryvaldová and Žižka, 2005: 55)

Adair points out, that although many companies understand how important innovation is, they are not able to use innovations in practice despite their strategies, visions and many other documents aimed at permanent innovation. (Adair, 2004: 167) This may be due to many reasons ranging from motivation and rewarding to the role of management and organizational environment, on which this paper is focused.

2. Organizational creativity environment

According to Amabile’s research, there are nine environmental stimulants to creativity and nine environmental obstacles. (Amabile, 1996b: 231‐232; Amabile and Gryskiewicz, 1989 in Runco, 2004: 662). Environmental stimulants consist of:

- Freedom: Freedom in deciding what to do and how to accomplish tasks.
- Good project management: Manager as a good role model, with good communication skills and protecting the project team from outside distractions.
- Sufficient resources: Access to all resources needed, includes facility, people, equipment, information, and funds.
- Encouragement: Enthusiasm of management for new ideas, atmosphere free of threatening evaluation.
- Various Organizational Characteristics: Mechanism for considering new ideas, cooperative corporate climate, atmosphere where innovation is prized and failure is not fatal.
- Recognition: Knowing that creative work leads to appropriate feedback and reward.
- Sufficient time: Time to think creatively and to explore different perspectives.
- Challenge: Sense of challenge arising from the task’s importance for the organization and from the intriguing nature of the problem.
- Pressure: Sense of urgency generated from the competition with outside organizations or from the desire to accomplish something important. (Amabile, 1996b: 231‐232)

Environmental obstacles to creativity then consist of:

- Various organizational characteristics: Inappropriate reward system, lack of cooperation in the organization, little regard for innovation in general.
- Constraint: Lack of freedom in deciding what to do and how to accomplish tasks.
- Organizational disinterest: Lack of organizational interest and support.
- Poor project management: Manager unable to set clear direction, with poor technical and communication skills, who controls too tightly.
- Evaluation: Inappropriate evaluation and feedback systems, focused on external evaluation, or criticism.
- Insufficient resources: A lack of appropriate facilities, funds, people, equipment or material.
- Time pressure: Insufficient time to think creatively, too much workload.
- Overemphasis on the status quo: Reluctance of managers and co-workers to change their way of doing things, an unwillingness to risk.
- Competition: Interpersonal or intergroup competition within the organization. (Amabile, 1996b: 232)

These findings agree with Witt and Beorkrem findings (Witt and Beorkrem, 1989, in Runco, 2004: 662). A questionnaire instrument called "KEYS: Assessing the Climate for Creativity" was developed based on these findings and was aimed to allow more standardized, quantitative measures of work environment factors. (Amabile, 1996b: 232-233)

A question arises whether most influencing environment factors differ in different fields of industry or services or in organizations of different size. Amabile’s research was made with research and development scientists but the same factors were found also in samples of bank and railroad employees later. (Amabile, 1996b: 231) That would suggest that the field of operation is not very important.

Another question is whether an environment with high stimulation of creativity leads to innovation. Research of Cokpekin and Knudsen (2012) among small companies shows only limited support to it. In this research Cokpekin and Knudsen were looking for a correlation between the creative characteristics of an organization and the likelihood of a product or process innovation. Significant positive correlation for product innovation was found in three characteristics only. One of them, autonomy and freedom (the most important stimulant in Amabile’s research), was even in significant negative correlation with product innovation and without any significant support for correlation with process innovation. Process innovation was positively correlated only with organizational motivation. (Cokpekin and Knudsen, 2012: 311)

Conversely Foss, Woll and Moilanen (2013) research shows that idea generation and their implementation depend on similar intrinsic motivational factors, however, implementing ideas also depends on decision-making authority. They also state that the relationship between creativity and implementation is moderated by gender: women’s ideas are not implemented to the same degree as men’s.

Research of Wang and Tsai (2014) in the context of service companies found that positive effects on creativity have expertise, creativity skills, and intrinsic motivation while resources, support of management, and organizational motivation have positive effects on innovation.

Research of Gong et al. (2012) also finds out the importance of employees proactivity and their building of strong trust relationships with supervisors and colleagues. The relationship between information exchange and employee creativity was fully mediated by trust.

Alongside the KEYS, other tools were developed to define the components of creativity stimulating work environment. The CCQ of Ekvall (1996) measures freedom, challenging tasks, idea support and idea stimulating debates, risk taking, idea time provided, perceived trust, openness, dynamism, playfulness and humour in the work climate and tension resulting from conflict. (Ekvall 1996; Ekvall 1997 in Cokpekin and Knudsen, 2012: 305) Both tools were compared by Moultrie and Young (2009) and it was found, that CCQ of Ekvall is too broad and therefore not producing detailed insight or valid representation of organization creativity in comparison to Amabile’s KEYS. However, it is more robust in it. It was concluded that these models complemented each other well. (Moultrie and Young, 2009: 136)

3. Creativity and innovation potential of operatives

Many companies put emphasis on the importance of innovation ideas from all of their employees – operatives as well as officers or executives. In big industrial companies, operatives represent a large part of the
company’s employees. Moreover, they are close to the manufacturing process and experience all its failures and shortcomings. For these reasons, they are able to come with innovative ideas that could not be seen by knowledge workers, officers and executives.

Although many companies work with this potential, there is nearly no academic evidence of incidental specifics of the factors enhancing creative environment and innovative work behaviour of operatives. It could be only estimated, that there would be some specifics based on different work activities, different main tasks and problems to solve during working time.

4. Research methodology

The main aim of this research is to find out if work environment characteristics by Amabile influence the amount of process innovation from among operatives. Environment factors from Amabile’s research and her tool KEYS was used (Amabile, 1996b). These factors are organizational encouragement, managerial encouragement, team support, sufficient resources, supporting work, freedom and autonomy, working overload and stress, organizational obstacles.

All of these factors were used as independent variables. The amount of accepted process innovation suggestions was used as a dependent variable.

Data on environment factors (independent variable) was collected by a quantitative questionnaire research carried out in autumn 2013 among operatives in big tyres companies in the Czech Republic. These operatives are workers operating tyre making machines. Each factor was assessed by means of three to seven questions. Answers for each question were designed as a four point Likert-type scale. The number of respondents was 147.

There are sophisticated systems how operatives may submit suggestions for improvement of manufacturing process in the involved companies. For this reason, these suggestions are well recorded. Data on the amount of accepted process improvement suggestions (dependent variable) in last twelve months was collected from this system.

5. Hypotheses

The first six factors are expected to positively influence process innovation. Negative influence is expected with working overload and stress and with organizational obstacles. These expectations come from the assumption that enhancing creativity results in growing innovations and lowering of creativity results in lowering of innovations. (Amabile et al., 1996b; Ford, 1996; Georgsdottir & Getz, 2004; Shalley, Zhou & Oldham, 2004; Puccio & Cabra, 2010)

Hypothesis 1: Organizational encouragement is positively related to producing accepted process innovation suggestions among operatives at p<0,05 level.

Hypothesis 2: Managerial encouragement is positively related to producing accepted process innovation suggestions among operatives at p<0,05 level.

Hypothesis 3: Team support is positively related to producing accepted process innovation suggestions among operatives at p<0,05 level.

Hypothesis 4: Sufficient resources are positively related to producing accepted process innovation suggestions among operatives at p<0,05 level.

Hypothesis 5: Supporting work is positively related to producing accepted process innovation suggestions among operatives at p<0,05 level.

Hypothesis 6: Freedom and autonomy is positively related to producing accepted process innovation suggestions among operatives at p<0,05 level.

Hypothesis 7: Working overload and stress are negatively related to producing accepted process innovation suggestions among operatives at p<0,05 level.

Hypothesis 8: Organizational obstacles are negatively related to producing accepted process innovation suggestions among operatives at p<0,05 level.
6. Results

Collected data was analysed by analysis of regression.

For analysis of causes the Poisson model for count data was used, because the dependent variable is low integer variable.

\[ \log(\mu_i) = \alpha_0 + \alpha_j x_j \]

Distribution of errors is determined by Poisson distribution:

\[ \gamma \sim \text{Poi} (\mu_i) \]

Results of the analysis of regression are provided in Table 1.

**Table 1: Analysis of regression model**

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard error</th>
<th>z value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
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<td>Intercept</td>
<td>-3.3021</td>
<td>1.7967</td>
<td>-1.84</td>
<td>0.073</td>
</tr>
<tr>
<td>( x_1 )</td>
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<td>1.0007</td>
<td>1.84</td>
<td>0.072</td>
</tr>
<tr>
<td>( x_2 )</td>
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<td>0.9958</td>
<td>-1.35</td>
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<tr>
<td>( x_3 )</td>
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<td>0.4881</td>
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<tr>
<td>( x_4 )</td>
<td>0.2261</td>
<td>0.3885</td>
<td>0.58</td>
<td>0.564</td>
</tr>
<tr>
<td>( x_5 )</td>
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</tr>
<tr>
<td>( x_6 )</td>
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<td>0.4126</td>
<td>-0.48</td>
<td>0.631</td>
</tr>
<tr>
<td>( x_7 )</td>
<td>0.2945</td>
<td>0.5034</td>
<td>-0.59</td>
<td>0.562</td>
</tr>
<tr>
<td>( x_8 )</td>
<td>0.0424</td>
<td>0.3441</td>
<td>0.12</td>
<td>0.903</td>
</tr>
</tbody>
</table>

As can be seen in Table 1, the model is not significant at \( p<0.05 \) level nor any of independent variables is. Because of that, the model selection technique stepwise vs backwise was used to make the model more significant by removing the most insignificant variables till the model is significant at the level.

**Table 2: Regression results on process innovation**

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>Standard error</th>
<th>z value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-2.558</td>
<td>0.777</td>
<td>-3.29</td>
<td>0.0010</td>
</tr>
<tr>
<td>( x_1 )</td>
<td>0.829</td>
<td>0.245</td>
<td>3.38</td>
<td>0.00073</td>
</tr>
</tbody>
</table>

Using the model selection technique, \( x_2 \)-\( x_9 \) variables were gradually excluded. As can be seen in Table 2, the final model of only one variable \( x_1 \) is highly significant (\( p=0.001 \)). The organizational encouragement variable is positive and highly significant (\( p<0.001 \)). It can be said that we can support its positive effect in 5 \% of significance level in line with Hypothesis 1. Due to this, Hypothesis 1 is supported. Hypotheses 2 - 8 are not supported at 5 \% of significance level.

The overall results are shown in Table 3. Only Hypothesis 1 was supported with significant positive effect on the amount of process innovation suggestions. None of other hypotheses could be supported.

**Table 3: Hypotheses and overall results**

<table>
<thead>
<tr>
<th>Hypothesis number</th>
<th>Hypothesis</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x_1 )</td>
<td>Organizational encouragement is positively related to producing accepted process innovation suggestions among operatives.</td>
<td>Positive significant effect</td>
</tr>
<tr>
<td>( x_2 )</td>
<td>Managerial encouragement is positively related to producing accepted process innovation suggestions among operatives.</td>
<td>No support</td>
</tr>
<tr>
<td>Hypothesis number</td>
<td>Hypothesis</td>
<td>Results</td>
</tr>
<tr>
<td>-------------------</td>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>$x_3$</td>
<td>Team support is positively related to producing accepted process innovation suggestions among operatives.</td>
<td>No support</td>
</tr>
<tr>
<td>$x_4$</td>
<td>Sufficient resources are positively related to producing accepted process innovation suggestions among operatives.</td>
<td>No support</td>
</tr>
<tr>
<td>$x_5$</td>
<td>Supporting work is positively related to producing accepted process innovation suggestions among operatives.</td>
<td>No support</td>
</tr>
<tr>
<td>$x_6$</td>
<td>Freedom and autonomy is positively related to producing accepted process innovation suggestions among operatives.</td>
<td>No support</td>
</tr>
<tr>
<td>$x_7$</td>
<td>Working overload and stress are negatively related to producing accepted process innovation suggestions among operatives.</td>
<td>No support</td>
</tr>
<tr>
<td>$x_8$</td>
<td>Organizational obstacles are negatively related to producing accepted process innovation suggestions among operatives.</td>
<td>No support</td>
</tr>
</tbody>
</table>

7. Conclusion

Only one factor from Amabile’s research – organizational encouragement – was found positively related to the production of accepted process innovation suggestions among operatives.

The findings of this paper are in line with the findings of Cokpekin and Knudsen (2012). In their research, only “organizational motivation” (which also contains managerial encouragement) was supported as positively related to producing process innovation.

The findings of this paper support their results, that stimulating creativity is not associated with real process innovation, and they question the common assumption that creativity stimulating environment results in innovation.

Cokpekin and Knudsen (2012) made their results on a sample of small companies from different fields. They conclude that one type of enhancing creativity could not fit all types of innovations and all types of work environments. But the findings of this paper come just from operatives from large companies and from one working field. It can be also concluded that the association of creativity stimulating environment with the amount of innovations in this work environment can’t be supported.

Different characteristics of process innovation in comparison to product innovation, as well as some specifics of work environment of operatives, could be interpreted as a cause of this finding.

Acknowledgements

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References


Public Value as Indicator for Public Administration to Make Sustainable Decisions

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mircea_sandru@yahoo.com

Abstract: This paper highlights the results of a research carried out to offer a new indicator for public administration performance, in order to increase the efficiency and effectiveness in achieving the mandatory and voluntary tasks. The current situation of the public sector forces immediate measures to close the gap between revenues and expenses, to prevent further debts and regain freedom to act. Increasing complexity of mandatory tasks combined with maintenance of existent infrastructure are the current challenges of public administration. But exclusive focus to monetary values ignores the peculiar purpose of public administration and the challenges of the combination of economics and politics. Simple adoption of existent risk evaluation models leads to a limited view. To present an improved basis for appropriate decisions on parliamentary and administrative level, public value offers a second dimension beneath monetary judgment. First objective is to prove the current status of ‘science’ considering the term public value. Although the term was introduced 20 years ago and by application of the New Public Management (NPM) principles the public sector is in a transition, performance measurement remains vague. A theoretical approach is used to show the spectrum of public value used for economic purposes in order to evaluate the consequences and magnitude of current status and potential decisions. Different appraisals are compared to show limits, and to further focus on public value maximization. Second is to enlighten the consequences of decisions in the meaning of deviation from public value. The transformation of given public administration targets by execution of political programs creates changes. These processes cope with desired and non-desired directions, concerning utility to the population. Individual and collective articulated public interests are first indicators, while public value - as term - is created by private and public organizations, by the society or by individuals. Third objective is to convert the evaluation of public value deviation by decisions in numeric indicators for further application in public administration risk management systems, and for better in-sight of possible consequences to politicians and public managers. Further to the evaluation of the decisions ramification in order to enhance the basement of decisions by similar expected courses of actions. The use of public value as indicator will contribute to a comprehensive analysis of economic status and to citizen-valued distribution of the scarce resources by public administration. The result will contribute to enhancing the grade of efficiency in distribution of resources, in the sense of increasing of individual and collective public value.

Keywords: public value, public administration, risk management, efficiency

1. Introduction

Performance measurement in non-profit organizations is a steady challenge for organizational researches and new paradigms to reform. Efficiency and effectiveness is doubted; but the Weber’s bureaucratic model, extended by the separation paradigm of Wilson and the Scientific Management of Taylor are globally accepted and applied in larger organizations (Ostrom and Ostrom, 1971). The dilemma occurs where performance measurement is on one hand legally and politically not opportune or the results are illusive, or on the other hand services and products and their desired outcome are only vaguely described. How to measure a performance without concrete and relevant references to compare with the expected and desired results? This situation is amplified for instance in deviations from a decisional situation: If politicians or public managers are forced to decide under risk or under uncertainty, what kind and what grades of chances or threats are to be expected and who will share the desired or undesired results? There is a prevailing perception that non-profit organizations, especially governmental institutions and their output, have to be measured by peculiar indicators. The absence of competition, virtual unlimited resources, and the guarantee of existence, make public administration an untouchable and politically trusted and secured organization. Current public projects, i.e. in Germany the exploding costs at the Berlin municipal airport, or absent marketing strategy for the Elb-Philharmony, a concert hall in Hamburg, show the magnitude of decisions and doubtful management. The expected and desired outcomes of such projects could have a very wide spectrum: Reputation, increase in the range of infrastructural or cultural services, attraction for jobseekers or companies and other collateral outcomes. The issue of wrong estimation of the volume and timetable could cause waste of additional resources and major distrust in public organizations and qualified personnel.
Considerations about outcomes to interests and values will support the path for regaining responsiveness; this will further contribute to faster orientation and better guidance, with focus on society, on fulfilling fundamental objectives and increasing the welfare of the citizen.

1.1 Current approaches to public value

The Weberian Model and the interpretation of the system both invite to a discussion about performance in public administration and about increase of effectiveness and efficiency by the use of public funded resources. Ostrom and Ostrom (1971, p. 204) show that - according to Wilson - , good administration “will be hierarchically ordered in a system of grades ranks subject to political direction by heads of departments at the center of government.” That kind of devotional execution of political programs could be a ‘broken shoe’ in modernizing public administration and cleaning / highlighting the prevailing notions of this sector.

For a better understanding, the term ‘value’ and the combination with ‘public’ is the pivot for application of potential changes in public value through decision-making. Referring to economic indicators for success, the performance of an organization or enterprise is evaluated by the value-added statement (Law, 2009, p. 577). This statement shows how much wealth - in the meaning of value added - has been created by the organization or enterprise. The value added is thereby a product of the collective use of capital, employees, know-how and others. This declaration of success is typically made for a specific period of time.

For the concrete application, Oakley, Negler and Lee (2006) suggest that public value can be used as an indicator of how government should best react and respond to the changing tendencies of public opinion - as identified by polling and other measurements and types of consumer market researches. They consider public value as a possibility to evaluate the output, expressed as a signal and direction of satisfying public demand. The Organization for Economic Cooperation and Development (OECD) states that ‘public management arrangements deliver not only public services’; they also ensure deeper governance values (O’Flynn, 2007, p. 358). Society, politics and economy are common tasks for politicians, entrepreneurs, electorate and public administration as executive for political programs.

According to the Oxford Dictionary value added means “The total sales of a firm less purchases of inputs from other firms. What is left is available for wages of its employees and the profits of its owners.” (Black, Hashimzade and Myles, 2009, p. 474). In addition the Oxford Dictionary offers another definition of value: “To acknowledge some feature of things as a value is to take it into account in decision making.” (Blackburn, 2008, p. 377). Value as a term is split by the Cambridge Dictionary of Philosophy. This dictionary highlights the two attempts of value: First, the thing has an intrinsic value; it is worth of something. Second attempt is to employ the concept of “fittingness” or “appropriateness” to it, certain kinds of emotions and desires (Audi, 2009, p. 948). For applicability in decision-making, or as at least guidance for decisions to make in public sector, a combination of all definitions with their concepts behind them represents an objective one. For Kelly, Mulgan and Muers (2002) services, outcomes, and trust are the main blocks public value is consistent of. They state that application of New Public Management (NPM) is an interstation on the way from traditional public administrative work to the public value paradigm. NPM is forced by the premise that management techniques from private sector are in general applicable for public sector, too. O’Flynn (2007, p. 360) comes to similar results. Public administration is on paradigm change from the classical administration in the sense of implementation of political master plan; next step was the NPM paradigm as pursuit of results and efficiency gains; currently the process in the decision of the public value paradigm is advocate of politics rather than input. Pečarić (2013, p. 1948) confirms that the public administration has to make value judgments, but must be also responsive to community values / needs.

According to O’Flynn (2007) both private and public sector follow different objectives and purposes: While the private sector focuses on efficiency, quality, security and reliability, the public sector combines those above with accountability and collective public preferences. Similar values are highlighted by Moore: He mentioned that the role of the government, represented through all public sector organizations, is not limited to the role of rule-setter and service provider, but to also contribute to public value in all public spheres: political, economical, social and cultural (Benington and Moore, 2011).

Moore developed in the nineties the strategic triangle of public value: First, he considered the legalization of activities to provide some form of output second, the operational capacity to create and provide those services
and products, and third, the outcomes resulting from the provision. All of the three are dependent among each other as shown in Figure 1.

**Figure 1:** The strategic triangle of public value

Kahnemann and Knetsch (1992) use a different approach: They compare the evaluation to provided public services and goods with the estimation of private goods. But they also criticize that the willingness to pay (WTP) for public goods is not comparable to the economic value of the goods. All of the thoughts of public value are directed to the common sense that public value is defined and therefore created by government and by the executive departments and organizations for the realization of political programs. Main focus for influence to the term of public value is the notion of public goods and services as non-rivalrous and non-excludable. Public value refers thereby to public goods, the public interest and choice or the public domain.

<table>
<thead>
<tr>
<th>Current value benchmark for private corporations</th>
<th>Shareholder value</th>
<th>Stakeholder value</th>
<th>Corporate social responsibility</th>
<th>Customer value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus</td>
<td>Increase of welfare for shareholders</td>
<td>Focus to interest groups</td>
<td>Recognizing of other, minor interest groups</td>
<td>Focus to customer/consumer satisfaction</td>
</tr>
<tr>
<td>Danger</td>
<td>Financial value domination</td>
<td>Too strong heterogeneous expectations</td>
<td>No relevance for core business</td>
<td>Superelevation of customer satisfaction</td>
</tr>
<tr>
<td>Result</td>
<td>One-dimensional views, qualitative evaluation</td>
<td>Unsatisfiability of expectations</td>
<td>Loss of credibility</td>
<td>Neglecting social effects</td>
</tr>
<tr>
<td>Valuation standard</td>
<td>Instrumentally, material</td>
<td>Political-social</td>
<td>Ethical, moral</td>
<td>Hedonistic, aesthetic</td>
</tr>
</tbody>
</table>


**Figure 2:** Value benchmark for private corporations

Gomez and Meynhardt (2009, p.131) call public value the social net product. They summarize beneath others, the future challenges for private and public actors in contributing to welfare in general:

- thoughts recognizing global business and network, capital markets, transparency for medias, internet communication changing societal expectations, real social imbalances and following the increased sensibility - considering climate, natural environment, protection of species.

All of them mean an obvious value for the society, articulated in the political environment.

Combining the different approaches to public value, the following definition builds up a bracket for further considerations: Value as a term, what is being evaluated by the citizenry, can be influenced in both increase and decrease by the government through services, products, laws regulations and other actions. Public value is
individually or collectively articulated through politics or through referendums concerning certain decisions to make.

1.2 Research methodology applied for defining public value and the appropriate application considering decisions under no certainty

Analyzing the different approaches, brought up a more or less common sense about public value as term used to describe the peculiar favors of the public. Public value can be used as a fixed indicator at a current status. At a certain time the basic line has to be fixed, deviations for increase or decrease will be indicator for measurement of success of political programs and their execution by public administration.

The doctoral study will further enlighten the current status of selected public administration. Over 100 public administrations are addressed. The returns from Austria (5), Germany (23), and Switzerland (2), form the empirical basement for status and further conclusions considering risk management. Peculiarities, like legal and organizational frameworks, have to be analyzed. Financial indicators will describe their initial situation. By using a questionnaire completed by interviews with mayors and Chief Financial Officers (CFOs) or former chamberlains, the status of investments given guarantees or estimated influence spheres will contribute to draw a fundamental need for risk management. Private sector instruments using concepts like Value-at-Risk (VaR) are adapted, recognizing the objectives and purposes of public administration, embedded in political strains and financial limits. Public value is introduced not as a new concept but as indicator of what values are at risk for the society, because the organization of public administration is seldom in doubt.

2. Application of public value

Public value can be interpreted to depend and rely upon the politically-mediated expression of collectively determined and articulated preferences. That means what the citizenry determines and articulates as valuable (O’Flynn, p. 360). The bandwidth of personal estimation of a current situation spread from an egoistic point of view to a collective view with a pronounced public spirit. Figure 3 shows one possible spectrum of interests and evaluation.

<table>
<thead>
<tr>
<th>Spectrum of outcome-estimation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus:</td>
</tr>
<tr>
<td>Individual interests</td>
</tr>
<tr>
<td>Objective evaluation</td>
</tr>
<tr>
<td>Collective interests</td>
</tr>
<tr>
<td>Collective interests</td>
</tr>
<tr>
<td>Category:</td>
</tr>
<tr>
<td>Individualism/ egoism</td>
</tr>
<tr>
<td>Limited individualism</td>
</tr>
<tr>
<td>Limited sense of community</td>
</tr>
<tr>
<td>Sense of Community</td>
</tr>
</tbody>
</table>

Source: Developed by authors by analyzing the different models of estimation of public activities

Figure 3: Categories of outcome-estimation

Each individual has an own notion of best performance and undergoes the use and utility of provided goods in an individual way. Individuals will judge and use of taxes and fees as money spent by government on collective goods at the expense of private consumption.

Each utility of public or private provided products and services creates or destroys also social utility. A balance of utility and disutility is based on collective or individual evaluations. Those judgments are most rational and subjective, but will also lead to an articulated will of a bigger or less big part of the society.

One fundamental question remains within all of the considerations of public value: Is public value only a product of governmental action, executed by public administration and other public sector organizations? Providing a legal framework is the legitimate domain of government within the society. This means boundaries and freedom to act both as business and as private. The membership and the different views have effects to the estimation of the current situation. It remains whether the distinction between public and private value is fixed; or are these value concepts semipermeable in the meaning that private activities will influence the public value and vice versa. To evaluate public value as an abstract, numeric value, private contributions could not be excluded, i.e. a private park, open to the public, can increase the public value for the persons who are interested to use the park. Combining the possibilities by legal framework through mandatory tasks, to improve or at least to maintain public value, is an issue of government, but we prefer the notion that others contribute to public value also. For example voluntary associations, private persons and organization bring in
their part of public value and will be estimated as elementary factors for public value, in the meaning of contribution to the quality of life for the citizens. They create concrete utility within the given framework.

3. Measurement of public value

As Moore (2013, p. 8) points out, government, from federal to local level, face a diverse and volatile political and social environment. A changing environment has already direct influence to demand and supply of service and goods. It challenges in specific the public manager in a decision taking situation. The expected or processes deviation of public value could be used as guidance to better estimation of ramification of decision, collectively and individually, under condition of changing environment and demand.

For application as indicator and guidance for decision making, public value has to be measured in numeric values, to be comparable. In case of risk management, the main focus for this consideration is the deviation of public value by decisions. In the case of decisions for not-mandatory tasks under uncertainty, potential deviations in a desired and not desired way are indicators for the decision maker. Desired results will increase public value; undesired results will reduce public value. For a concrete application a model and a formula for calculating the outcomes is necessary.

The following variables have to be part of the formula to describe the effects of a decision on public value:

<table>
<thead>
<tr>
<th>Positive effects</th>
<th>Negative effects</th>
<th>Period:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affected persons in numbers</td>
<td>Affected/ not affected persons in numbers</td>
<td></td>
</tr>
<tr>
<td>Steady utility and grade of utility</td>
<td>Steady disutility and grade of disutility</td>
<td></td>
</tr>
<tr>
<td>Temporarily utility and grade of utility</td>
<td>Temporarily disutility and grade of disutility</td>
<td></td>
</tr>
<tr>
<td>Side effects for steady utility</td>
<td>Side effects for steady disutility</td>
<td>Measurement of changes over a certain period of time</td>
</tr>
<tr>
<td>Side effects for temporarily utility</td>
<td>Side effects for temporarily disutility</td>
<td></td>
</tr>
<tr>
<td>Opportunities</td>
<td>Threats</td>
<td></td>
</tr>
<tr>
<td>As appropriate changing grades of affection</td>
<td>As appropriate changing grades of affection</td>
<td></td>
</tr>
<tr>
<td>Sum of positive effects</td>
<td>Sum of negative effects</td>
<td>Balance of effects</td>
</tr>
</tbody>
</table>

Source: Developed by authors

Figure 4: Deviation of current public value status by decisions to make

Figure 4 shows the different influences for the estimation of a decision results. It has to be analyzed in a given timeframe for comparison. The given examples of local society affected persons, and the intentional and occasional beneficiaries have to be examined; caused divergence from a current status in absolute or proportional numbers could be used as indicator. Under conditions of uncertainty Figure 4 has to be replenished by the expected probability to get a comparable value. For risk management the opposite calculation is necessary to get an integral estimation of opportunities or threats, and their effects to public value.

This evaluation of potential effects is to apply, in the case of decision under no certainty, to show the balance in the desired and undesired scenario. Both evaluations will lead to a concrete value taking in consideration the change of public value. As guidance for politics the spread between both, combined with the probability, offers a comprehensive notion of the estimated change in public value. It is comparable with the way of private sector risk management concepts, for example VaR. The difference lays in the conversion of value: For private sector economic indicators are used, for public sector or society outcomes, the personal estimations are used in order to show the potential ramifications in case of decision under certainty and uncertainty. According to Olaru and Sandru (2013, p. 2), using different methods it is possible to assess the impact of various risk categories, including the Value-at-Risk under the abovementioned investment projects and, starting from this, defining adequate programmes for risk mitigation, ensuring the prioritisation of measure to be taken. According to O’Flynn (2007, p. 358) public value is a reflection of collectively expressed and politically mediated preferences consumed by the citizenry. Further it is built through deliberation involving elected and appointed government officials and key stakeholders. For Alford and Hughes (2008, p. 132) value is not a net concept, rather a function of benefits created. On the other hand public funded resources are expended by public organization in generating those benefits. But this concept has its limits in measuring the impact of benefits to an individual or to a collective. As shown in Figure 3 there is wide-span bandwidth...
estimation of benefits created by the government. Each service and product can be evaluated in a personal
matter and refers to the individual grade of utility, generating a benefit. A playground in the neighborhood has
a big benefit for families with kinds, but could generate a bigger disutility for older persons, considering the
missing infrastructure and the noise generated.

Collective measurement has to consider different aspects to reflect the sum of all effects in case of a decision
making: The affected region has to be limited. This can be done by the political and administrative boundaries,
but public goods have often no geographical or personal limits. This lies in the character of public goods: A
highway could have a big utility for trucks coming from all over Europe, they cannot be excluded from using
this transport way. Persons in the vicinity of the highway are affected steadily. Evasive actions are almost
impossible. Maybe the truck can be involved by paying a fee for using the highway; the affected inhabitants
will not get a steady compensation by users for restraints created by noise, pollution, view and others. A
solution like a referendum enhances the ability to take part to the decision; but it bears just as described
above the necessity to submit personal interests to the collectively articulated interests and has to be
prepared with a formalized timetable. Public value can be produced only in an area of conflict. Gain in utility
for one person will almost ever lead to a loss or at least to not a gain for a different person with divergent
interests and preferences. Analogue to the absolute affection of a person, gradual differences exists. Persons
living in the near of the planned highway have a higher impact by noise and pollution that persons in the wider
area although both are part of the municipality. According to Hanson (2002, p.18) is the utility of a mixture of
potential outcomes equal to the utility outcome that actually materializes. By applying a moral discourse an
action-guidance could be expelled. It remains the identification of potential outcomes, their deviations and for
both indicators for change in public value. Public value is therefore to handle as current status represented by
a numeric indicator. Analogue to risk management systems forecasts will offer a range of public value in the
case of desired and undesired developments. By evaluation of the expected values a political or administrative
decision can be judged by outcomes to the society as a whole.

4. Conclusion and outlook

The results of the research undertaken showed that developing a quasi-mathematical formula, based on the
assumption made in Figure 4, converts different variables in net values which could be used as a decision
evaluation indicator. Economic evaluation could be supplemented and the view to social outcomes affecting
public value widen. Decisions based on referendums are time and money consuming; references by historical
data and involvement of politics have to consequently contribute. Also be noted that using public value as
indicator for public administration to make sustainable decisions, provides a view to projects from an
economic point of view. By defining risk, ramification and results in the case of decisions under uncertainty
and under risk, a model for application of risk management was developed. This model recognizes the peculiar
structure and influence spheres, but also purposes of public administration. The use of the model should
prevent surprising or unprepared situations and provide a set of indicators for initial decisions and the need of
adjustments in the case of decisions already made.

If public value is an expression of politically mediated and collectively determined preferences it reflects a
collectively and common developed model of values. For a better understanding and better processing of
public value, the model and a numeric evaluation have to be tested and developed for practical use. Indicator
to be processed have a wide spectrum, for example number of complains, increase or decrease of settlements
of companies, public protests against projects and many more. So public value has to be transferred from a
subjective estimation to an objective and comparable standard. The processing of data has to combine hard
facts with subjective made quality appraisal of individuals. For better forecasts these recorded data can be
applied as reference numbers or classes. The more decisions and the later estimated change in public value
processed, the more precise the guidelines and forecasts. With a wide-spread data base for decisions under
not certainty will increase efficiency and effectiveness of local public administrations.

References


Steuerungsmodell”, Verwaltungsführung, Organisation, Personalführung, 1, p. 6 -11.

Investigating the Adoption of Sustainable Green Initiatives in Scottish Food and Drink SMEs

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Abstract: Increasing concerns towards environmental issues (transportation emissions, global warming, depletion of natural resources) in today’s global economy has resulted in the need for businesses to be more environmentally friendly and act in an environmentally responsible manner. Like most developed nations, the UK has placed significant importance on the need for more sustainable business operations. However the smooth adoption and implementation of these green practices by businesses is slow due to challenges such as lack of awareness, cost, resourcing, legislation, and incorporation into existing business processes. Green practices are often assumed by SMEs to involve significant expense, and in some cases even unaffordable. Particularly during the recent time of recession, focus has been on keeping SMEs afloat rather than making substantial investment in what are perceived to be “nice to have” green initiatives. SMEs sometimes also cite lack of knowledge of how to implement green initiatives and lack of support for such activity. The focus of this research is Scottish food and drink sector, which plays a vital role contributing nearly £10bn yearly to the economy. However, this positive contribution of the sector to the economy sits in tension with the fact it also generates a substantial amount of waste (estimated to generate 2 million tonnes of waste annually), and thus has costly negative impacts on the environment. This paper forms part of a larger doctoral study on green supply chain initiatives in Scottish SMEs. Specifically, the research has been set up to explore the various factors motivating and inhibiting the adoption of green initiatives by food and drink businesses. In this paper, the focus is on a review of the literature that was undertaken to establish some initial motivators and inhibitors among SMEs across a range of sectors. These were then explored further in a pilot study among six small firms in the food and drink sector Scotland. This qualitative pilot study was undertaken using semi-structured interviews with the owner-managers. Arising from the findings of the pilot study, a scale of “green-ness” was devised to chart the extent to which the firms have innovated by incorporating green practices into their business processes. A more extensive study is now being designed to test and refine the scale with a view to creating a model to assist small businesses in their planning and strategizing in relation to introducing green practices. The paper reports on the early stages of this research, including the pilot study and the creation of the “green-ness” scale.

Keywords: sustainability, green, environment, food and drink, green supply chain management, SMEs

1. Introduction

Sustainability is defined by (Linton et al. 2007) as “using resources to meet the needs of the present without compromising the ability of future generations to meet their own needs”. The Global introduction to sustainability concerns started in the 1970’s, with the need to integrate environmental concerns with business strategy. The late 1980’s saw a shift to research in organizational green and the internalization of the concept of sustainability by businesses to their core values (Starik and Marcus 2000; Winn 1995), by the 1990’s, the sustainability focus became; Green marketing, with the introduction of preventative green management and production measures (Schmidheiny 1992; Porter and van der Linde 1995; Sharma et al. 2010; Teixeira et al. 2012), by the 21st century sustainability had evolved to be included into the activities of the supply chain, integrating issues that related to supplier selection, product life cycle, packaging and recycling, regulations and compliance, waste minimization etc (Starik and Marcus 2000). This integration of sustainability thinking in the supply chain is popularly referred to as “Green supply chain management”. Green sustainability is an important issue evidenced by the on-going number of prominent conferences and events for the last 50 years or so that relate to world business sustainability for example in 1968 the UN Economic and Social council held a summit on “Environmental issues in global consciousness” and in 2013 the UN conference was on “the reduction of greenhouse gas emissions.

The focus of this study is SMEs in the Scottish food and drink sector; the study chose this sector because it holds a vital economic importance to the UK economy and international supply chain. Despite this positive attribute, total food waste in the UK is estimated at around 16million tonnes, however this research is narrowed to focus on Scottish food and drink SMEs, this sector is noted to produce over 2 million tonnes of food waste annually (Food and Drink Report 2013). Individually food and drink SMEs may not have a huge impact, but collectively they play a vital role within the industry and are highly critical to many large supply
chains as well as to achieving industry sustainability and meeting the green ambition target. Improving the business environmental sustainability enhances the business resilience in the long-term and also mitigates against shortage risks along the supply chain. This is of particular interest to the research as it seeks to investigate how the food and drink companies are implementing green initiatives within their business activities to reduce the environmental impact generated by the industry as a whole.

This paper presents the findings from a pilot undertaken as part of a pilot study of 6 small businesses in the Scottish food and drink sector. The overall aim of the pilot was to explore the case respondents knowledge on the adoption of green practices within their businesses. The paper begins by considering existing literature in the field, followed by a description of the context and approach of the study, the key findings are presented and discussed and ends with a conclusion on the future considerations for further work. Though the paper and main study is focused on Scottish food and drink, the need for greener and sustainable activities is faced by most industries; the findings should therefore be of interest to other fields working on SMEs.

2. Relevant literature

The increasing focus on supply management has resulted in an integration between green environmental issues and supply management, hence the use of terms like green supply chain management (GSCM), which focuses on ever increasing concerns on how to maximize value from existing business supply chains while yet minimizing its environmental impact in an efficient and sustainable way (Bowen et al. 2001). The green component to supply chain enhances the influence between the environment and supply chain management (Zhu et al 2008) Some examples of GSCM practices include; waste reduction and packaging, assessing suppliers on their environmental performance, eco-friendly products, and reducing Co2 emissions arising from goods transportation. Other initiatives that also seek to address environmental issues at the source include the use of an environmental management system by the company for example lean management practices, kaizen, ISO 14001 etc).

It has been noted that despite the popularity and interest generated within this field there still exists a lack of clarity and standards on issues of sustainability (Berns et al. 2009). Also, of particular interest to the context of this research is the acknowledgment of the gap between implementing green initiatives in practice by businesses, for example an emerging barrier to the implementation of green practices is “green washing”, this term is associated with companies who pretend to support and advocate for green sustainability without actually making any real commitments within their business (Sarkis et al. 2011; Gnoni et al. 2011; Bergenwall et al. 2012; Liu et al. 2012). This research attempts to contribute to this gap with the emphasis on identifying green initiative issues and subsequently investigating the relevant and appropriate strategies to overcome these inhibitors.

3. The research context and approach: Exploratory case studies

The overall aim of this PhD research is to conduct an empirical assessment of on-going green supply chain initiatives adopted by the Scottish food and drink SMEs, evaluating the extent to which these SME’s are involved in incorporating green environmental management practices into their business supply chains, as well as assessing the impact of the adoption. However, this paper is confined to the specific aim of assessing the awareness of adopting green practices by food and drink businesses. The objectives in line with this aim were to:

- Assess the awareness of green practices to the businesses in the sector
- Identify the forms of green initiatives adopted by the SMEs
- Identify the motivators and barriers to green efforts by SMEs in the Scottish food and drink sector

The objectives were met by conducting an exploratory pilot of 6 case studies within the sector. A qualitative method is adopted for the study to enable an in-depth approach to investigating the adoption of green initiatives by Scottish food and drink SMEs. Qualitative research studies have been noted to seek to illuminate, comprehend and explore situations, without manipulating the phenomenon of interest (Carter and Easton 2011). The methodology adopted by the study draws on the design of a multiple case study; this is representative of the research case (multiple food and drink SMEs) and the issue of focus (the adoption of green initiatives). This design will enable the research illustrate various perspective on the issue from looking at multiple case studies and doing cross case analysis (i.e. the difference between companies investigated), this is a form of qualitative research design that focuses on issues with individual cases, as it builds on a
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detailed understanding of the case through multiple sources of information such as interviews, documents and reports (Yin 2003).

Interviews served as the main source of data for the pilot, the respondent’s details were obtained from the UK food and drink directory called “Food and Drink Federation” which contains updated information of companies within the industry (www.fdf.org.uk). The interviews were semi-structured, this was found appropriate due to the individual nature of the respondent firms and the potential of this method to generate rich data for the research to explore. Interview topics and questions include details of the company, annual income and expenditure, knowledge and awareness of green initiatives, decisions to foster such initiatives, existing initiatives carried out by the company, drivers and barriers to such green initiatives. Interviews were digitally recorded and transcribed by the researcher. The data was further analysed by identifying key themes of interest, grouping the similarities and dissimilarities and carrying out a comparison between the findings and existing literature.

Six companies are investigated in this study, table 1, presents some of the information about these companies with particular reference to their size, activity, green awareness level and adopted green practices. At the moment, the research maintains a wide scale using the food and drink sector, though the pilot was mainly focused on businesses based in North- east Scotland, the research is still being shaped and yet to be narrowed down to specific sector (i.e. producers, manufacturers, wholesalers, retailers). The researcher has maintained this broad sector outlook at the moment to see where the study is likely to get the most responses.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Company A</th>
<th>Company B</th>
<th>Company C</th>
<th>Company D</th>
<th>Company E</th>
<th>Company F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market</td>
<td>Bar and Restaurant</td>
<td>Bar</td>
<td>Meat, Game and Poultry production</td>
<td>Bar and Restaurant</td>
<td>Alcoholic Beverages production</td>
<td>Organic Fruit and Vegetable Farm</td>
</tr>
<tr>
<td>Employees</td>
<td>40</td>
<td>5</td>
<td>2</td>
<td>13</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Annual turnover</td>
<td>450-500K</td>
<td>350-450K</td>
<td>100-200K</td>
<td>200-300K</td>
<td>250-350K</td>
<td>100-200K</td>
</tr>
<tr>
<td>Awareness of Green</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Green initiatives</td>
<td>Recycling</td>
<td>Recycling</td>
<td>Recycling</td>
<td>- Recycling - Low food miles</td>
<td>-Product redesign, Low energy equipment</td>
<td>-Recycling - Low logistics miles</td>
</tr>
</tbody>
</table>

Results obtained from the pilot are presented in the following sections.

4. Findings and discussion

The result obtained from the empirical analysis are presented and discussed in this section.

4.1 Green awareness

All case companies acknowledged to be aware of green initiatives, however the level of awareness differed. For instance; company A, B and C for noted the popularity of green initiatives and mostly associated it with eco-marketing and adverts but when asked to elaborate with details of practices they became highly unfamiliar.

4.2 Motivators and on-going practices

Since the case companies confirmed their awareness of green initiatives, the study went further to investigate the factors fostering the adoption of such green practices and the extent to which these practices are adopted and deemed important by the business owners. Zhu and Sarkis (2006) found that firms in different industries have different drivers and practices, this clearly suggests that drivers and barriers to green are likely to be industry specific and cannot be generalised, thus the need for the study to gather industry specific data from
food and drink businesses on the motivators to green initiatives. The study adopts a narrative style in presenting the findings from the respective SMEs.

Company A: is a bar and restaurant business with over 40 employees, the key driver for the firm towards green initiatives here is legislation. At the moment the initiatives adopted is recycling which is restricted to glass and cardboards, this is attributed to the challenge of costs, according to the respondent “the cost of having to allocate different recycling to different companies and different rates requires time, effort and money. I remember the days when you got money for recycling stuff, but it’s all changed so much now”. Despite this the owner notes a generous amount of waste is generated by their process, and is looking to adopt more particularly in the areas of food waste minimization and more energy efficient practices. The company currently has no green initiative strategy or programs in place for the business but acknowledges the importance of green initiatives and looks to do better in the future.

Company B is also driven by legislation to recycle. The particular green practice adopted here is recycling cardboard, though they generate a huge volume of bottles due to the nature of the business they are not involved in bottle recycled, however they agree it is important by stating “I think it would be good to recycle our glassware but we need to have a system as well that is easy to recycle”. Other areas they would like to improve and adopt more efficient processes include cutting down on their water use and saving on energy.

Company C: Is not driven by any particular reason to adopt green initiatives, the business is however involved in recycling on occasion but not very consistent. The owner stresses on the need to keep the business afloat and stay profitable and feels including other activities will have cost implications that the business cannot afford to bear and stay profitable.

Company D: is inclined to adopt green initiatives as a business value, the business owners strongly supports the relevance of green initiatives as a means of reducing their impact as a business on the environment. Stating, “I think the food and drink industry is very wasteful and very difficult to manage”. They are currently involved in lowering carbon-footprints by procuring products from local environmentally friendly suppliers, recycling glass and minimizing the travel miles of the business in general.

Company E: attributes their desire to be green to the need to meet their customers demand, to improve on their process, quality and the efficiency of the business stating “We work with our producers to make sure that we try to be as green as we can, we also source locally to reduce our carbon-footprint. We also try to ensure we produce in the most efficient way by recycling water, which improves our energy efficiency, and further promote and encourage a paper-free environment”. The owner further associated the efficiency of the business to reducing costs stating “We now use lightweight glass, compare to 5 years ago where it was heavier glass, this means we can get more on a pallet, and we now ship more efficiently than we did 5 years ago, efficiency for us means saving money in many ways, an initiative that makes glass lighter actually saves a lot of money”. The business owner fully supports the adoption of green initiatives and finds it to be an advantage for businesses in today’s competitive environment.

Company F: Is involved in an organic business and strongly supports the relevance of green initiatives. The main driver is the influence of customer demand for organic produce, the business has a relatively low environmental impact because it is solely organic, and also is actively involved in recycling plastic boards. Waste is kept to a minimal by its re-use as fertilizers on farms, and transportation miles are kept low as a means of reducing the carbon-footprint.

The narrative analysis and construction from interviewees enabled the study identify themes which stand out as motivators for the SMEs to adopting green initiatives presented in figure 1. In enabling and facilitating these green initiatives the most prominent activity seems to be recycling, with the exception of company E which seems to be looking for (green) best practices to add on, the other companies are less active towards the adoption of green initiatives, the study identified some difficulties they encounter towards actively adopting green initiatives.
4.3 Inhibitors

An observation from this study indicates that there seems to be more inhibitors to the adoption of green initiatives for businesses in the food and drink SMEs than there are motivators. The factors are summarised as inhibitors in figure 1 and discussed below.

All companies investigated identified with some form of challenge. They acknowledged that to be active in greening their businesses they would need to allocate additional resources to facilitate the development of such green practices and they were not certain the benefits of such would outweigh the costs associated and the effort required. An example of such a view is seen in company D “if I focused my energy on none business related activities, nothing will get done to my standard”, on this Company A states “I know we generate a lot of food waste and I should probably look into food recycling but I just have not been able to do it”, while Company B agrees stating “it is time consuming for us and it will also cost more” the companies further stress that they are not getting the right form of support or encouragement from government legislation. Costs was identified as a major barrier, the cost of going green is associated with costs among the SMEs, the study found that the businesses are happy to adopt green initiatives if it cost nothing, the companies confirmed they encountered costs to recycling and the inconvenience of needing to recycle with different companies for different products such as paper, plastics, wood, and glass was even more frustrating and a big obstacle to their active engagement for example, company B stated “it would be nice to make sure that we are doing good to the environment as a business and our waste was not going to landfill, but not if that comes at an extra cost”.

Also, the restriction to recycle yards makes it even more difficult, Company D states, “commercial vehicles are not allowed in the recycling yard, only residents, so even though we pay the business rates, we are not given access and get penalized when we use the yard”. Company E, was involved in re-designing their product to be more eco-friendly and confirms that a major challenge they experienced was disruption to their business production as a result they re-design every 10 years in-order to avoid major disruptions.

Five companies out of the six (6) were not active members of trade associations, there was therefore a general sense of lack of knowledge on the subject of green practices and on how their employees get trained to assist in implementing such environmental practices, there was a general trend by the interviewees to indicate one-off trainings or illustrations with workers on how to recycle glass. With the exception of company E who found it immensely useful to be involved with associations and training programmes for its staff as well noting “we strive to be aware of how things can be improved, and the objective for us it to be efficient”. From this analysis of inhibitors, we can present the following emerging themes illustrated in figure 1.

**Figure 1:** Motivators and inhibitors to green adoption

The respondents acknowledged awareness of green initiatives but also associated adopting green to high cost that would impact their business profitability and as a result this makes it difficult to adopt. This is not strange as SMEs are noted to face greater obstacles when adopting new innovative initiatives, this is partly associated to the costs of greening, costs associated to training, implementation, environmental regulations, re-design, energy and logistics (Hassini et al. 2012; Revell and Blackburn 2007), they further struggle with issues such as a lack of ample resources, green knowledge and expertise and time constraints (Worthington 2012). SMEs
clearly do not have sufficient understanding of how to adopt green initiatives and this poses a huge barrier to sustainability of green practices within the food and drink sector.

4.4 Further research

The findings from the pilot have identified areas that will be further investigated in the main data collection of the study, since the pilot was merely used to gauge the receptiveness of respondents within the sector and gain a sense of issues relating to the adoption of green initiatives that might exist in the sector. Previous studies have either examined SMEs from diverse industries (Banomyong and Supatn 2011) or conducted comparative studies between large businesses and SMEs (Islam and Karim 2011) but there is still a limitation of work where green sustainability practices of SMEs and particularly for food and drink (Lee et al. 2012; Bourlakis et al. 2013) and none to the best of our knowledge. This paper sheds some light towards this gap, it has investigated the micro and small firms in the food and drink chain and identified the motivators and inhibitors to the firms adoption of green practices. The findings reveal a disparity among the firms on the forms of practices they are actively engaged in for instance some patterns have emerged in terms of the ongoing practices between these firms, which is highly influenced by some of the inhibitors identified. There is a mixture of both micro and small firms that seem to be more inclined and consistent with on-going green practices mostly influenced by the perception and values of the business owners alongside the need to continuously improve their processes and reduce environmental impact while still maintaining their profitability. The activities of this group goes beyond just recycling and extends into areas of waste minimization, eco supplier selection and reducing Co2 emissions, these are high-level green adopters. Another emerging group is those with very minimal involvement towards green practices, despite their acknowledgment of a generous amount of waste being generated, they are less involved in minimising their impact unless compelled to by legislation, an example of such is one of the companies noted to generate a lot of food waste and despite being aware of food recycling does not implement this as a means to reduce waste. A third group identified is also on the minimal level; they recycle products such as bottles and papers but are not interested in doing more. There are also those with a low awareness level of what green initiatives are and are likely affected by what seems to be a lack of access to information on what they can do within their processes.

Clearly, the data gathered was for exploratory purposes but the findings have led the study to generate a scale, which will explore the level of greenness of these business. The scale could go from low level to high or vice-versa, however the study does not have sufficient data to label what falls in-between the scale as illustrated in the figure 2.

**Figure 2:** Emerging scale of Greenness among SMEs

Future research will look into expanding this scale and make it more explicit to understand the distinctions between the various participatory levels of adopting green (possible theories to be explored include Rogers “theory of diffusion of innovation”). We also include green washing as a label that might likely be investigated. Green washing as a term emerges from secondary data in literature (Bergenwall et al. 2012; Liu et al. 2012), however this study has not come across any companies from the pilot that fall under this label and simply acknowledges its existence from literature.

5. Conclusion

The overall objective of this research was to investigate the adoption of green practices in the food and drink SMEs, though the pilot study is presented in this paper, it has been possible to identify some motivators and inhibitors to adoption. The study involved preliminary data collected from six-micro and small firms. The conclusions drawn from this pilot study are that:

- Food and drink businesses are inclined towards the adoption of green practices as a notion rather than in actual practice.
- Majority of the companies are involved in green practices on a passive activity basis, the most prominent form of practice is recycling which is mostly limited to paper, wood, plastic and bottle recycling and not necessarily to waste generated within the core business activity for example food waste recycling.
There is clear evidence of both internal barriers such as (lack of knowledge/ access to information, trainings, cost, and time constraints) and external barriers such as (lack of support, resources and cost).

The findings indicate that awareness on environmental issues has not yet been translated into sustainable green practice adoption.

A scale of greenness has emerged from the findings, which will explore and expand in future research on activity levels of adoption. Companies will be categorised according to labels of on-going practices.

The limitation of this study is it is only exploratory and was conducted based on very preliminary data, this however serves as a sound basis for expansion into future research as the doctoral study progresses.

References


Process Innovation as a Necessary Condition for Successful Implementation of a new Production Planning System

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Abstract: Information technology is a really necessary requirement for today’s business environment. It helps to manage all business processes, enables efficient communication within the whole supply chain and provides important results for driving a company’s performance. However, the implementation of a new information technology system is not sufficient for reaching expected results. A lot of other changes are also required in terms of process innovations and people’s behaviour. A process innovation itself includes significant changes in process management, techniques, and equipment or software tools. However, the implementation of a new software tool without any other improvements in the relevant processes is not enough to achieve a complete process innovation process innovation. This paper deals with advanced planning systems and the process innovations needed for their successful implementation. The whole research part is based on the study conducted within Czech manufacturing companies that have implemented and used any type of advanced software support for production planning in the last five years. A questionnaire-based investigation was used just to obtain a basic overview of the actual state of this field. However, the most relevant results were reached through the interviews conducted with production managers or planners from selected companies, own experiences, case studies and other personal contacts with respondents. In particular, they were asked about the most significant benefits that were achieved in relation to the new planning software and process innovation that were adopted before finalising the whole implementation process. As the results show, process innovations are not always regarded so seriously during the whole implementation process, which might lead to the failure of the entire implementation. Therefore, the main goal of this paper is to point out the importance of process innovation for the successful implementation of advanced planning systems and to find out how strong the interdependence existing between these two variables is. The outcome of the whole research activity in this field should be some kind of methodology containing important requirements for the successful implementation of advanced production planning systems and all the necessary process innovations that could significantly influence the whole implementation process.

Keywords: production planning, process innovation, information system, system implementation

1. Introduction

Information systems for production planning have been evolving for several decades. The first production planning systems were based on the push principle. Information technology (IT) producers started to integrate pull principles into the planning algorithms of their information systems in the 1970s as a reaction to the growing importance of ‘lean’ manufacturing. The flexibility of a production process has become a fundamental competitive advantage and IT providers have needed to react. One of the typical pull methods integrated into many information systems (ERP systems) is electronic kanban (Chen, 2006). This is a method for efficient production scheduling according to the current requirements of consequent production stage. Kanban determines what, when and how much to produce. It was first introduced as an integral part of the lean manufacturing methodology created by Toyota. The implementation of electronic kanban requires radical changes in logistics and inventory management. The pull principle must be adopted by all business processes (especially production processes) before starting the implementation of the electronic kanban system itself. The successful implementation of kanban can bring many benefits such as costs and inventory reduction or better traceability. However, as Hollingsworth says (2011), kanban is not suitable for every company; its suitability depends on the situation and the type of production process.

Today, a lot of planning systems include the combination of a push and pull approach in their planning mechanisms. These applications are usually based on the Theory of Constraints (TOC) principle; this means that they consider production system bottlenecks more seriously. According to TOC, the planning process should start with bottlenecks in order to provide their maximum utilisation (Cox and Schleier, 2010). Theory of Constraint principles are supported by production planning applications and methods such as Drum–Buffer–Rope (very often implemented as a planning algorithm of ERP), Optimized Production Technology or the most frequently used Advanced Planning and Scheduling (APS). The APS planning system combines forward and backward planning in order to optimize production schedule (Sodomka and Klčová, 2011).
The process of the implementation of an information system for production planning and scheduling is influenced by many internal and external factors that can cause serious problems and complications. On the other hand, good preparation for a system’s implementation and serious consideration of all factors that may somehow influence this process can lead to excellent results. Firstly, it is absolutely necessary to know the type and basic characteristics of the production system and current rules used for its planning and scheduling. This is the basis for specifying key requirements for a production planning system and choosing the appropriate software and its provider in the future (Laudon, 2007). Although system providers usually claim that their application is able to adapt to any manufacturing environment, the reality shows the very opposite situation in many cases. However, it is not always the problem of the system itself or even the system integrator. Very often manufacturing companies underestimate the initial process analysis and implementation of necessary process innovations into practice before starting the implementation project.

Process innovation can be understood as an implementation of new approaches, techniques, methods or procedures. It is possible to innovate any process within the organisation; process innovation does not consider just manufacturing processes. The implementation of a new technology or software tools can be considered as a process innovation as well. Bi, Ma and Huang (2013) tried to find the answer to the question of how informatisation affects the process innovation in manufacturing enterprises. Their results confirmed that there is a two-way relationship between the informatisation in all areas and process innovation development.

Jang, Hong, Bock and Kim (2002) highlight the importance of knowledge management in process innovation and also explain their two-way relationship. They describe process knowledge as an outcome of the process innovation process and consider it as a very important competitive advantage.

The main goal of implementing advanced software tools for production planning and scheduling is to make planning and consequent manufacturing processes more efficient, flexible and transparent. Therefore, process innovations supporting an implementation of an advanced planning system should lead to lean processes.

Womack and Jones (2003) describe the process of implementing lean principles into a manufacturing system as a set of the following five steps:

1. Defining the value required by the customer
2. Identification of all needed changes for increasing the value offered to the final customer and reduction of all activities that are non-value adding from the customer’s viewpoint
3. Designing continuous material flow without any unnecessary waste
4. Implementing the pull principle in all manufacturing processes where possible
5. Repeating the whole process from the first step in order to ensure continuous improvement.

The originality of this paper lies in describing the relationship between process innovation and information systems for production planning and scheduling which has not received a great deal of attention in other studies. The implementation of a new technology or software tools can be considered as a process innovation itself. This paper focuses on the required changes in relevant processes (process innovations) before starting the implementation of an advanced information system in order to ensure the greatest improvements. In the following sections, several models for production process classification are briefly described in order to explain the background of the necessary process innovation for each type of production.

2. Methodology

The methodology used for this study is a combination of primary and secondary research methods. In the first part, three basic types of classification of production processes are briefly described in order to explain the suitability of various planning methods for various production types. The most important requirements for production planning and system scheduling, resulting from the basic characteristics of each kind of production process, and the necessary process innovations for the successful implementation of a production planning system are briefly discussed in the following sections.

The first part of the research is based on the quantitative study conducted within Czech manufacturing companies that have implemented any type of advanced planning system in last five years. A questionnaire-based investigation was used just to obtain a basic overview of the actual state in this field and therefore the sample is rather small. It includes 28 production companies of all sizes (except microenterprises) with all types of production processes. When identifying the sample, attention was paid on having at least five respondents
from each kind of production process according to the three considered types of classifications explained later, except for the classification according to the VATI analysis, where it was not possible to find any respondents using the I-type production process. Finally, the sample included:

- 6 respondents with one-off manufacturing, 15 respondents with batch manufacturing and 7 respondents with mass production prevalent
- 12 respondents with discrete production, 5 respondents with process manufacturing and 11 respondents with line flow manufacturing prevalent
- 5 respondents with V-type manufacturing, 10 respondents with A-type manufacturing and 13 respondents with T-type manufacturing

The sample for quantitative research was identified according to the reference customers of various providers of advanced planning systems in Czech Republic. In order to provide more valuable results it was followed by the more detailed qualitative research, which was realised by interviews conducted with production managers or planners from selected companies, own experiences, case studies or other personal contacts with respondents. In particular, respondents were asked about the most significant benefits that were achieved in relation to the new planning software and process innovation that were adopted before finalising the whole implementation process. This sample included nine respondents from the most important medium-sized and large Czech companies (or Czech plants of global enterprises). The results of structured interviews were completed with own experiences from practical projects realised in manufacturing companies in the last three years.

The main goal of this paper is to prove the importance of process innovation for the successful implementation of a production planning system, define the key areas of production process innovations that must be considered when implementing any production planning system, and to describe the interdependence between all these variables. This research is just a part of the long-term research activities of the author that should lead to the formulation of a complex model of process innovation for an efficient production planning system implementation.

3. Production process classifications that are useful for the implementing of planning system

The very basic classification of production processes takes into account production volumes and the frequency in which the production is repeated. Production process classification according to the number of produced units includes:

- One-off manufacturing (job production) is the most labour-intensive production where each product is made separately.
- Batch manufacturing (serial production) represents a production of small or medium-sized quantities of identical products in higher volumes than one piece.
- Mass manufacturing (continuous flow production) describes the situation where hundreds or even thousands of identical products are made at the same time.

The most often used classification of production processes in business informatics is classification according to production continuity. This considers three types of manufacturing (Vollmann 2005):

- Discrete (discontinuous) manufacturing which is typified by breaks in time in the manufacturing process (tool change or tool clamping etc.).
- Process (continuous) manufacturing which proceeds without any interruption in time and it is usually linked to quality management (for example, pharmaceutical industry).
- Repetitive line flow manufacturing which consists of several closed manufacturing cells with continuous one-way flow of material without buffer stock. This is typical for assembly lines.

The last type of classification that was used in this research is the classification of production processes according to VATI analysis. This type of classification reflects the relation between final products and all materials and components used for their production. The following types of production processes are considered under this type of classification (Inman 2011; Umble 1990; Ferenčíková 2011):
V-type manufacturing is typical for a wide range of final products and a relatively small number of purchased items (materials, components). It consists of several points of divergence where a semi-product is divided into several next semi-products.

- **A-type manufacturing**, contradictory to the previous one, is typical for the limited range of final products and numerous purchased items (materials, components). It consists of several points of convergence where several semi-products are assembled to one other semi-product or final product.

- **T-type manufacturing** is a combination of several approaches. It is typical for a lot of similar final products and a limited number of purchased components. The technological process is very similar for all types of produced items and it can consist of several divergent and convergent points. At the end of the production process, components are usually assembled into several variants of final products.

- **I-type manufacturing** is the simplest type of production process where a limited number of purchased items are transformed to a limited range of final products without any convergent or divergent points. Not often practiced.

4. **Results**

There are several planning methods or planning algorithms of information systems used for production planning and scheduling available on the Czech market. Their basic characteristics were briefly described in the first – introduction part. This section should provide a basic overview of the usage of various planning methods by Czech manufacturing companies, explain their suitability for various production types (according to the above-mentioned types of classification) and highlight all the necessary process innovations influencing the successful implementation of any production planning system.

4.1 **Production planning methods and their usage in Czech manufacturing companies**

Firstly, the quantitative questionnaire-based study was conducted within Czech manufacturing companies in order to obtain a basic overview of the actual situation of the field of production planning systems. As the results show, many production companies (23%) still only use MS Excel or some in-house-created simple methods for production planning and scheduling despite the fact that their production processes are very complex and they face a lot of planning problems every day.

![Figure 1: The usage of various planning methods in Czech manufacturing companies (author's own)](image)

Advanced planning methods based on TOC principles regarding bottleneck resources are still not so frequently used in practice, as the results show (Figure 1). The reasons are various, the most common being the high price of such a software solution. Companies usually use the standard planning algorithms of their ERP systems (MRPI or MRPII).
On the other hand, there are a lot of manufacturing companies in the market, where standard planning methods such as MRPI or MRPII are absolutely sufficient. The next figure shows the combination of different production processes (according to the number of produced units and production continuity) and suitable planning methods for all of them (Figure 2).

![Figure 2: Production planning methods according to the type of production process (author’s own).](image)

However, using the appropriate technology for production planning and scheduling is not enough. An information system is not able to solve any problem itself. Therefore, every change in the field of information technology must be supplemented by several changes in relevant processes – by process innovation.

### 4.2 Production planning methods and process innovations

The respondents of the questionnaire-based investigation were also asked about their opinions on how significantly various selected internal processes (except the manufacturing process itself) influence the quality of production planning and scheduling. They could choose one option from a scale of 1 to 5, where 1 means poor influence and 5 means significant influence. According to the gained results, the most important internal processes that can positively or negatively influence production planning activities are updating stock control records, warehouse management and good demand forecasting (Figure 3). No interdependence was observed between the type of production process of the respondents and their answers to this question.

![Figure 3: The influence of other internal processes to the quality of production planning (author’s own).](image)

The subsequent qualitative research was conducted in the form of interviews with nine production managers or planners from selected manufacturing companies. Respondents were asked about the most significant benefits of implemented systems for production planning and scheduling, the major problems and process innovations that had to be adopted before finalising the whole implementation process. When speaking about problems, all of the respondents mentioned the following in particular:
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- Changing priorities which make production planning extremely difficult
- Constrained capacities
- Difficult prediction of the future demand
- Changing requirements of final customers, frequent design changes
- Unreliability of the suppliers
- Inaccurate data
- Breaking the set rules
- Unpredictable defects (machine breakdowns, people’s mistakes...)

The respondents confirmed that successful implementation of an advanced planning system can bring the company a lot of significant benefits, such as increased sales, decreased manufacturing costs, improved services and production process flexibility, improved utilisation of manufacturing resources etc. On the other hand, they also admitted that none of the benefits mentioned above would be so significant without any process innovation. In the case of production planning, the most often implemented process innovations in practice are:

- New rules and technological process specification
- Production process design innovation (new layout)
- Implementation of pull principle into production process
- Throughput orientation
- Implementation of TOC-based rules such as creating buffers in front of constraint resources
- Reducing inventories
- Setting minimal and maximal stock levels for ensuring availability of required materials
- Reducing waste in all areas
- Implementation of sophisticated methods for total productive maintenance in order to eliminate breakdowns in the manufacturing process
- Changes in motivation system, team building

5. Discussion

The implementation of any software tool is a very complicated and long-term process which includes a lot of complementary issues. Technology is a very important requirement for efficient management in various areas but it is not sufficient condition. This paper explains the importance of process innovations for efficient implementation of advanced production planning and scheduling software tools.

A production system is a complex set of numerous elements and the relationships between them. Generally speaking, there are five basic elements influencing the whole efficiency, productivity and flexibility of a production system: products and their quality, machines, people, working environment and processes. When speaking about process innovations, we need to consider all of these elements, not just the processes themselves. The next figure (Figure 4) sums up the results of this study in an easy way. It describes the most significant process innovation needed for successful implementation of a planning system divided into five areas (according to the five above-mentioned elements of a production system). The core of the scheme represents people as the most significant factor of any change.
When speaking about process innovations for successful production planning system implementation, it is necessary to also take into account some non-manufacturing processes that can also seriously influence the production planning system. These processes were discussed in the previous section. The respondents of the quantitative investigation regard the most significant ones to be: updating stock control records, warehouse management and good demand forecasting.

6. Conclusion and future research

The main goal of this paper was to prove and describe the importance of process innovation for the successful implementation of a production planning system according to the experiences of Czech manufacturing companies. As the results show, process innovation is an essential requirement for efficient production planning. Information technology itself is not able to gain expected results without any other changes in the related processes.

In a future study, a more detailed methodology for efficient production planning systems implementation will be prepared with a special emphasis on process innovation.

References


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Social Entrepreneurship: The new World Trend

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Abstract: Social entrepreneurship is a complex and multi-level phenomenon, which can be investigated through the use of various concepts and theoretically at different levels - individual, organizational and group. Given that area has not been previously studied in depth in Kazakhstan, the researcher saw the need for an exploratory research, a trial study, which requires describing and understanding the research subject and defining the scope, given the breadth of the concept. The paper explores the ways of innovative approaches to entrepreneurship. Its main focus is on the social change of these approaches. Therefore the understanding of social entrepreneurship is important. Exploring the process of pursuing innovative solutions to social problems also has social value (Dees, 1998). In order to make it sustainable, there is a need to define criteria of social entrepreneurship. To avoid ambiguities, the researcher has limited the meaning of “social enterprise” by the definition proposed by Alter (2007): A social enterprise is any business venture created for a social purpose—mitigating or reducing a social problem or a market failure—and to generate social value while operating with the financial discipline, innovation and determination of a private sector business. In its widespread usage, "social entrepreneur" is the individual and "social enterprise" is the organization. Therefore, social enterprise is an institutional expression of the term social entrepreneur”. The paper also reviews the best practices of social entrepreneurship in the world. Therefore there is going to be a literature review that is either proved or not supported in the environment. The purpose of the study is to provide grounds for further research and development of country-specific analysis. In particular, it will review the existing literature on social entrepreneurship. The goal of the research is the idea of stimulating the development of social entrepreneurship in Kazakhstan. By conducting the research the author already creates social value. The objectives are: the analysis of the existing social enterprises and best practices in the world and exploring their presence in Kazakhstan. For this purpose–mitigating the social entrepreneurship.

Keywords: social entrepreneurship, social enterprise, sustainability, social value, Kazakhstan

1. Introduction

Social entrepreneurship is a complex and multi-level phenomenon, which can be investigated through the use of various concepts and theoretically at different levels - individual, organizational and group. Given that area has not been previously studied in depth in Kazakhstan, the researcher saw the need for an exploratory research, a trial study, which requires describing and understanding the research subject and defining the scope, given the breadth of the concept.

The paper explores the ways of innovative approaches to entrepreneurship. Its main focus is on the social change of these approaches. Therefore the understanding of social entrepreneurship is important. Exploring the process of pursuing innovative solutions to social problems also has social value (Dees, 1998). In order to make it sustainable, there is a need to define criteria of social entrepreneurship. To avoid ambiguities, the researcher has limited the meaning of “social enterprise” by the definition proposed by Alter (2007):

A social enterprise is any business venture created for a social purpose—mitigating or reducing a social problem or a market failure—and to generate social value while operating with the financial discipline, innovation and determination of a private sector business. In its widespread usage, "social entrepreneur" is the individual and "social enterprise" is the organization. Therefore, social enterprise is an institutional expression of the term social entrepreneur”.

The paper also reviews the best practices of social entrepreneurship in the world. Therefore there is going to be a literature review that is either proved or not supported in the environment. The purpose of the study is to provide grounds for further research and development of country-specific analysis. In particular, it will review the existing literature on social entrepreneurship. It will also touch the barriers for the current social enterprises.

The goal of the research is the idea of stimulating the development of social entrepreneurship in Kazakhstan. By conducting the research the author already creates social value. The objectives are: the analysis of the existing social enterprises and best practices in the world and exploring their presence in Kazakhstan. For this
purpose a country profile will be introduced to see the prospects and dangers of social entrepreneurship in Kazakhstan.

Market gap is observed in Kazakhstan. The adherence to the concept of social entrepreneurship is seen only in the NGO sector, and only to the extent of solving social problems being funded by other organizations and donors. With the use of qualitative methods, research can be further developed: in-depth questionnaires can be created and spread among companies of different type of ownership, size and from various industries, to see the relationship between the perceptions and major barriers to social entrepreneurship. The findings are useful for businesses, policy-makers and researchers, as the results would guide them in fostering social entrepreneurship in the country – creating and sustaining social value.

The structure of the study will include:

1) Identification of the country context:
a) Political, economic, social and technological factors affecting the development of entrepreneurship and the social sector.
b) Brief profile of Kazakhstan.
c) The development of the NGO sector in Kazakhstan.
2) Literature review – general understanding of social entrepreneurship abroad.
3) Analysis of the best practices, business models of social enterprises on the basis of international experience.
4) Interviews and questionnaires of social entrepreneurs - basic questions:
a) The definition of ‘social entrepreneurship’.
b) The need for social entrepreneurship in Kazakhstan.
c) The main obstacles for the development of social entrepreneurship in Kazakhstan.
d) The development prospects of social entrepreneurship in Kazakhstan.
e) The evaluation of existing programs/initiatives in Kazakhstan.

2. What is social entrepreneurship?

There are many definitions of social entrepreneurship both by foreign authors and Russian authors. The term and the phenomenon were likely introduced on the West to determine the specific activity aimed at solving social problems commercially. Due to the fact that the term combines the most pressing issues for modern society as "social" and "entrepreneurship", it is applied in many areas - from non-profit organizations to purely business structures. Closest definition to the essence of social entrepreneurship was proposed by Professors Martin and Osberg (2007).

It is worth noting that the social enterprise is a special organization, socio-economic hybrid, in which the social mission is combined with market activities under the conditions of self-sufficiency. Unlike socially responsible business, there is a predominance of social objectives over the economic and social organization of non-profit purposes (NPO or NGO) - a commercial basis in the activities for the sustainable market position and financial independence in the implementation of social objectives.

A literature review on social entrepreneurship is carried out, which admits it as emerging (Braunerhjelm and Hamilton, 2012): Entrepreneurship has been a well-defined area within economic theory since Schumpeter published his seminal work in 1911 (Swedberg, 2000), but social entrepreneurship was not a core element in such general entrepreneurship theory, and was hardly dealt with or even mentioned in textbooks or review articles on entrepreneurship.

The research on and development of social entrepreneurship was undertaken, until recent years, by scholars and experts who typically did not belong to the field of entrepreneurship (Steyart and Hjorth, 2006). On the other side, the research in the field is characterized by case studies and success stories, and lacks a theoretical base and therefore generalizability (Lepoutre et al, 2011).

3. How does social entrepreneurship work in Kazakhstan and the rest of the world?

The definition by Professors Martin and Osberg (2007):
identifying a stable but inherently unjust equilibrium that causes the exclusion, marginalization, or suffering of a segment of humanity that lacks the financial means or political clout to achieve any transformative benefit on its own; (2) identifying an opportunity in this unjust equilibrium, developing a social value proposition, and bringing to bear inspiration, creativity, direct action, courage, and fortitude, thereby challenging the stable state’s hegemony; and (3) forging a new, stable equilibrium that releases trapped potential or alleviates the suffering of the targeted group, and through imitation and the creation of a stable ecosystem around the new equilibrium ensuring a better future for the targeted group and even society at large.

4. What is happening in Kazakhstan?

Country profile (Indexmundi, 2014):

- History & geography: located in Central Asia, approx. 17 mln. population; independence since 1991; government type: republic; authoritarian presidential rule, with little power outside the executive branch.

- Culture/education: education index – 0.84; literacy – 100%; languages: Kazakh (state language) 64.4%, Russian (official, used in everyday business, designated the "language of interethnic communication") 95%.

- Business activity: industries such as oil, coal, iron ore, manganese, chromite, lead, zinc, copper, titanium, bauxite, gold, silver, phosphates, sulfur, uranium, iron and steel; tractors and other agricultural machinery, electric motors, construction materials.

- Resources & Economy: GDP of 5% (2012 est.); geographically the largest of the former Soviet republics, excluding Russia, possesses enormous fossil fuel reserves and plentiful supplies of other minerals and metals, such as uranium, copper, and zinc. It also has a large agricultural sector featuring livestock and grain. In 2002 Kazakhstan became the first country in the former Soviet Union to receive an investment-grade credit rating. Extractive industries have been and will continue to be the engine of Kazakhstan’s growth, although the country is aggressively pursuing diversification strategies. Landlocked, with restricted access to the high seas, Kazakhstan relies on its neighbors to export its products, especially oil and grain. Although its Caspian Sea ports, pipelines, and rail lines carrying oil have been upgraded, civil aviation and roadways continue to need attention. At the end of 2007, global financial markets froze up and the loss of capital inflows to Kazakh banks caused a credit crunch. The subsequent and sharp fall of oil and commodity prices in 2008 aggravated the economic situation, and Kazakhstan plunged into recession. In 2010 Kazakhstan joined the Belarus-Kazakhstan-Russia Customs Union in an effort to boost foreign investment and improve trade relationships and is planning to accede to the World Trade Organization in 2013.

- NGO sector (ADB, 2014): non-government organizations (NGO) in Kazakhstan existed and worked already in the soviet times but they started actively develop with perestroika. Today there are recognized leaders, which names are well-known as well as small organizations established by enthusiasts or simply desperate people who decided to solve own problems through establishing an NGO. NGO is also called "the third sector". However, still the activity of this sector is not very well known to public or is known but very fragmentally. And this is despite the fact that their main purpose is attracting public attention to the problems of society and filling in of the so-called "niches" in the social-economic development of the country, which for certain reasons are out of sight of state structures. here are around 1000 NGO actively working in Kazakhstan.

NGO sector analysis of Kazakhstan:

Strengths
- skilled and educated workforce
- experienced business units
- tolerant to international expertise

Weaknesses
- tax system
- overdependence on natural resources

Opportunities
The development of social entrepreneurship in Kazakhstan is in its infancy. Despite the fact that there are separate initiatives supporting or working on the principle of "teach how to fish" (Drayton, 1980), there is no information describing the overall picture of the development of social entrepreneurship, features, and characteristics. The present study aims to fill this gap and provide the analysis, which will be based on a study of existing organizations dealing with or working on the principles of social entrepreneurship.

The paper bears not only the novelty of the research - the process of studying the phenomenon of social entrepreneurship, but also the development of SE in Kazakhstan. Partly principles of social entrepreneurship will be applied in the process of the implementation of the research, as the research serves as basis for further development of the topic.

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Cultural Barriers to Open Innovation in Countries With a Transitional Economy: Case of Kazakhstan

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Abstract: After the breakdown of the Soviet Union, the economy of the Republic of Kazakhstan has been shifting from a centrally planned towards a free market-based model. The country has undergone many changes that led to lack of intellectual capital and strong barriers to innovation in industries. Due to economic globalisation and the subsequent attraction of the foreign capital into Kazakhstan’s economy, particularly in the oil and mining industries, a lot of international companies have arrived to Kazakhstan. The country is rich in natural resources, which became a pole of attraction for foreign investors. All these factors make Kazakhstani economy highly dependable on export of raw materials. In order to sustain the economic development and shift from a resource-based economy Kazakhstani strategy is focused on knowledge management, internationalization of innovation, technology transfer and open innovation. The notion of open innovation has recently gained a widespread attention. The term encompasses the generation, capture, and employment of knowledge at the firm level by both acquiring intellectual property from outside the company and using external paths to market for commercialisation. Processes of open innovation emerge mainly from inter-organisational collaboration. When it comes to transitional economies, such as Kazakhstani one, inter-organisational cooperation and open innovation in general have many barriers, especially cultural. Therefore, this paper intends to provide an understanding of major challenges towards open innovation in Kazakhstan from the perspective of cultural aspects. To understand the theoretical background on open innovation, paper focuses on overview of management culture of Kazakhstan and its implications on open innovation. Kazakhstani management culture is reviewed using theoretical constructs developed by well-known researchers (Hofstede, 2010) in the field of organisational culture. Results suggest that the influence of peculiarities of national culture upon the adoption of certain elements of open innovation model is very prominent.

Keywords: open innovation, organisational culture, Kazakhstan, transitional economy

1. Introduction

An open innovation model suggests that organisations can improve their innovation effectiveness by acquisition of knowledge from external sources, and enhance financial performance by exploiting external routes to market for technologies generated within the company that do not fit their business model (Chesbrough, 2003). The concept of open innovation also implies that inter-organisational collaboration enhances innovative performance. In other words, this means that the notion is appropriate not only at a firm level, but also at the regional and country levels. When it comes to the country context, structural and cultural aspects may affect companies’ adoption of open innovation practices. Therefore, it is of a great interest to investigate how cultural issues influence on knowledge sharing between organisations within a given region or country, which in this case is Kazakhstan.

Being the ninth largest country in the world in terms of land area (Potluri et al., 2010: 113) with vast natural resources, Kazakhstan recently became open to the world after the break-up of the Soviet Union in 1991(Junisbai, 2010). Kazakhstan is considered to be an unexplored market, which is included in the list of countries with a transitional economy (Auty, 2004). A transitional economy is an economy, which is changing from a centrally planned economy to a free market (Wei, 2002). After the breakdown of the Soviet Union, the economy has been shifting from a centrally planned towards a free market-based model (De Melo et al., 1996: 1). Since the nature of the business is becoming global (Michael J. Marquardt, 2012), in order to succeed in this highly competitive environment, the industry constantly seeks for new markets, new relationships, partners, and sources. These changes in both the global economy and the Kazakhstani one have led to the attraction of foreign direct investments into the country. The arrival of the foreign capital has resulted in the establishment of multinational companies and various international joint ventures and mergers (FIC, 2010). All these cross-cultural collaborations are aimed toward integration in terms of technology transfer, knowledge sharing, and business objectives (Desouza and Evaristo, 2003). Thus, it is important to recognise certain features of national and organisational cultural factors that may affect the use of open innovation practices at the country and organisational levels respectively.

At the organisational level culture refers to the norms and value systems that are shared among the employees of an organisation (Hill and Jain, 2007). The cultural dimensions proposed by Hofstede (1980) show
the overall characteristics at the country level. These dimensions may meaningfully influence internal knowledge transfer as well as external collaboration with businesses (Hall and Hall, 1990).

This investigation focuses on how to overcome cultural barriers that may set back knowledge production and open innovation in Kazakhstani organisations. The nature of the business changes and it is time of unification and globalisation of processes. Cultural differences still play a major role in achieving success in a business relationship. Cultural aspects may positively influence by accelerating communication and business dealings. At the same time, they may also inhibit knowledge sharing and prevent open innovation process (Hauke, 2006). Therefore, it is important to realise that culture significantly impacts knowledge sharing and hence open innovation. Initially, it is needed to examine barriers and motivators to adoption of open innovation in Kazakhstani firms.

The main objective of this on-going research is to identify cultural barriers that can set back the open innovation process and the new knowledge generation of the organisations using companies in Kazakhstan as case studies. Researcher is planning to select 5-7 leading companies from main sectors of the economy (oil and gas, mining, banking, manufacturing, construction, telecommunications, retail) for the case study investigation. The outcome of this study is expected to outline the current cultural barriers to open innovation in Kazakhstan. The results are expected to be useful for implementing an effective set of best practices in order to overcome cultural values and practices that interfere with the concept of open innovation. These results may benefit local and foreign organisations that operate in Kazakhstan. Two research questions were developed:

RQ1: Are there any cultural barriers that set back the production of new knowledge and open innovation Kazakhstani organisations?

RQ2: Do these organisations promote an organisational culture addressed to open innovation?

The following hypotheses were developed to test the answers for these questions:

H1: Organisations in Kazakhstan have cultural barriers that set back open innovation.

H2: Organisations in Kazakhstan do not promote open innovation.

2. Theoretical background on open innovation

The term “open innovation” was first proposed as a new paradigm by Chesbrough (2003) and has received a widespread attention from scientific researchers and business practitioners. It is defined as purposive activities of knowledge inflows and outflows that facilitate internal innovation, and expand the markets for external use of innovation, respectively. The paradigm assumes that organisations are able to and recommended to use both inbound and outbound movements of technologies and ideas as well as paths to market, as they look to improve innovation performance and generate additional value (Enkel et al., 2009).

Open innovation can also be described in terms of combination of two differently directed processes: outside-in and inside-out. Outside-in process corresponds to in-sourcing external knowledge in order to obtain valuable technology, idea, personnel etc. This is enabled through licensing in, spinning in, acquisition and referred to as “technology acquisition” (Lichtenthaler, 2008). External and internal flows of knowledge also imply collaboration alongside value chain. This can be illustrated as cooperation between customers, suppliers, competitors, and other institutions (Huston and Sakkab, 2006). Inside-out process represents external implementation of internally generated knowledge. Chesbrough (2003) believes that the surplus of knowledge, not fitting organisation’s business model, should not be unutilised as in close innovation model. Valuable knowledge sitting on the shelf forces the company to protect this surplus by intellectual property rights. Open innovation approach suggests that this intellectual property could generate some potential value to the company by selling it to the other firm, that is more likely able to adopt and implement it within its resource base and business model. This process is known as “technology exploitation” (Lichtenthaler, 2009). The process of technology acquisition has increased significantly and has gained a lot of interest from the academia and business (Chesbrough, 2013, Gassmann, 2006, Spithoven et al., 2011). While the sourcing of external knowledge is nowadays is a common practice, the technology exploitation and commercialisation of intellectual property outside the company is still rarely observed (Lichtenthaler and Ernst, 2007).
3. Kazakhstan - general information

The Republic of Kazakhstan is the biggest country in the former Soviet Union Bloc, landlocked and situated in Central Asia. It is the ninth largest country in the world, yet many people may not even heard of its name, as it has only recently become open to the world after the declaration of its independence in 1991 (Potluri et al., 2010).

Economy wise, Kazakhstan possesses a broad resource base for agricultural, mineral, and industrial production. The country has enormous rich natural resources: 99 elements among 110 elements of the Mendeleev periodic system are found in depth of the country. These natural resources include rich deposits of iron, zinc, bauxite gold, silver, uranium, coal, crude oil and natural gas. For example, Kazakhstan currently ranks in the top 10 countries in oil land gas reserves (BP, 2012). Natural resources, land, a skilled and cheap labour force, political stability, and a favourable geographical location are main aspects that attract foreign companies to do business in Kazakhstan. Even though the country is young, during these two decades the economy grew fast.

The population of 17.5 million people (as at July, 2011; IndexMundi, 2012) come from different cultures. Ethnical kaleidoscope of Kazakhstani society is naturally unique because of diversity of nationalities and variety of religions. There are around 132 different nationalities (George, 2001: 3). The ethnic composition consists of: Kazakh (Qazaq) 53.4%, Russian 30%, Ukrainian 3.7%, Uzbek 2.5%, German 2.4%, Tatar 1.7%, Uighur 1.4%, other 4.9%; Major religions include: Muslim 47%, Russian Orthodox 44%, Protestant 2%, other 7% (Datamonitor, 2010).

Originally, the pre-Soviet culture of Kazakhs till 1930 was defined by a nomadic lifestyle. Ethnicity or national identity of the majority of population in Central Asia was simply unknown up to the twentieth century. The people were characterized based on their nomadic style of life and Islamic religious views (Gross, 1992: 46). Today the Kazakh nation is described as a transitive race between European and Mongolian South-Siberian race. From the perspective of language, Kazakh belongs to the Kipchak group of the Turk languages. The majority of Kazakhs are Sunni Muslims. The main characteristics of their nomadic way of thinking are a high degree of religious tolerance, high level of collectivism, flexibility, respect for elders, and the capacity to adapt to a frequently changing environment (Zhdanko, 1966). Based on these cultural traits, during the pre-Soviet period, power and authority relied on traditional norms and values passed from one generation to another over centuries. In recent history, Kazakhstan has undergone at least three models of modernization: accession to the Russian Empire (1731-1920), the Soviet regime (1921-1991), and the post-Soviet Western neo-liberal reformation (1992 onward). During the Soviet Union period people of Kazakhstan experienced the strong influence of Russian culture and language. Major “Russification” took place because of the high concentration of Russians in the republic and low status of Kazakh language in the Soviet Union. Today, Kazakh is a state language (approximately 65% of the country’s population master their native language), while the Russian language also holds the status of official language (approximately 95% of the country’s population speaks the language) (Datamonitor, 2010). Even though, the government strongly promotes the national identity and usage of the native language via educational and social reforms, Russian is still the main language of conversation in large cities where “elite” is linguistically russified.

Soviet-communist ideology could not pass without a trace. Socio- cultural values of Kazakhstan and features of management culture of the Kazakhstani organisations are highly affected by soviet mentality associated with heavy bureaucracy, high centralisation, high resistance to change, and collectivism.

In order to understand the reality that people from former socialistic countries were dealing with for 70 years, it is important to give a picture of the situation during the Soviet time. Socialism was driven by the planned economy, which had two fundamental features: central planning and bureaucratic control. Communist leaders such as Marx, Lenin and their followers believed that capitalism’s effect of supply and demand resulted in unemployment, overproduction and recession (Peng, 2000: 17). According to them, a central planned economy was the solution for avoidance of these crises and development of more efficient and productive economy than capitalistic countries, which would result in high standard of living. Control and coordination of the economy activities was carried out through complex mechanism of bureaucratic control.

Private business and private ownership was considered to be illegal. One of the reasons was that it leads to exploitation of employees by owners. More importantly, private ownership contradicted the communist idea
of “utopia” where properties that belong to the state were “the property of the whole people”. This means that there were no family, group or individual as an owner, which resulted in the phenomena that “state property belongs to all and to none” (Kornai, 1992: 75). The same notion applies in terms of the responsibility: “everyone is collectively responsible, but nobody personally”. This was due to the fact that everybody was treated equally and employees did not have right to contradict with orders and express their own opinion. Thereby, personal responsibility and initiative was not recognised, which lead to collective responsibility.

Since all organisations were state owned, managers had no motivation for profit maximising, because it was enough just to fulfil the plan proposed by the government. The efficiency of the work was not the priority, as there was no extra wage for extra work. The firm’s major role was to ensure employee equality and security in their jobs and less upon improving quality of the product or lowering the cost to produce (Peng and Heath, 1996). The only thing, which was needed, is to fulfil the plan. Due to the lack of motivation, the management strategy was not build on competitiveness and competence, but rather on other goals such as working for public wealth and meeting the established plan.

After the breakdown of the Soviet Union a series of transformations from the planned economy towards market economy has begun. Countries, which are in the process of change from a planned economy to a free market economy, are called countries of transitional economies (Shook and Bratianu, 2010). This is a complex process, which has a lot of implications on economic, social and political situation. State owned organisations became available for privatisation, which results in market competition and managerial entrepreneurship. The mentality that all employees are treated equally is not valid anymore and people are valued based on individual responsibility and commitment. All these factors lead to significant changes in the society, individuals and their values and practices. In 1993, in order to overcome a crisis after the fall of the Soviet Union, Kazakhstan started the privatisation process (Alexander, 2004: 257). Hence, the policy aimed to attract foreign investments was declared. Encouragement of foreign capital in the economy was promoted through joint ventures, merges, acquisitions, representative offices, and subsidiaries. Privatisation has affected almost all sectors, apart from strategically important enterprises and public assets such as education, health and safety, social infrastructure.

When it comes to the business and management cultural aspects of Kazakhstan, due to high ethnic heterogeneity it is suggested to use the term Kazakhstani management culture as opposed to Kazakh management culture (Minbaeva et al., 1998). As Kazakhstan is a multinational country, it makes sense when describing Kazakhstani business culture as the combination of cultural elements from all ethnic groups. However, in fact the business culture mainly comprises Kazakh and Russian cultural components with a minor influence of other ethnicities. Moreover, the Soviet time with communist mentality had a strong impact upon the management culture. Additionally, in today’s constant changing environment toward the market relations and globalisation, western-style management culture is gaining importance and influence on Kazakhstani culture.

4. Tentative results on cultural barriers to open innovation

The analysis of cultural barriers to open innovation in Kazakhstan deals with national and organisational cultures. Prior to 1980, organisational and national cultures were considered by many to be independent of each other. However, Hofstede (1980) argues that an organisations are nested within a country. Therefore, national culture influences organisational culture. Hence, national culture should influence human resource practices and organisational behaviour. It is assumed that culture has an influence on the diffusions of innovations (Dwyer et al., 2005). For this study a theoretical concept proposed by Hofstede (2010) is used. The following dimensions of culture explain behaviour of individuals and organisations by their cultural peculiarities: level of power distance, individualism versus collectivism, level of uncertainty avoidance, masculinity versus femininity.

Individualism vs. collectivism dimension represents to what extent interdependence is maintained among the members of the group. Kazakhstan has a relatively low index of individualism and considered to be a highly collectivist society (Csh et al., 2004). In individualist societies the interests of the individual are superior over the interests of the group. However, in Kazakhstan with its collectivist mentality the family and the origin are very significant, common interests prevail over the interests of an individual; people view themselves as an integral part of a group. All Kazakhs know their origins and to what tribe and zhuz (clan, there are three zhuzes:
Yeşlan Kushekbayev

The main idea of power distance dimension is about how people perceive inequality. It is anticipated that, in general, power distance index in Kazakhstan is quite high, as in other Post-Soviet countries, due to the authoritarian communist mentality. Soviet centralisation and control along with a highly hierarchical bureaucracy contributed to the creation of a strong respect and obedience to the authority. The social status and position were more important than a person's qualities (Besseyre Des Horts and Muratbekova, 1999). However, finding evidence about the specific national context (Kazakhstan) was not an easy task due to the scarcity in the relevant literature. According to Nezhina and Ibrayeva (2008), who conducted research of Kazakhstan's culture based on the three cultural dimensions of Hofstede (power distance, individualism, uncertainty avoidance), power distance index for Kazakhstan was found to be high (85%). In comparison, power distance index for the UK is relatively low (35%) (Hofstede, n.d.). Power distance is ranking high in Kazakhstan, which means that the governance is very much centralised. This creates the barrier to research surplus and new ideas circulating within organisation. This means that the employees at a lower position are afraid to show ideas to the organisation. Also high power distance sets back the communication between business partners and cooperation with other enterprises (Gold et al., 2001).

Uncertainty avoidance is related to the extent to which people accept uncertain situations. Higher degree of uncertainty results in the establishment of more rules and regulations in order to reduce unexpected situations in everyday life. 70 years of the centralised control during the Soviet times helped to reduce the uncertainty avoidance and to have a powerful control over all parts of people's life. This authoritarian regime is a main reason of a great fear to make mistakes and take initiatives. People of the older generation (Soviet generation) have a strong sense of helplessness and they are afraid of taking decisions (Besseyre Des Horts and Muratbekova, 1999). Even after 20 years freed from any communist ideological influences, Kazakhstan is still considered to be a highly uncertainty avoidance culture (Nezhina and Ibrayeva, 2008). High level of uncertainty avoidance leads to less risk-taking model. For example, compared with old brands, new products are more risky because the function and performance are more ambiguous. In this case, people from countries characterised by strong uncertainty avoidance are less innovative than people from countries characterised by weak uncertainty avoidance.

Masculinity vs. femininity dimension index refers to the environment of cooperation where employees feel secure to share their knowledge with others colleagues. It shows reconciliation, not aggression and self-achievement. It is expected that Kazakhstan will score high in masculinity. Cultures that are high in masculinity prone to have less knowledge transfer between organisational members if the competitiveness is individually based, then there may be no difference if competitiveness is organisationally based. Moreover, idea sharing between heterogeneous cultural groups may be more difficult or require more time and effort than idea sharing within a homogenous cultural groups (Ford and Chan, 2003).

Researcher wants to claim in this paper that the cultural factors at the organisational level in the companies are influencing the adoption of open innovation. This supports the first hypothesis. When it comes to the second hypothesis, it is required to finish the case studies with the selected companies. Though, to confirm the strong influence of this the cross-cultural comparison might be considered as a direction of further research. Future research also includes the investigation of economic systems and initiatives. In particular, the protection of intellectual property rights is required as it may have a large impact on the behaviour of firms regarding their involvement in open innovation practices in Kazakhstan.

Overall this research is relevant not only for academics, but also for policy makers interested in fostering innovativeness in their domains. That is, the development of a more supportive environment for open innovation in Kazakhstan should be a highly important goal in regional and national innovation policies for
government as well. The outcome of this study may also provide some insights for foreign firms that maintain business partnerships with Kazakhstani companies.

5. Research methodology

Objectives of the research:

- to investigate cultural aspects in the management of selected Kazakhstani companies.
- to identify and describe cultural barriers associated with open innovation.
- to identify and analyse how Kazakhstani organisations promote open innovation and overcome cultural aspects.

The implementation of empirical research was decided for investigating cultural aspects of Kazakhstani management culture. Researcher is planning to select 5-7 leading companies from main sectors of the economy (oil and gas, mining, banking, manufacturing, construction, telecommunications, retail) for the case study investigation. Since the purpose of the current study is to increase understanding of cultural aspects that impact Kazakhstani industry, based on the industrial visits, it was decided that a qualitative research approach would be more suitable. Firstly, it is essential to gain wide and detailed information about the business nature of the companies, their relationships with foreign partners and cultural aspects of the organisations. All these data are more likely to be gathered with the help of qualitative interviews and observations of appropriate documents rather than statistical data from questionnaire responses. Secondly, the scale of investigation is relatively small (5-7 companies), which again suggests that a qualitative research method would be more relevant. Moreover, several scholars claim that it is insufficient to use statistical and quantitative surveys to observe human affairs, whereas a qualitative approach is able to provide a deeper understanding of this research area (Bryman and Bell, 2007, Packer, 2010).

The most suitable strategy for the continuity of this research’s investigation is a case study of several companies in Kazakhstan (considering the geographical focus of this study is a territory of transitional economy), so as to observe the cultural aspects of organisations. Since the data collection of cultural issues requires in-depth and detailed understanding, a nature of case study has to have an explorative and investigative character such as: “how” and “why” questions. The formation of the research questions is one of the most significant issues, as it directly influences the data that will be gathered (Yin, 2008). A case study strategy does not involve control of behavioural events, whereas the emphasis is on the observation of contemporary events occurring throughout the duration of a case study. Therefore, the researcher has hardly any control over the outcome (Yin, 2008). In this dissertation there is no control over the outcome, because it is not clear what the outcome will be, as it all depends on the interviewed people and collected data. (Yin, 2008) claims that the case study strategy is generally used to deepen the knowledge in organisational, social, and political research areas, since it provides an opportunity to investigate attributes of the real life such as the organisational culture and business and management processes. The purpose of this study is to raise understanding about management strategies for open innovation in Kazakhstan from the perspective of culture; thereby a case study is a suitable research strategy as it investigates elements of real life.

References


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Business Success by Understanding the Process of Innovation

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²Reinvis-consulting, Breunigweiler, Germany
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Abstract: Today, any organization - regardless of the specific activity - must be prepared to face continuous and radical changes, innovation thus becoming a condition of survival in a globalized market. Although the process of innovation is one of the most important drivers of growth and prosperity in today’s global economy, it is also one of the least understood. Throughout the last century, industry leaders learnt to master the production process to such an extent that now it no longer functions as a significant competitive advantage. The new challenge is to master the innovation process – harnessing change, creating new competitive advantages by offering better products, using better processes, delivering better services or even offering entirely new solutions. The mastery of the innovation processes can be done only by knowing and understanding innovation, not just the definition but also the entire process that lead to the success of innovation and in the end the success of the companies that implement it. The purpose of this article is to offer a clear image regarding the innovation process so that every organization can implement innovation in their everyday activities. Better understanding that innovation is not a simple activity, that innovation needs to be seen as a process, is made in this article by proposing a number of steps for innovation process and by presenting the results and the benefits of the innovation process. The literature review on innovation made in this paper allows us to point out some important conclusions regarding the approach of the innovation process in organizations, innovation patterns and their evolution, the benefits of the innovation process and steps to be followed for achieving business success. This article can be also used as a base for future studies regarding the process of innovation, the management of the innovation process, the establishing of a management system of innovation and its implementation into existing management systems.

Keywords: innovation, innovation process, innovation management, business success

1. Approaches regarding innovation process

The innovation process is a sequence of activities carried out by the management of a company to produce new products and services, for sale. At the same time, in the category of innovation processes are included also the activities of expanding the markets, to improve the functioning of supply, production processes, equipment maintenance, distribution channels, the servicing and, not least, improving administrative and management activities of the company. In other words, any change made to the company in order to improve its economic situation, its position in the market, the working conditions of staff or protecting the environment is an integral part of the innovation process (Rothwell 1992), (Rothwell 1994), (Rogers 1995), (Van de Ven 1999), (Bessant 2005).

2. Innovation process stages

If we look at the innovation as a process we can see that this complexity of the activity of innovation led to the development of some stages for innovation, the idea of stages is present in all models of the innovation process (table 1). The smallest numbers of stages are three and the model with the highest number of stages, proposed by Tidd and Bessant, is formed from seven stages (Maier 2013).

Table 1: Stages of different approaches of the innovation process

<table>
<thead>
<tr>
<th>Stages Models</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
<th>Stage 6</th>
<th>Stage 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rothwell 1994</td>
<td>Idea generation</td>
<td>Research design and development</td>
<td>Prototype realization</td>
<td>Manufacturing</td>
<td>Marketing and sales</td>
<td>Commercialization</td>
<td></td>
</tr>
<tr>
<td>Van der Vent et al. 1999</td>
<td>Initial period</td>
<td>Development period</td>
<td>Implementation period / finishing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As it can be seen from the above approaches, an innovation is the result of a process that consists of a set of tasks and a sequence of events. By reviewing the literature, we propose a set of stages for innovation process shown in Figure 1. The innovation process typically consists of seven distinct phases that begins with an idea and ends with putting it into practice (Hesmer, 2010).

<table>
<thead>
<tr>
<th>Stages Models</th>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
<th>Stage 6</th>
<th>Stage 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nooteboom 2001</td>
<td>New ideas</td>
<td>Consolidation</td>
<td>Generalization</td>
<td>Differentiation</td>
<td>Reciprocatoin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mulgan and Albury 2003</td>
<td>Generating Possibility</td>
<td>Prototypes of promising ideas</td>
<td>Manufacturing and expanding</td>
<td>Analysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verloop 2004</td>
<td>Generating and crystallization of the idea</td>
<td>Developing and demonstrating</td>
<td>Investing and preparing for launch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cormican and O Sullivan 2004</td>
<td>The environment analyses and identifying opportunities</td>
<td>Innovation generating and investigating</td>
<td>Planning and sponsor selection</td>
<td>Project prioritization and assign teams</td>
<td>Implement the product implementation plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tidd and Bessant 2005</td>
<td>Searching</td>
<td>Selection</td>
<td>Realization</td>
<td>Execution</td>
<td>Commercialization</td>
<td>Sustaining</td>
<td>Learning and reinnovating</td>
</tr>
<tr>
<td>Andrew and Sirkin 2006</td>
<td>Generating the idea</td>
<td>Commercialization</td>
<td>Realization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hansen and Birkinshaw 2007</td>
<td>Generating the idea</td>
<td>Idea conversion</td>
<td>Idea diffusion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jacobs and Snijder 2008</td>
<td>Variation</td>
<td>Selection (Internal)</td>
<td>Realization</td>
<td>Selection (External) / survival</td>
<td>Multiplication</td>
<td>Learning</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1:** Stages of innovation process
1. The idea generating can come from internal or external company. This phase is characterized, in general, by something resembling like a chaos. Depending on frequency analysis, only 8% of companies have a clear and fixed structure to collect ideas, and one in three has a weak structure. This implies that ideas are created at random, and even worse, they are not accounted. This step is very important for the success of the innovation process and there should be a clear criteria and objectives to generate ideas and also formal procedures and systems for filtering of the ideas (Kusiak 2007).

2. Idea selection. At this stage, the company should try to eliminate less profitable ideas before spending money on investigating and future development. In the process of idea selection, usually, two very important aspects need to be considered: the first is to assess the market potential and production capacity and sales of the product, and the second level requires numerical evaluation of the product.

3. Developing and testing the prototype. There must be a clear link between innovation core competencies and the strategy - growth potential so that is maximized when all three elements are aligned, one study shows that 28% of all companies reject the idea if it does not fit the company’s strategy, while 22% are prepared to adapt policies to benefit from innovation (Kusiak 2007).

4. Business Analysis. At this stage, the company supposedly has better information on the product nature and specifications, and a marketing evaluation is needed.

5. Financial Analysis. The financial analysis is based on the evaluation of marketing. You can perform calculations showing: value of sales, variable and fixed costs and establishing new product profitability.

6. Developing and testing the prototype. At this stage, the company is faced with the task of determining aspects of establishing a low cost in order to obtain a realistic price. Test marketing is the stage in which the new product is available to the client, but in a smaller amount than in the case of mass releases, which will follow.

7. Commercialization is the last step in the innovation process, and the success of the companies is different from one company to another. This is the case where the results of the innovation process can be seen and where all the effort made for creating added value for organizations are rewarded or, on the contrary the added value obtained is not significant compared with the effort involved in creating it (Kusiak 2007).

3. The results and benefits of the innovation process

The innovation process influenced managers to create models of innovation within the organization. A model that scored very well the factors that influence an organization’s innovation process is shown in Figure 2.

![Innovation process model](image)

*Figure 2: Innovation process model (Dervitisiotis 2010)*
According to this model the innovation process can be influenced by management, organizational culture, the innovation strategy, the process of employee participation, the innovation resources, the feedback from the client, the participation of the supplier in the process.

The innovation process uses all entries above in order to select the best ideas for developing new added-value products and services, which may reach the market quickly and become new sources of revenue and profit. This process is analyzed for each of the four stages of added value: generating ideas, selecting specific innovation projects, development of new products through prototyping and commercialization (Dervitisiotis 2010). The results and benefits of a firm in the innovation process include the following (Figure 3.):

- **the impact on customers**, the form of customer satisfaction increased from products / services that offer more value with increased loyalty to the organization;
- **the impact on employees**, the form of employee satisfaction, increased loyalty and better cooperation within the organization;
- **the impact on the organization** as a growing level of confidence, a healthy attitude towards reasonable risks and greater cooperation;
- **overall improvement of performance** as measured by revenue from new products.

Successful innovation is primarily a matter of conscious, focus and lasting managerial effort - and is not dependent on the availability of brilliant scientific or creative minds. Innovation excellence is the result of achieving the best practices in each phase and size of the innovation process. To be successful, companies must live and breathe innovation. This conclusion is reinforced by the fact that less successful firms tend to have a weak innovation culture (Cobirzan 2014), for example, do not allow the occurrence of errors or reward initiative, thus undermining the culture of learning that is essential to support the generation of ideas and continuous improvement of the innovation process. Less successful companies have failed in incorporating innovation in their DNA.

Although successful innovators do everything better, they attach more importance to certain aspects. These important issues can be divided into two categories (Kusiak 2007):

- **Fundamental innovation** - strategies, culture, team, skills, learning, etc.
- **Support for innovation** - ideas, evaluation, simulation, planning and implementing business.
Regarding the process of innovation, successful companies achieved remarkable results in the implementation phase, particularly in the following parameters: training (providing specific skills) and monitoring-evaluation (to correct the accumulation of knowledge about what works and what not).

Analyzing these things we find that the true DNA of innovation is not related to the “free wheeling”, chaotic organizations which adopt a culture “out of the box”, which welcomes creative types who get brilliant ideas (Cobirzan 2013). This approach might work very well, but generally, the innovation experts do not consider this approach. On the contrary, successful innovators create a clear and concise agenda for achieving innovation, help create a solid structural framework with strong values that motivate all employees in an organization to contribute to generate and execute a variety of ideas, strategies aligned. In other words, great innovation is achieved by closely managing the innovation process and at the same time by fostering creativity.

4. Conclusion

This article wants to create a clear image of the innovation, a simple image, an image that can be very easily understood by every organization with little knowledge about the complex process of innovation. In order to create this clear image we have presented the evolution of the vision of various authors regarding the steps of the innovation process and based on these approaches, we propose a set of stages, needed in order to implement successfully the innovation process. A successful implementation of innovation by every organization is essential in bringing that added value, or that extra value so that it can remain competitive and also developments in today’s harsh economic climate.

Reference

Factors Defining Satisfaction and Loyalty of the Online Shopping Customers Within e-Commerce and Cyber Entrepreneurship

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Abstract: This abstract focuses on the analysis that concerns definition of the factors that affect customer satisfaction and loyalty when using the online shopping. Through the identified factors, it is possible to precisely specify online customer segments in terms of customer satisfaction and loyalty and that will help achieve considerably more efficient targeting of internet marketing businesses when applied in practice. In the research, e-shops are firstly categorized according to assortment which most customers buy online, while questions to the satisfaction, trust and loyalty of customers relate to the selected, most purchased assortment. The paper analyzes several research areas affecting the level of satisfaction with realizing purchase on the Internet. The first of these areas is the design of the website, a graphic layout of the e-shop website. Web design is the first factor that can attract customers and make them form certain idea of the level of seriousness and professionalism of e-shop. Another of these areas is the clarity of the web, which means ease of navigation on the e-shop website. Another factor affecting the realization of online shopping and the level of satisfaction with the online shopping is the ease of use of website during ordering goods and payment. The quality of the visual capture of assortment is another research area specific to the E-commerce due to the impossibility to touch and examine the goods before buying. Communication with the customer is another research area affecting customer satisfaction with the purchase. Communication is meant both before and after the purchase, such as a shopping assistant function, handling complaints and grievances. Another research area that affects the degree of satisfaction with the on-line purchase is transport of goods. It means variety of transport possibilities, speed and flexibility of delivery of the goods according to customer’s wishes. The price of goods also plays an important role in the decision to realize online-purchase. One of the last areas of this research is security of foreign exchange payments and guarantee for the protection of consumer data. All of these areas to a greater or lesser degree contribute to satisfaction or dissatisfaction with online-shopping. The level of satisfaction is a predictor of trust that arises between a satisfied customer and the online e-shop. Built trust affects the level of loyalty of online customers. Realization of re-purchases and customer loyalty are critical to the success and profitability of online shops. This research was conducted on a sample of more than 500 respondents. For the processing were used descriptive statistics, hypothesis testing and correlation.

Keywords: cyber entrepreneurship, customer satisfaction, customer loyalty, trust, descriptive statistics, correlation

1. Introduction

Online shopping is a growing phenomenon worldwide, especially for marketing activities on the Internet. The development of improved technology simplifies the use of the Internet as a means to buy goods and services. Research shows that online shopping is in the phase of significant growth worldwide. This fact supports a growing number of users in emerging markets who shop online for the first time and increasing confidence in e-commerce. For this reason, it is essential that suppliers in cyberspace understand online consumers.

Inspired by the idea of competitive advantage in the context of online shopping several online customer segmentations has been performed on the basis of demographic and socio-economic factors (Crisp et al, 1997; Donthu and Garcia et al, 1999). However, demographic or socioeconomic factors are not sufficient for emerging segments (Wedel and Kamakura et al, 2000) and they are not even good predictors of tendencies toward online shopping (Vellido et al, 2000). So far no segmentation based on online customer satisfaction and customer loyalty has been performed. But in a growing number of online customers and in a growing number of emerging e-shops these two aspects are currently becoming serious in maintaining competitiveness and profitability of e-shop. The cost of acquiring new customers is significantly higher than the cost of retaining existing customers (Reichheld and Schefter et al, 2000). To be precise the cost of retaining existing customers is five times higher (Strauss, El-Ansary, and Frost et al, 2006). Scientists recognize that customer loyalty is a key route to profitability (Srinivasan, Anderson, and Ponnavolu et al, 2002). Maintaining customer loyalty in the online environment is another unsolved marketing issue (Srinivasan et al, 2002).

Product comparison tools enable customers to compare alternative products and their prices easily and quickly. The customer's switch to a competitor is quick; just click (Kwon and Lennon et al, 2009). The importance of online customer loyalty is significant to the survival of a large e-shop.

For these reasons, the
project Student Grant Competition 2014 conducted the present research to determine whether the respondents in the Czech Republic are happy with online services of e-shops and whether they are loyal. It was also important to identify the factors that are crucial to ensuring customer satisfaction and loyalty of online customers according to the kind of goods.

According to the existing marketing literature several factors affecting loyalty of online customers has been proven, namely: trust (Gommans, and Scheffold Krishnan et al, 2001; Harris and Goode et al, 2004; Reichheld and Scheffter et al, 2000), customer service, website design and technology, adapting to the needs of customers (Gommans et al, 2001; Srinivasan et al, 2002), the perceived obstacle to click through (Balabanis, and Simintiras Reynolds et al, 2006), e-satisfaction (Anderson and Srinivasan et al, 2003; Balabanis et al, 2006) and image (Kwon and Lennon et al, 2009). Consumers are therefore likely to be loyal to e-shops if they perceive a high level of interactivity and customer care. (Balabanis et al, 2006) in his study covers several factors, such as e-loyalty, e-satisfaction, perceived economic barriers in terms of high prices, perceived emotional barriers in terms of loss of loyal customer benefits.

2. Research model and hypotheses

Draft of the "Model of online customer loyalty is based on conferences E-commerce forum Czech Republic and models applied within the following individual studies (Luoa M., Chen JS. And Ching R. et al, 2011) An examination of the effects of virtual experiential marketing on online customer intentions and loyalty, The Service Industries Journal; (Chiu CH-M., Chang CH-CH. And Cheng et al, 2009) determinants of customer repurchase intention in online shopping, Emerald Article; (J. Donia, Masari Passiante P. and G. et al, 2006) Customer satisfaction and loyalty in a digital environment: an empirical test, Journal of Consumer Marketing. The concept of a research model is based on and was taken from these mentioned studies. The proposed model of online customer loyalty is captured in Figure 1. Within this proposed model there were tested three hypotheses:

- $H_1$: Customer satisfaction significantly influences customer confidence.
- $H_2$: Customer satisfaction importantly influences customer loyalty.
- $H_3$: Trust of the customer significantly affects customer loyalty.

![Imagery](image167x193 to 428x406)

Figure 1: Model of online customer loyalty

3. Methodology

The research is based on an empirical method of selective interviews (interviewing a sample of respondents) according to pre-established questionnaire. As for the method of selection of respondents there was used the improbability quota selection of respondents due to inexistence of the list of population buying clothes online. Due to the technique of questioning, thus sending out questionnaires electronically through social networks, there has been established premise about electronic literacy of respondents and online shopping experience.
The sample size of respondents was based on the judgment with regard to current realized research and the size of the research budget. Data were collected in two phases. In the first phase, which included piloting, group discussions and personal interviews, the defining of satisfaction attributes was carried out. In the second phase, involving the collection of data through electronic interviews using social networks the satisfaction measurement, identifying the main factors of satisfaction and loyalty were carried out. The questionnaire is based on questions with answers in the form of a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. The data were analysed using the software STATGRAPHICS CENTURION XVI. At first methods of descriptive statistics (measures of location, variability and concentration ratios) were applied and then univariate statistical analysis (statistical hypothesis testing) and multivariate statistical analysis (correlation and factor analysis) were applied.

In the context of presented research Factors defining satisfaction and loyalty of the online shopping customers' 512 respondents were interviewed via social networks. The number of respondents consisted of 262 men (51.17%) and 250 women (48.83%). Average age of respondents is 31.89 years. Results of the research show that the most common goods purchased online are clothes 32.62%, electronics 22.85%, cosmetics 15.04% and tickets 8.79% (Figure 2).

Figure 2: The most frequent online shopping products

4. Analysis and discussion

Since the present research analyzes factors of satisfaction and loyalty of online customers by type of goods, there was selected sample of respondents who buy the most commonly purchased type of goods online, and that is clothing. The research focused on selected e-shops that offer a range of the most commonly purchased goods online, which is clothing. The sample includes 167 respondents out of 512 respondents. According to the research results men buy clothes online more frequently (56.89%) than women (43.11%). After application of the Sturges rule there were created 23 age range intervals. The most frequent age of respondents ranges from 19.6 to 22.22 years. The coefficient of variation reaches Vx = 0.3042. Standardized skewness coefficient is α = 4.04588 which means slightly positively sloped frequency distribution. The value of the standardized kurtosis coefficient β = -0.305218 indicates that it probably was a flatter distribution than the standard normal distribution.

As for the education of the respondents who buy clothes online, the most frequent are the respondents with university education (46.71%), then secondary school graduates (33.53%), without GCE (10.18%) and primary education (9, 58%) (Figure 4).

When determining the overall satisfaction with buying clothes online 78.44% of respondents said that e-commerce has met their expectations, 9.58% of respondents said that e-shop even exceeded their expectations and 11.98% of the respondents were not satisfied.

In the following table there are captured 25 factors which affect to a greater or lesser extent customer satisfaction. It should be emphasized that the degree of satisfaction with these factors relates to satisfaction with the buying clothes online. Factors that have the most significant contribution to customer satisfaction
when buying clothes online are: product description, resolving claims, photo documentation, offer of payment options and speed of response. The least satisfaction is with the factor of shipping and handling.

![Polygon of Age](image)

**Figure 3:** Polygon of age

![Education](image)

**Figure 4:** Education

**Table 1:** Summary statistics

<table>
<thead>
<tr>
<th>Factor</th>
<th>Average</th>
<th>Standard deviation</th>
<th>Coeff. of variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product description</td>
<td>4,01198</td>
<td>0,658476</td>
<td>16,4128%</td>
</tr>
<tr>
<td>Resolving claims</td>
<td>3,99401</td>
<td>0,867742</td>
<td>21,7261%</td>
</tr>
<tr>
<td>Photo documentation</td>
<td>3,9521</td>
<td>0,855939</td>
<td>21,6578%</td>
</tr>
<tr>
<td>Offer of payment options</td>
<td>3,93413</td>
<td>0,919257</td>
<td>23,3662%</td>
</tr>
<tr>
<td>Speed of response</td>
<td>3,82036</td>
<td>0,838138</td>
<td>21,9387%</td>
</tr>
<tr>
<td>Info about the processing</td>
<td>3,79042</td>
<td>0,876963</td>
<td>23,1363%</td>
</tr>
<tr>
<td>The smoothness of the succession</td>
<td>3,7485</td>
<td>0,734015</td>
<td>19,5815%</td>
</tr>
<tr>
<td>Info on availability</td>
<td>3,72455</td>
<td>0,708508</td>
<td>19,0226%</td>
</tr>
<tr>
<td>Communication of the e-shop</td>
<td>3,69461</td>
<td>0,789331</td>
<td>21,3644%</td>
</tr>
<tr>
<td>Range of goods</td>
<td>3,66467</td>
<td>0,87544</td>
<td>23,8886%</td>
</tr>
<tr>
<td>Impression of the website</td>
<td>3,62874</td>
<td>0,689779</td>
<td>19,0088%</td>
</tr>
<tr>
<td>Web design</td>
<td>3,60479</td>
<td>0,806286</td>
<td>22,3671%</td>
</tr>
<tr>
<td>Delivery of goods</td>
<td>3,5988</td>
<td>0,807046</td>
<td>22,4254%</td>
</tr>
<tr>
<td>Total</td>
<td>3,58563</td>
<td>0,861954</td>
<td>24,0391%</td>
</tr>
<tr>
<td>Speed of delivery</td>
<td>3,56287</td>
<td>0,847</td>
<td>23,7729%</td>
</tr>
<tr>
<td>Provided info</td>
<td>3,53892</td>
<td>0,75049</td>
<td>21,2067%</td>
</tr>
<tr>
<td>Price level</td>
<td>3,52695</td>
<td>0,883683</td>
<td>25,0552%</td>
</tr>
<tr>
<td>Observance of info on the web</td>
<td>3,52096</td>
<td>0,726755</td>
<td>20,6408%</td>
</tr>
<tr>
<td>Flexibility of delivery</td>
<td>3,45509</td>
<td>0,862237</td>
<td>24,9556%</td>
</tr>
<tr>
<td>The success of the transaction</td>
<td>3,45509</td>
<td>0,903184</td>
<td>26,1407%</td>
</tr>
</tbody>
</table>
Table 2: Frequency table

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Row Total</th>
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<tbody>
<tr>
<td>not come up to expectations</td>
<td>2</td>
<td>5</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>exceed expectations</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>10</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>come up to expectations</td>
<td>0</td>
<td>9</td>
<td>66</td>
<td>46</td>
<td>10</td>
<td>131</td>
</tr>
<tr>
<td>Column Total</td>
<td>2</td>
<td>14</td>
<td>82</td>
<td>56</td>
<td>13</td>
<td>167</td>
</tr>
</tbody>
</table>

1) H₀: The level of overall satisfaction does not affect the level of trust in the e-shop.
2) Test criterion:

\[ G = \sum_{i=1}^{r} \sum_{j=1}^{s} \frac{\left( n_{ij} - n_{ij}^* \right)^2}{n_{ij}} \sim \chi^2_{(r-1) \times (s-1)} \]

3) Critical study:

\[ W \equiv \{ G, G \geq \chi^2_{\alpha, 56} (8) \} \]

\[ W \equiv \{ G, G \geq 15,597 \} \]

4) Tests of Independence:

Table 3: Tests of independence

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic</th>
<th>Df</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>41.902</td>
<td>8</td>
<td><strong>0.0000</strong></td>
</tr>
</tbody>
</table>

41.902 > 15.507 \rightarrow G \in W

At the significance level of 5% it was demonstrated that the level of overall customer satisfaction affects the level of customer confidence in e-shop. According to the results of Cramer’s V and Pearson’s R there is a weak dependence.

Table 4: Coefficients of dependence

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>P-Value</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contingency Coeff.</td>
<td>0.4479</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cramer’s V</td>
<td>0.3542</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conditional Gamma</td>
<td>0.2619</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson’s R</td>
<td>0.1742</td>
<td>0.0244</td>
<td>165</td>
</tr>
<tr>
<td>Kendall’s Tau b</td>
<td>0.1338</td>
<td>0.0605</td>
<td></td>
</tr>
<tr>
<td>Kendall’s Tau c</td>
<td>0.0960</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The second hypothesis examines whether there is a correlation between loyalty to the e-shop and the level of overall satisfaction or dissatisfaction with online shopping for clothes, in other words, whether the degree of
customer satisfaction affects the loyal attitude to the e-shop at a significance level of 5%. To determine the dependence a correlation table was used (Table 5).

**Table 5: Frequency table**

<table>
<thead>
<tr>
<th></th>
<th>yes</th>
<th>no</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>not come up to expectations</td>
<td>6</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>exceed expectations</td>
<td>14</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>come up to expectations</td>
<td>83</td>
<td>48</td>
<td>131</td>
</tr>
<tr>
<td><strong>Column Total</strong></td>
<td><strong>103</strong></td>
<td><strong>64</strong></td>
<td><strong>167</strong></td>
</tr>
</tbody>
</table>

1) H₀: The rate of overall satisfaction does not affect the level of loyalty to the e-shop.
   H₁: non H₀

2) Test criterion:

\[ G = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(n_{ij} - \bar{n}_{i}. \bar{n}.)^2}{n_{ij}} \approx \chi^2 \times (r - 1) \times (c - 1) \]

3) Kritický obor:

\[ W = \{ G, G > \chi^2_{0,05} (2) \} \]
\[ W = \{ G, G > 5,911 \} \]

4) Tests of Independence:

**Table 6: Tests of independence**

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic</th>
<th>Df</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>13,161</td>
<td>2</td>
<td>0,0014</td>
</tr>
</tbody>
</table>

**13,161 > 5,911 \Rightarrow G \in W**

At the significance level of 5% it was demonstrated that the level of overall customer satisfaction influences the degree of customer loyalty to e-shop. According to the results of Cramer’s V and Pearson’s R there is a weak dependence.

**Table 7: Coefficients of dependence**

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>P-Value</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contingency Coeff.</td>
<td>0,2703</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cramer’s V</td>
<td>0,2807</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conditional Gamma</td>
<td>-0,2212</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pearson’s R</td>
<td>-0,0983</td>
<td>0,2064</td>
<td>165</td>
</tr>
<tr>
<td>Kendall’s Tau b</td>
<td>-0,0958</td>
<td>0,2054</td>
<td></td>
</tr>
<tr>
<td>Kendall’s Tau c</td>
<td>-0,0792</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The third hypothesis examines whether there is a correlation between the level of trust and loyalty to the e-shop, in other words, whether the degree of customer confidence affects the loyal attitude to the e-shop at a significance level of 5%. To determine the dependence a correlation table was used (Table 8).

**Table 8: Frequency table**

<table>
<thead>
<tr>
<th></th>
<th>yes</th>
<th>no</th>
<th>Row Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>48</td>
<td>34</td>
<td>82</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>16</td>
<td>56</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td><strong>Column Total</strong></td>
<td><strong>103</strong></td>
<td><strong>64</strong></td>
<td><strong>167</strong></td>
</tr>
</tbody>
</table>
1) $H_0$: The level of consumer confidence in e-shop does not affect the level of loyalty to the e-shop.  
$H_1$: non $H0$
2) Test criterion:
$$G = \sum_{i=1}^{r} \sum_{j=1}^{s} \frac{(n_{ij} - \mu_{ij})^2}{\mu_{ij}}$$  
$\chi^2$ 
3) Critical study:
$$W \equiv \{ G \geq \chi^2_{0.05} (r-1) \times (s-1) \}$$  
$$W \equiv \{ G \geq \chi^2_{0.05} (4) \}$$  
$$W \equiv \{ G \geq 9.488 \}$$
4) Tests of Independence:

Table 9: Tests of independence

<table>
<thead>
<tr>
<th>Test</th>
<th>Statistic</th>
<th>Df</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>6,622</td>
<td>4</td>
<td>0,1573</td>
</tr>
</tbody>
</table>

6,622 < 9,488 $\rightarrow$ G e V

At the significance level of 5% it was demonstrated that the level of consumer confidence in e-shop does not affect the level of loyalty to the e-shop.

5. Implications and conclusion

The research results show that the most purchased goods online are clothes, electronics, cosmetics and tickets. According to the research results respondents who say they most often buy clothes online, buy more often and in smaller amounts. Factors that have the most significant contribution to satisfaction of customers who buy clothes online are description of the goods, resolving claims, photo documentation, offer of payment options and speed of response. Respondents are least satisfied with the factor of shipping and handling. A significant proportion of another factor which is description of the goods can be attributed to the need for more detailed description of the structure of a substance, instructions for washing etc. Also factor of photo documentation is related to this aspect due to an inability to see and touch the product or try your size before you buy. Resolving claims factor and its significance may be related to any exchange of goods because of the wrong size, style or material. The speed of response is directly related to this factor. Offer of payment options is another factor with a significant share of satisfaction. According to the research results the respondents are least satisfied with the factor of shipping and handling. Due to the nature of the goods there is possible relation to replacing expensive goods.

Within the proposed model of customer loyalty there were tested three hypotheses. Only the first two were verified. Satisfaction or dissatisfaction affects the level of customer confidence in e-shops but only slightly. As for the second hypothesis, satisfaction or dissatisfaction affects loyal attitude of customer but only slightly. Dependence between trust and loyalty to the e-shop has not been demonstrated. According to the research results e-shops offering clothes can be recommended to focus on the description of the goods, thus creating the appropriate content, photographic documentation, meaning capturing goods in high-quality resolution, then to simplify the resolving claims and work on speed of response and the offer of payment options. As was shown online customer satisfaction slightly affects the attitude of loyal online customer, therefore it is necessary to work on customer satisfaction and increase the level of satisfaction to retain existing customers but also to attract new customers.

References


Design of Process and Organizational Innovation Application Methodology

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Abstract: This paper reports on the current situation in many companies involved in improving their processes using industrial engineering methods. But the room for their use is still shrinking. There is a need for innovative approaches to be applied in the areas of process and organization for business competitiveness. This, however, affects management methods and approaches, which may be reasons for failure, as described in this paper. Opinions are supported by findings two kind of research. Quantitative research focuses on the weights of influences on business performance and applications of selected methods in industrial engineering companies. The second research inform about results of characteristics of improvement projects and approaches to improvement from conducted case studies in manufacturing companies are also listed. The results show the need for applications that cannot be random, but rather systemic. The conclusion of this paper is also an objective, whereby the design of a methodology for process and organizational innovation application is carried out.

Keywords: improvement, process innovation, organizational innovation, industrial engineering, project management, competitiveness

1. Introduction

The constant rush of manufacturing companies to reduce costs through lean cannot be infinite. The application of Lean, Six Sigma or lean manufacturing methods, in fact, hides in our company environment simply cutting costs in the form of reducing personnel or stores or increasing standards of time consumption, but this does not lead to long-lasting success. Since it is only a partial reduction in costs and improvement of an existing process, it is only a one-sided success. On the other hand, there is a need to focus on customers and their needs. By simply cutting costs the value is not increasing, which decides about product marketability.

Processes are not changing, only the arrangement of internal elements, but this can stand behind future success or failure. Determining customer needs and then applying these to the process is the right way to succeed in the future. It is process innovation, which is necessary for change.

Innovation is currently an often discussed term, where many actions and deeds are hidden. Very often there is a blending of improvements through rationalization proposals, and for “better-sounding” concepts terms such as innovation or application project are used. But no border is defined, where we talk about improving and it is already possible to use innovation. At present, it depends more on the creativity of authorities or a change of owners.

This contribution will be devoted to the issue of the impact of industrial engineering and project management on process and organizational innovation creation. In the Czech business environment, too much importance in this area is not given; discussion on the topic of innovation mostly revolves around product innovations, but behind ultimate success lies the production process itself, which has been neglected.

The main aim of this paper is to describe the design of a methodological procedure for the successful application of process or organizational innovation. The actual proposal was preceded by appropriate research.

2. Current state of solved issue

The Czech Republic, as an EU member and also as a separate economy, was included (based on analysis) among 25 rapidly developing economies said to have a better chance of overcoming any crisis. One of the pillars for continuing to grow is success in the field of competitiveness, and one of the possible potentials is innovation.
The innovative potential of the Czech Republic cannot be compared without the context of developments. The economy of our country, and in particular its competitiveness, is strongly signed years of central planning and bureaucratic control, the consequences of which we carry today. Since the Velvet evolution, our country has had to deal with the problems that still carry them and that may be one of the reasons for our position in the watch innovation performance. The weaknesses include our innovative environment (AIP CR 2012 -2014):

- dangerously low number of patent applications per capita (1.6 times lower than in Hungary, 3.2 times lower in Slovenia, 8.4 times lower than in Finland, 13.7 x lower than in the USA),
- very low number of innovative companies,
- low volume of seed funding (the so-called “seed capital”), thus supporting the first phase of spin-off companies.

The causes of this unsatisfactory situation are as follows:

- little emphasis on patents, especially realized,
- inadequate care research and business circles of protection of industrial property rights,
- little support for applied research,
- unsatisfactory practices in the transfer of research results into practice (which does not lead to the creation of spin-off companies),
- small amount of venture capital - venture capital , causing small state interest (analogy with indirect support instruments), but also a lack of supply of interesting and promising topics (direct link to the absence of patents).

Unfortunately, this fact is confirmed by the latest statistics, and the gap between us and the innovation developed countries is still growing.

The Innovation Union Scoreboard divided the EU member states into four groups based on their summary performance. The Innovation Union Index is categorized into three main types of indicators, which are divided into 25 different indicators. The Czech Republic belongs to the moderate innovators group with a below average performance. The indicators, relatively strength, are human resources, innovators and economic effect. The weaknesses are in excellent and open research system, finances and innovation support. A strong decline in non-R&D expenditures was noticed. If we compare the obtained results with the best group, there still exist differences these groups in the categories described above (europa.eu 2012)

On June 8, 2009, the National Innovation Strategy of the Czech Republic for the period 2011–2015 was approved by Resolution of the government n. 729. The main objective is to reinforce the importance of innovation and the use of high technologies as sources of competitiveness for the Czech Republic. This idea is further supported by the Ministry of Industry and Trade. As a proof is publication of the framework programme Competitiveness and Innovations 2007–2011, which is still running. The programme is addressed to European communities to promote innovation, including eco-innovation, entrepreneurship and more. Up to 60% of the budget is designed for small and medium-sized enterprises, which can play straight in development and be much more flexible in response to stimulus than large businesses, which have long-term development, but whose flexibility is sometimes slower. Innovation is therefore strongly supported by the government of the Czech Republic and thus offers a consolidation of its activities in Czech enterprises. (Ministerstvo průmyslu a obchodu 2005)

Problem area is access to innovation. The way innovations are managed often lacks a systematic approach, which is an area that will be discussed in this work.

2.1 Management methods

If you can think about process innovation, or even improvement, all these processes need to be driven. The success of the application depends on the way it is managed.

The importance of management techniques is that they fundamentally determine a company’s needs. They are a marker between corporate strategy and its implementation. Management methods, for any character of changes, affect corporate governance, all processes, human resources and finally enterprise culture and
climate. There are a number of specific methods that are used across an enterprise (process management, strategic management etc.). Each specific method can be stacked and combined in different ways. (Basl 2012)

It is necessary to approach the innovation of enterprise systems methodically and by respecting fundamental principles. These should reflect the types of innovations and should be based on the concepts of:

- system concept,
- innovation orientation to main goals,
- knowledge concept of innovation,
- concept of ongoing changes in innovation cycle. (Basl 2012)

Ways in which companies can respond to the challenges of a changing society have been described as innovative studies. They focus on the industry knowledge base, database links in industry surveys and breadth of information, which must be evaluated. Cluster analysis is used for processing; it reaches conclusions about knowledge structure and the need for innovation. (Fagerberg 2012)

The whole innovation process is a sequence of individual activities. Innovation is realized if it is located on the market and is actually used in the production or management process. Continuously implementing effective innovations in the business unit is expected to fulfil the double objective of:

- eliminating or at least mitigating inefficiency,
- setting up and maintaining effective long-term development and growth of the business unit (Vlček 2010).

During the creation and management of process and organizational innovation it is necessary to keep the previous concept.

### 2.2 Failure reasons

Proverbial resistance to change is not a universal human trait. In fact, man likes change, looks for it and gets pleasure from it – if the change protects the support network, which he is a part of. Man did not hinder progress in the form of the typewriter, toothbrush or powerful tractor or car. He does not prevent current technologies, but does to top ones. For which process and organizational innovation can be considered. Hitting into an existing, for functional system worker and change of its conception, sequences and previously accepted rules does not always lead to positive acceptance. (Kosturiak 2010)

Possible reasons for failure in innovation and improvement are:

- Managers and entrepreneurs do not understand that innovation is a source of future business, competitive advantages and profits. Innovations don't have to be revolutionary changes or sophisticated technical solutions. What is what is not an innovation is not decided by the leaderboard, or offices, but the customer.
- Innovations do not have space in the company in a key process, whose product is unknown future business.
- There are companies that claim they are innovating, but they do not know their customers and their needs.
- Innovation management is a process and not a project, as was needed. Areas such as production and innovation are managed differently.
- Development of production is usually unilateral, but innovation capacity is lagging behind.
- Systematic procedures and innovative methods are almost unknown in enterprises. (Kosturiak, Chal 2008)

Possible problems that may arise from innovation application include a lack of stabilization of these innovations. The area that may be most affected is the one where the human factor enters into the process during daily activities. The lack of stability standards for new innovative processes causes lower growth performance than was expected.

Successful innovation is not a coincidence or an isolated idea. It is a planned, managed process. During the whole process it is necessary to realize that the later we discover a mistake that we have committed, the more expensive is its axle.
2.3 Definition of innovation and improvement

A lot of literature in the production process is devoted to comparing and distinguishing innovation from improvement. Under the concept of change in industrial engineering falls Kaizen, continuous process improvement and re-engineering, which affects radical changes that are more related to innovation. The present article deals with concepts such as improvement and innovation.

It is be appreciated that successful product innovation cannot be realized without properly installed and functioning processes. Each individual process is further influenced by a lot of factors that need to respond, along with the process model, to the desired output. Process improvement is an activity characterized by a few steps. At the beginning of each improvement is a thorough analysis and the next step after the analysis and evaluation is to design a new state and its improvement. Here we see the possible scope for the implementation of industrial engineering methods, which are designed to assist proper management of the process and to manage a successful conclusion. Approaches to how to improve are few; basic ones include:

- TOC – Theory of Constraints (bottleneck theory), which also focuses on the weakest link of the production chain, strengthens it and increases its flow.
- Six Sigma – this methodology tries to reduce variability in the process. If the process meets Six Sigma, then it produces 3.4 failures from the million made.
- Application of lean processes – their base is the elimination of waste and continuous improvement. (Kosturiak 2010)

The word “innovation” comes from Latin and means “restore”. In most research work, by this term we mean planning and organization changes. By innovation we can describe a creative process, whose goal is to solve problems in a unique way. Innovation is a change in innovation (product, process, service) and transition to a new state.

One opinion, if there is still room for innovation of radial significance, was expressed in the article, when it was said that rather than being driven by user requirements, innovation design is driven by promoting a strong vision about possible new products. Meanings and understanding can be understood variably in society. Design innovation and its management, which plays such a key role in innovation strategy, remains largely unexplored. (Verganti 2008)

Since this contribution deals with the area of production, where innovation is possible in the process or in organizational focus, the remaining types of innovation will not be characterized.

Process innovation is defined as the introduction of new or significantly improved methods of production or distribution. This includes substantial changes to procedures, technology or equipment or software improvement and process optimization and re-engineering. The aim is always to increase productivity, increase business performance, reduce scrap, and more. Organizational innovation is the introduction of a new organizational method in business practices, jobs, organizational and external relations. This type of innovation also involves an increase in business performance by reducing administrative costs, improving the working environment or reducing the price of supplies. The aim is to increase productivity plays a very significant role in deciding the financial side of the project. In times of economic crisis, all the costs that the implementation of innovation causes are carefully considered. Innovation itself is very costly; on the other hand, it is also a source of extraordinary innovation profits. Innovation is the key driver of economic development and brings other benefits. Ideas and discoveries increase our standard of living. Innovation can contribute to increasing safety, improving health care, improving the quality of products and introducing more environment-friendly products to the environment. Innovation will significantly increase productivity and dramatically change the way we live. Innovation and education are key conditions for success in the knowledge economy. (Vacek 2008)

Importance and weight should be placed mainly on a strategic approach to knowledge management, which is a key element of success in innovation, both in the theory and practice of companies. In this sense, companies must be able to manage knowledge in innovation process, in particular, understanding business partners, their models and strategic plans, such as their motivation to cooperate. (Valkokari, Paasi 2012)
Due to the focus of this contribution, the surveyed area will be orientate particular process and organizational innovations that extend into the most researched part of the innovation process, which is part of the production where your application will find methods of industrial engineering. There is a strong likelihood that their separate use will not be possible. Logic suggests that due to the type of innovation others cannot be applied, since the application of one most likely causes the use of another. The author assumes that in the case of product innovations there will be pressure on the innovation process, which must ensure the production of innovative products and thereby move it closer to the end consumer. Innovation of a production system, how procedural and organizational innovation can be understood, is likely to significantly interfere with the operation of the principle, but the nature of the function should be maintained. This would be the application of the sixth or seventh innovation order.

3. Methodology

The above-described problems of the current situation reveal that it is a current topic and very important for business. Innovation is an often discussed concept and we can say its importance grows. In cases where companies avoid existing principles that are no longer sufficient for market needs and customer requirements (both external and internal), and successfully implement their portfolio innovation processes in process and organizational innovation through systematic procedures, which is project management, they achieve significant competitive advantages that significantly affect the future existence of the market.

The aim of this paper is to demonstrate the importance of design of methodology of a systematic approach to the application process and organizational innovation. Importance is demonstrated by the confirmation of hypotheses in this paper. The design will be made according to project management that provide a systematic approach, taking into account the critical points, which will be defined in part of the research.

Based on these assumptions, two hypotheses were defined:

H1: In Czech companies a systematic approach is not used for improvement projects.

H2: There is a space in Czech companies, which are the methods of industrial engineering ready for connection with project management to implement process innovation.

Confirming or refuting these hypotheses and getting aims is important be made the research. There are two kinds of research, quantitative interviews and case studies of practical improvement projects. The aim of of quantitative research is primarily about obtaining information about knowledge, and the prevalence of use of industrial engineering methods that are inherently associated with managing change in the manufacturing environment and thus process innovation. At the same time determine whether there is space in the Czech companies to use project management to the implementation of process innovations. The second aim of of the research is to identify the critical points in the course of practical improvement projects and to determine the level of use of a systematic approach to improvement projects.

The procedure for obtaining this information was evaluating quantitative research through project IGA/79/FaME/10\D OTB and the effect of the application of industrial engineering methods on manufacturing and logistics organization performance. Research was conducted in 90 manufacturing companies that are a target group for obtaining the necessary information and are the basis for steps leading to the goal of the work (the design of a methodology for the application process and organizational innovation).

A total of 402 Czech and Slovak companies took part in the quantitative research. Quantitative research was conducted using the questionnaire inquiry. Questionnaires were sent to representatives of companies electronically. The selected group of 138 respondents (manufacturing companies) was beyond the basic questionnaire addressed to implement subsequent more detailed qualitative research oriented mainly on the content of the production and logistic processes in organization, production and logistics business performance factors used, methods and metrics management and measurement of manufacturing and logistics performance, the extent of actual or planned implementation of industrial engineering methods in organizations. Research was conducted through structured questionnaires, where respondents answered questions prepared in advance and consultation to defined circuits.

Another approach to obtaining the necessary documents for drafting a methodology comprises case studies undertaken in the context of improving or improvement projects. Both of these approaches took place in an
Pavlina Pivodova, Eva Jurickova and Roman Bobak

environment of manufacturing firms. In the current process, change took place in the form of improvement that used some of the methods of industrial engineering, or the change was carried out systematically and through a rationalization project. The research was conducted personally with the author’s contribution and participation in research during her PhD study. These case studies must carry same basic characteristics for all who are involved in the research and will provide a basis for the proposed methodology.

4. Results

Based on the above-described research method, which will serve as an information base for the creation of the methodology, the following results are contained in this chapter.

4.1 Quantitative research

From quantitative research the following values occurred. The evaluation criteria, for use in this work, were the studied area of innovation and the production process, and the other area was the examination of applications of industrial engineering methods in surveyed companies.

The first examination of the impact of weight on factors affecting performance (values 0–5) was the result of the selected values:

- Innovative activity – 3.41 out of 5
- Manufacturing process – 4.31 out of 5
- Resource utilization – 4.14 out of 5
- Product – 4.35 out of 5

The results of the mentioned values are shown in Figure 1.

**Figure 1**: Influence of weight of factors affecting performance

By second examination in firms applications of industrial engineering methods, was found and which was evaluated as:

- Lean production – 28.13% from 100%
- Most – 15.63% from 100%
- 5S – 21.88% from 100%
- Kaizen – 62.50% from 100%
- SMED – 15.63% from 100%. The methods are shown in Figure 2.

The quantitative research had an extensive character and simultaneously served to compare the development of individual characteristics observed in previous years (2002, 2010).
4.2 Project participation

In manufacturing companies, with vast holdings of one engaged in chemical production focused on the processing of food additives and detergents, improvement projects have been implemented, numerically 10 and 4. The characteristics that serve to implement various improvement stages were identical for all projects. Only four other improvement approaches processed in different societies have different steps. On the basis of documents, the following information was found.

In the process of manufacturing companies, where there was no systematic process, improvements were detected, and these shortcomings are being solved:

- 100% of the time-consuming exceeding to implement,
- 75% of non-completion of planned savings and therefore targets
- 50% with volatility of phase change and improvement after six months.

For evaluation, only general characteristics were chosen that provide a basic overview. The cause of shortcomings in the first place seems to be the lack of a systematic approach. Failing to achieve organizational objectives, the problem itself and application improvements. Instability solutions build on previous parameters, and high frequency of failure to achieve goals may indirectly affect the volatility changes, therefore there is a lack of control mechanisms. The environment improvement projects in a manufacturing company comprised ten improvement projects. All were based on the concept of project improvement through the DMAIC method. None of the projects have been duplicated and executed in the same production environment. The phases, milestones bounded time guaranteeing a clear sequence of steps. However, there were shortcomings:

- 10% exceeding time performance for realization,
- 40% failure of planned economies and therefore goals,
- 40% with volatility of changed phases and improvement after six months.

The research shows that systemacy secured by using the DMAIC approach appears to be positive. However, there still exist the same shortcomings as in previous research.

4.3 Methodology design

From previous research, these conclusions arise:

- The need for a systematic approach.
- Strengthening of the application access.
- Definition of control mechanisms.
The research was used to evaluate the defined hypotheses. Both hypotheses were confirmed. H1: was confirmed on the basis of the case studies. Lack of a systemic approach, which causes a time delay and making for economies and goals. H2: was partially confirmed. The results of the quantitative research confirmed the existence of space to use project management; industrial engineering methods, however, are not at a high level.

Concerns expressed in the article deal with the application of process and organizational innovation, where improvement is insufficient. This is a situation where you need to build on the design of product innovation, and quickly respond to changing technologies and customer requirements, with the smallest deviations from the desired state. Whilst there are currently no resolutely separate concepts of innovation and improvement in corporate practices, methodology design is designed to change a major character, which needs to be managed. Time and resources are important for the company.

For design systematic approach is maintained, which is based on the DMAIC method and was verified by case studies. Application access, which should ensure the creation of good changes that will guarantee benefit sis taken from product innovative methodologies WOIS, that is commonly used. By logical path is included in the steps of the analysis and implementation, which leads to action that ensures value creation. The design model can be described as follows:

D – Define
M – Measure
A – Analyse
  1) Define strategic direction.
  2) Define contradiction.
I – Implementation
  3) Solve contradictions and search for solution maps.
  4) Innovation of process, organization, resources, enforcement.
C – Control

Changes made based on steps that ensure the detection of solutions to needs to achieve the desired objectives and their subsequent implementation will cover application access. Only after testing the proposed model is it possible to reassess the control mechanisms, which are another area of failure. The model is currently a proposal without further specification of the steps that will be added in the future after the completion of research and extension. The proposed model is currently being tested in corporate practice. The analysis steps and implementation are completed, and the control phase is beginning. It is therefore not possible to fine-tune model nuances. The project will be evaluated only after the control phase. Individual steps in designing the model will be subsequently refined and generalized.

5. Discussion

The current approach of society, which includes manufacturing companies, consumers and government, is often to use the words “innovation” and “innovated product”. Companies are constantly seeking a competitive advantage when they use free space on the market by creating or upgrading an existing product.

However, there is no secondary event, which has significant contribution in maintaining product in the market and the profitability of a company. It is a process innovation, whereby product is needed to quickly and efficiently adapt to the work environment. This must be done so that the primary effect of product innovation is not reduced, but rather is supported by reliable delivery, a satisfactory level of cost, a continuous flow of material and all related aspects for the production and distribution of innovative products. This also results in a need for changes in the work organization and its filling.

Methodology design is the first step to maintaining successful production, which was upgraded. It makes a significant contribution to further developments in this area. I think that methodology for process and organizational innovation is primarily beneficial for manufacturing organizations, but is also important for theory, since this is a new area. The next steps would be testing methodology, its treatment and subsequent generalizations.
6. Conclusion

Process improvement through IE methods such as continuous process improvement leads to an improvement of standards and processes, but not always, since process improvement, whose parameters are not sufficient, does not lead to success. Using an innovation environment in process manufacturing companies in the Czech Republic is still a very strong player in a company’s competitiveness. Innovation is a much discussed term, but its use in practice is not entirely known. Therefore, this contribution is devoted to designing a methodological procedure for applying procedural and organizational innovation.

Proposal precedes the research, defining its aims and objectives. The results of quantitative research, which is dedicated to influence of factors affecting the performance. When indicated, non-innovative processes in companies are still underestimated. Another area of research that examined the application of selected methods for IE in organizations, reason was, in what way improve is preferred in societies and through what methods. The quantitative research was supplemented by examining the results of case studies that were conducted in corporate practice. There were 14 studies in total. Two areas were carried out. The first was manufacturing companies, which was an environment where process improvement took place. The second area was that of the production environment, where the ten studies was the improvement projects were all carried an identical approach. The basic characteristics of all 14 were then evaluated. The conclusions obtained were developed to design a methodology for application process and organizational innovation. The present proposal is being tested in the corporate environment and is in the control phase.

References

The Linkage Between Tacit Knowledge and Models of Innovation: A Theoretical Overview Towards Companies’ Performance

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Abstract: Deeply embodied in emotions, personal values and beliefs, tacit knowledge emerges associated to skills which are dynamically translated into individual actions and experiences. Marked by its intrinsic difficulties in its formalization and communication processes, knowledge capture or creation seems to be intuitive, interpretive and hard to measure and disclose. Broadly understood as the main source of wisdom, it can be individual or collectively held, and its transformation process merges through the development and interpretation of explicit knowledge, usually structured around codification processes. If developed in a sustainable basis, those transformation processes are a source of competitive advantages. Its embodiment results in indexed drivers such as the contextual nature in which the fluidity becomes the key enabler of creation. Embodied in proactive strategies, knowledge and innovation are linked in a bilateral cause and effect clue towards the competitive advantages identification. Thus, intangibles factors that support them plunge, naturally, in the four areas of innovation proposed by the OSLO Manual: product innovation, process innovation, marketing and organizational innovation. This linkage between tacit knowledge and innovation emerges from a multiplicity of contingent circumstances whose origin intersects the creation and the evolution of specific models which depends from the systematic capture of tacit knowledge typologies and natures. Despite the recognition of its importance in the economic and social development and sustainability, the efficiency and the effectiveness of the generating innovation processes have been characterized by their complexity in identifying, from a whole model, the causal links between science, technology, and society. This paper aims to identify the main innovation models from a macro and microeconomic perspective. Researchers and practitioners could identify the main innovation drivers and the multilateral links between its structural dimensions. This outlook is a multivariate overview about innovation linkages and their potential impacts in the companies’ performance. In this step, the theoretical model is also provided which identifies the main variables and cause and effect impacts in the integrated knowledge creation processes and intellectual property development and registration. Throughout a Structural Model of Equations (SME), our research aims to identify those structural linkages and theoretical relations between them. Furthermore, this theoretical model are derived from innovation boundaries and aligned with companies’ performance indicators such as return on equity, return on assets or even economic value added. It is expected that most of those variables could positively influence the performance towards a dynamic and structured sustainability, from a financial and strategic positioning.

Keywords: tacit knowledge, intellectual property, models of innovation, performance

1. Introduction

Knowledge and innovation emerge in modern economies as a competitive source of advantages (Nonaka and Takeuchi, 1995) and intangible drivers that support them (e.g. new or significantly improved products, update processes, development of brands or organizational restructuring, among others) falls naturally in the four types of innovation presented by the OSLO Manual (OECD, 2005). Quantifying, evaluating and benchmarking innovation competence and practice is a significant and complex issue for many contemporary organizations (Frenkel et al., 2000). An important challenge is to measure these complex processes and explore the connection between them and tacit knowledge. Studies of innovation, technology transfer and technology diffusion identify tacit knowledge as an important component of innovation (Dosi, 1988) being from this one that flourish the application of creative knowledge. Inventions stems from the technological materialization from all the efforts involved in the creation of new ideas and are often the first of several stages before an innovation is fully realized. Those processes often require the accumulation of new knowledge that precedes innovation (Kline e Rosenberg, 1986). Intellectual property (IP) is one of the most important groups of intangibles and represent, largely, the achievement of results in R&D (Erikson e Rothberg, 2008). To the World Intellectual Property Organization, IP reflects the capacity of human creation into inventions, literary and artistic works, symbols, names, images and commercial designs (Idris, 2003). Supported by the importance of the evolution of the innovation models, and based on the importance of IP as an inductor of value creation in organizations and consequently of its strategic positioning, and based on the current economic and financial context we aim, in this study, to propose a theoretical model that seeks to identify the main variables that
In introduction we briefly argue the importance of achieving tacit knowledge, also highlighting the importance of tacit knowledge in the innovation models. We also go through our working hypotheses based on the relationship between the models of innovation and the organizational performance. Then, research methodologies and a brief summary and directions up are presented.

2. Achieving tacit knowledge

The essence of knowledge creation was argued by Nonaka and Takeuchi (1995) as the “capability of a company as a whole to create, disseminate it throughout the organization, and embody it in product, services and systems”. As a result of this process, emerges the relation between tacit knowledge and explicit knowledge. Tacit knowledge is interpreted by Teece (1998) and Lopes (2010) as personal, applicable and specific to a particular context and, therefore hard to express by words, communicate or even formalized or structured. This heuristic, subjective, symbolic, and internalized knowledge, may be learned through practical examples, experiences and practices and, according Nonaka and Takeuchi (1995), includes cognitive and technical elements. Through cognitive elements it is possible to create an image of the present and project it into the future. These mental models allow us to use implicitly these elements in the analysis of the world around us and help us to create a vision of a reality in the future through the use of analogies, schema, paradigms, perspectives, beliefs or points of view. Thus, technical elements include the concrete know-how, skills and other competences hard to define. By contrast, articulated or explicit knowledge is codified and transmittable in formal and systematic languages. Despite the various means of dissemination, explicit knowledge may be expressed by words, numbers, scientific formulas, technical patterns, product specifications or coded procedures, among others and its major constituent is the general scientific principles and laws acknowledged by the scientific community in order to supplying the foundation for further practices (Kuhn, 1996). These principles and laws can be found in manuals and textbooks that expound the body of accepted theory, illustrate many or all of its successful applications and make possible the comparison between these applications, with exemplary observations, and experiments.

Crossing knowledge with organizational reality, tacit knowledge is the key driver to develop explicit knowledge (Polanyi, 1962) but the distinction between them must however be treated with caution because they are complementary and interact mutually, transforming themselves through individual or collective creative activities. The model of knowledge creation, not being a hermetic process, is presented by Nonaka and Takeuchi (1995) along two dimensions: the epistemological (concerning the distinction between tacit and explicit knowledge) and the ontological dimension (creation of organizational knowledge in opposition to the individual knowledge). Not being mutually exclusives, those dimensions are the foundation of knowledge creation in organizations through the conversion of tacit knowledge into explicit knowledge from the interaction of individual and collective activities (Alavi and Tiwana, 2005). This transformational process can be achieved through social and collaborative processes as well as through the use of cognitive processes (individual reflection).

The creation of knowledge is a mutable process that involves a wide range of interactions between various organizational levels using people to amplify and disseminate their knowledge, the dialectical process of thought and action involves the management of external interactions and knowledge flows within organizations, and merges with the capacity of firms to manage the legal protection mechanisms of their knowledge assets (Idris, 2003). IP represents largely the achievement of results in R&D. In an overall assessment to the management of intellectual capital and intangible, Lopes (2010) corroborates this assertion and argues that IP do not should be observed without previously take into account what is upstream. For him, the existence of a benefit or a return linked to a resource integrated on a category of IP is a signal for its capitalization as intangible resources.

Taking as an exclusive right granted to authors and inventors of goods and creative expressions, IP is embodied in the form of patents, models of utility, trademarks, commercial designs, copyrights, know-how or trade secrets (Chang et al., 2005). It reminds us the importance of the legal protection mechanisms inherent to IP, which enable organizations to protect their knowledge embodied in the production through the technologies involved in the materialization of their products, its commercialization, and the way as they act on the market.
This legal protection works, as expressed by Reilly and Schweihis (1999), as an important motivating factor for innovation.

3. Tacit knowledge and innovation models

The concept of innovation is not homogeneous and its definition goes beyond the simple technical concept that involves the creation of a product or the progress of a production process (Kline and Rosenberg, 1986). The progress of any innovation emerges from a multiplicity of contingent circumstances linked to the creation and evolution of specific innovation models which depends on different underlying levels of tacit knowledge (Tidd et al., 2003).

As a term, innovation is not only related to products and processes. The new combinations enunciated by Shumpeter (1952) allow us to conclude that innovation may be observed from the waves of creative destruction able to restructure the entire market. In our study, we will take the definition presented by the OSLO Manual (OECD, 2005) that defines innovation as “(...) the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations”.

The OSLO Manual (OECD, 2005) introduces four different types of innovation: product, process, marketing and organizational innovation.

- **Product innovation** relates to the **Introduction of new goods or services or significant** increases in their functional characteristics (technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics) regarding the intended use of existing goods and services improvements;

- **Process innovation** is the implementation of a new or significantly improved method of production or delivery. Include significant changes in techniques, equipment and/or software. This type of innovation is based in efficiency and intended to increase product quality, define new production methods or new kinds of delivery relating with new product or with significant improvements;

- **Marketing innovation** relates to the implementation of new marketing method able to promote significant changes in product design or packaging, product placement, product promotion or pricing;

- **Organizational innovations** are based on the implementation of new methods in order to organize routines and new procedures for the guidance of work. This type of innovation proposes the implementation of new organizational methods from the introduction of new business practices, workplace organization, external relationship of the companies, since they have not been used previously and which result from strategic decisions.

Following this, while product and process innovation are closely related to concept of the technological developments, marketing innovation relates to the four P’s of Kotler (1991) and finally, through organizational innovation, it is possible to increase performance by the reduction of administrative and transaction costs or by the improving workplace satisfaction gaining access to non-tradable assets such as tacit knowledge.

The development of policies, able to support the innovation, must relate the convergence of several critical aspects related to the innovation process such as innovation activities and interaction between actors and the relevant knowledge flows. Formally, innovation is considered as developments and new applications with the purpose of launching newness into the economic area. It can be conceived as the transformation of knowledge to commercial value. Based on a sequence of activities that involves, transfers, and utilizes knowledge, the process of innovation is defined by Clark and Guy (1998) as “the first commercial application of a new product or process, begins refuting the so-called linear model” where the research, followed by development, leads to innovation from an orderly and progressive sequential manner with scientific discoveries leading on to industrial R&D, technological development and manufacturing, resulting in marketable new product or processes. Two versions of linear models are often presented. One, the “Technology Push” model (1950s-1960s), is characterized by the absence of an organizational strategy in terms of technology and R&D, and represents innovation as it results from new ideas in basic science recognized to have commercial potential. The market is seen as a simple repository who promoted investment in R&D and the progression of scientific discovery is gradual and done through the use of applied research and technological development, and by the productive activity to the commercialization of new products. The other, “Demand Pull” (1960s-1970s)
belonging to the second generation of linear model (Rothwell, 1996), portraits the process as stemming from a market need detected and exploitation by the innovator, where the market is understood as a source of new ideas. These simplistic linear-sequential models neglect the concurrency and all the interactive activities which characterize intra-mural innovation and, similarly, ignore the inputs from the external environments such scientific and technological knowledge.

The stress is currently on the interactive nature of innovation, with attention being drawn to other models, more sophisticated, based on the importance of various rather complex and diverse feedback processes that recognize the importance to link science, technology and market. The “Coupling Model” (1970s-1980s) proposed by Rothwell (1996), is characterized by its sequential flow and its feedback loops and seeks to combine the two linear models indicated above (Push/Pull). Apart from these features, this model try to indicate the kinds of interactive process involved and outside its body, two major types of interaction can be identified (Clark and Guy, 1998). The first concerns to relationships with customers, suppliers and collaborators, who can influence any or all of the development, production and marketing stages leading to feedback within those stages by monitoring the on-going supply and demand conditions. The second is based on the interactions that arise whenever the technological or production competences intra-mural are inadequate for the tasks. The “Chain-linked Model”, proposed by Kline and Rosenberg (1986) in figure 1, incorporates information links and feedback loops between market-findings, design, production, distribution and research and conceptualize the last one as the storehouse of general technical knowledge which has accumulated overtime including all the knowledge gained by researchers during their experience provided by its recent researches.

A central implications of both interactive models is the permanent need to establish a closed synergy between parts of a firm’s R&D system, between this system and the rest of the firm’s production system, between the firm and other firms and, finally, between the firm and other public or private institutions (Clark and Guy, 1998). This point of view leads us for:

- The distinction between knowledge and information. As argued by Lopes (2013), “data, information, knowledge and wisdom, are articulated in a symbiotic mesh of pure dynamic transformation. It is from this transformation that societies evolve, the models, economic or others, gain adherence to new realities and utopias know their maturity and their extinction. In this spiral, sometimes complex and inconclusive, open up horizons for new realities and new areas of knowledge”.

- The distinction between codified and uncodified knowledge leads us to a tacit dimension where we know more than we transmit, introducing in the system a dynamic relationship between the level of knowledge or experiences encoded, its speed and their cost transfer (Teece, 1988), and the latter refers to information that is not specified or generally available.

The importance of interactions between different agents inserted in the innovation process became a focal point of many theoretical and empirical studies made in the field of economy and innovation (Dosi, 1988). Learning through these interactions is particularly important because the organizational and learning factors (learning by doing) are important to the innovation process and involve a wide range of scientific, technological, organizational, financial and commercial activities (Kline and Rosenberg, 1986).

The genealogy of innovation models, presented by Rothwell (1996) under the fifth-generation innovation process classification, try to reflect chronologically the growing complexity and pace of industrial technological change, forcing firms to establish new vertical and horizontal alliances to seek greater flexibility and efficiency in responding to the market changes. This classification is only completed with the presentation of two others models. The “Integrated Model” (1980s-1990s) focuses on core business and core technologies and its new focus encompasses the manufacturing technology. The emphasis is linked to the integration between R&D and manufacturing (design for marketable) and the shortening product life cycles led to time-based strategies. The “System Integration and Networking Model” (from mid 1990s) is incurred by the new technological resources (in particular by information technologies) and is strongly oriented towards speed to market (time-based strategies) and to the efficiency of the development of processes. The fast innovation is an important factor to determining company’s competitiveness. The strategic integration with primary suppliers include co-development of new products and also release the horizontal linkages (joint ventures, collaborative research groupings, collaborative marketing arrangements, among others) leading an increased focus on quality and other non-price factors.
4. Hypotheses of investigation

The key reason for innovativeness is the desire of firms to obtain increased business performance and increased competitive edge. Although firms globally have different levels of innovative capabilities, they should focus on many simultaneously aspects such as new products, new organizational and new marketing practices or administrative and technical systems (Johannessen et al., 2001). Considering the existing descriptive and empirical literature, we argue that organizational innovation leads to the improvement of intra-organizational coordination and cooperation mechanisms and thus, boost the remaining types of innovation. Accordingly this, we hypothesize that:

\[ H_1: \text{There is a positive relationship between the organizational innovation and others innovation types.} \]

\[ H_{1a}: \text{A high level of organizational innovation induces a higher level of product innovation.} \]

\[ H_{1b}: \text{A high level of organizational innovation induces a higher level of process innovation.} \]

\[ H_{1c}: \text{A high level of organizational innovation induces a higher level of marketing innovation.} \]

Coined by the importance of seeking and discovering new knowledge, radical innovation is associated to a shift of paradigm that, through an aggressive technological combination, allows the achievement of products completely new (Ellie et al., 1984). Therefore, the following hypothesis is:

\[ H_2: \text{A high level of process innovation induces a higher level of product innovation.} \]

The progress of any innovation emerge from a multiplicity of contingent circumstances whose origin may be associated with changes in the markets and customer expectations. Regarding the relationship between marketing innovation and product innovation it was impossible to us, until yet, to find a study that investigate, explicitly, the marketing and product innovation interaction. Hence, we hypothesized that:

\[ H_3: \text{A high level of marketing innovation induces a higher level of product innovation.} \]

Tuominen et al. (2004) argues that “Innovativeness refers to an organization’s capacity to innovate – to create or adopt innovations and implement them successfully”. Accordingly, innovativeness is a holistic combination
of overall organizational achievement in order to obtain results of renewal and improvements efforts promoted in agreement with processes, products, marketing and organizational structures, among others. The intensity of this flow, catapulted by attracting direct investments in R&D activities reflects, according Kümmérle (1997), the efforts of the organizations to consolidate their scientific and technological capabilities in the field of generation of new knowledge assets. These assets, characterized by works, inventions, innovations and other inherent expressions of human creativity are liable to conversion into private property and are susceptible of legal protection through the use of IP. The immateriality of these assets is sheltered within the scope of IP and goes beyond the simple philosophical intangibility or inability to touch them. In an economic environment, marked by strong competition, the breadth and specificity inherent to the immateriality of these objects protected by legal protection translates into aesthetic creation, investment in an image or in a technical solution. Due to their influence in the strategic and financial position and to the expectations of future income, our basic hypothesis performs the relationship between the investment promoted in R&D and the search for protection through IP:

\[ H_4: \text{A high level of innovations is associated to the high level of search of IP rights.} \]

\[ H_{4a}: \text{A high level of process innovation induces a higher level of search of IP rights.} \]

\[ H_{4b}: \text{A high level of product innovation induces a higher level of search of IP rights.} \]

\[ H_{4c}: \text{A high level of marketing innovation induces a higher level of search of IP rights.} \]

IP is seen in the literature as one of the most important driver of organizational performance thanks to the current paradigm of instantaneous communication, globalization and, mainly, by the lack of boundaries in knowledge dissemination. This aspect has encouraged the entrepreneurs, inventors, artists or scientists to invent, disclose and market their creations and innovations on a global scale ensuring an economic return of their investments (Erickson and Rothberg, 2008). Therefore, we argue that the majority of integrated variables in IP, recognized in the financial statements, are independent of the characteristics of the sector of activity.

\[ H_5: \text{The recognition of assets relating to IP in the financial statement is independent of the characteristics of the sector of activity.} \]

Despite the literature to devote four dimensions to evaluate organizational performance: innovative, production, market and financial performance (Yilmaz et al., 2005) our study is focused on the effects of firm’s financial performance.

\[ H_6: \text{There is a positive correlation between the variables comprised in IP, measured in the financial statements, AND FINANCIAL PERFORMANCE.} \]

Derived from the existent literature, the research framework generated in this study is illustrated below throughout a theoretical scheme, based on a Structural Model of Equation (SME) in order to investigate the impacts of innovations types on firm performance, enhancing the investment in IP.

**Figure 2:** Research framework and hypothesis
4.1 Measurement of variables

In the field of innovation policy measures, we have taken into account, for each type of innovation, theoretical and operational definitions stated in the OSLO Manual (OECD, 2005). In our study we will follow a similar approach to Hagedoorn and Cloodt (2003) to evaluate the in-firm innovation environment and innovative performance of the non-financial companies. Innovation and economic studies consider the number of patented or patentable innovation (e.g. new processes, products or technologies) as an important factor in order to compute the creativity and innovative performance (Hagedoorn and Cloodt, 2003). Companies with a highest rate of patents per capita are characteristically ones with the highest levels of business R&D intensity, and R&D expenditures and new product announcement are also broadly accepted as an innovation performance measures. To Damanpour (1996), the strength of innovation and firm performance relationship depends on how performance is measured. In this sense, financial performance will be measured by traditional performance indicators such as Return on Sales (ROS), Return on Assets (ROA), Return on Investments (ROI) and Return on Equity (ROE). These indicators seem to be, from an economic point of view, positively correlated with the intangibles capitalized and recognized in the companies’ balance sheet.

In order to explore, empirically, what are the main drivers of innovation and the impact of innovation on organizational performance, we propose the following Items related with innovation and innovative performance measures to be integrated in the data collection procedures:

<table>
<thead>
<tr>
<th>Organizational Innovation measures (Oi):</th>
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<tbody>
<tr>
<td>To what extent were the following items related to organizational innovations implemented in your organization in 2013?</td>
</tr>
<tr>
<td>Q1: Renewing the routines, procedures and processes employed to execute firm activities in innovative manner</td>
</tr>
<tr>
<td>Q2: Renewing the supply chain management system</td>
</tr>
<tr>
<td>Q3: Renewing the production and quality management systems</td>
</tr>
<tr>
<td>Q4: Renewing the human resources management system</td>
</tr>
<tr>
<td>Q5: Renewing the organization structure to facilitate teamwork</td>
</tr>
<tr>
<td>Q6: Renewing the organization structure to facilitate coordination between different functions such as marketing, manufacturing or provision of services</td>
</tr>
<tr>
<td>Q7: Renewing the organizational structure to facilitate strategic partnerships and long-term business collaboration</td>
</tr>
<tr>
<td>Q8: Renewing the organization structure to facilitate project type organization</td>
</tr>
<tr>
<td>Q9: Renewing the in-firm management information system and information sharing practice</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Process Innovation measures (Pi):</th>
</tr>
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<tbody>
<tr>
<td>To what extent were the following kinds of process innovations implemented in your organization in 2013?</td>
</tr>
<tr>
<td>Q1: Determining and eliminating non-value adding activities in production processes</td>
</tr>
<tr>
<td>Q2: Determining and eliminating non-value adding in activities in delivery related processes</td>
</tr>
<tr>
<td>Q3: Increasing output quality in manufacturing (or services provision) processes, techniques machinery and software</td>
</tr>
<tr>
<td>Q4: Decreasing variable costs components in manufacturing (or services) processes, techniques, machinery and software</td>
</tr>
<tr>
<td>Q5: Decreasing variable costs and/or increasing delivery speed in delivery related logistics processes</td>
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<tr>
<th>Marketing Innovation measures (Mi):</th>
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<tbody>
<tr>
<td>To what extent were the following kinds of market innovations implemented in your organization in 2013?</td>
</tr>
<tr>
<td>Q1: Renewing the design of the current (and or new) products through changes at the level of appearance, packaging, shape and volume without changing their basic technical and functional features</td>
</tr>
<tr>
<td>Q2: Renewing the distribution channels without changing the logistic processes related to the delivery of the product or service</td>
</tr>
<tr>
<td>Q3: Renewing the product promotion techniques employed for the promotions of the current (and or new) products or service</td>
</tr>
<tr>
<td>Q4: Renewing the product pricing techniques employed for the pricing of the current (and or new) products or service</td>
</tr>
<tr>
<td>Q5: Renewing general marketing management activities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Innovation measures (Pn):</th>
</tr>
</thead>
<tbody>
<tr>
<td>To what extent were the product innovations implemented in your organization in 2013 related to the following kind of activities?</td>
</tr>
<tr>
<td>Q1: Increasing manufacturing quality in components (or service) and materials of current products</td>
</tr>
<tr>
<td>Q2: Decreasing manufacturing cost in components (or service) and materials of current products</td>
</tr>
<tr>
<td>Q3: Developing newness for current products (or services) leading to improve ease use for customers and to improved customer satisfaction</td>
</tr>
<tr>
<td>Q4: Developing new products with technical specifications or new technological services totally differing from the current ones</td>
</tr>
<tr>
<td>Q5: Developing new products with components and materials or new services with functionalities totally differing from the current ones</td>
</tr>
</tbody>
</table>
5. Summing up

Through the linkage between tacit knowledge and innovation, it emerges a multiplicity of contingent circumstances whose origin intersects the creation and the evolution of specific models which depends from the systematic capture of tacit knowledge. Our theoretical model seeks the evidence of causal relations between science, technology and society. Through a Structural Model of Equations, we will focus on the operationalization of a multivariate analysis concerning the innovations’ relations and their potential impacts on companies’ key performance indicators.

References


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Evaluation of the Indirect Impact of Programs to Stimulate Innovation: Multi Case Studies

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Abstract: The present study proposes an approach for the rationale of evaluating innovation programs, analysing indirect impacts in order to identify knowledge acquisition and transformation processes. It will look predominantly at the problem of assessing the intangible effects of innovation programs, which has been scarcely or unsatisfactorily addressed by the literature. It is based on the observation and analysis of a program to encourage innovation in small and medium enterprises (SME). The program, called NITEC, aims to foster and support the creation of R&D structures inside SMEs. In this study, and in order to support our main arguments, we will refer to the experience of nine firms that participated in the NITEC program. The aim is to show how the NITEC program may contribute to the process of transformation of knowledge. Data was obtained through an extensive face to face interview with the top executive responsible for innovation, using a semi-structured approach. As part of each company case study, we compiled a detailed background analysis, through a semi-structured interview guide. The data was collected during the end of 2012 and the beginning of 2013, and involved interviews to the Head Manager of Innovation of the enterprise. It was found that there was a high degree of positive externalities, which are related to NITEC vocation to be a technological capability building program, with an important inducement potential inside and outside enterprises. The empirical observation that indirect impacts exists ratifies criticism of the linear model of innovation, since this model does not consider and not allow for those effects. In this case, the indirect impacts, i.e. knowledge acquisition and networking, are much more frequent as a perceived result of this program, which means that there are results that were not expected from the project’s initial objectives. All the enterprises of the sample have strong indirect impacts. The most frequent indirect impact is on Transfer Capacity, a proxy for knowledge transfer, revealing its importance for program evaluation and policy-making. All the evaluated enterprises had this kind of impact. The concentration of technological transfer effects for enterprises indicates that it was by means of a free and informal process of transfer of product and process technology to suppliers that it appropriated the gains of innovation. The present study gave a real idea of what indirect outcomes of a large technological program are, a relatively under researched and previously unknown terrain, and confirms the magnitude of the importance of indirect impacts, in particular those related to knowledge transfer, and the need to consider them in future evaluations. The study case methodology gave the opportunity of recognizing more accurately the nature of knowledge acquisition in the context of NITEC.

Keywords: innovation programs evaluation; intangible effects of innovation; indirect impacts; Portuguese SME

1. Introduction

Innovation programs are an integral part of the national innovation systems in the form of technological innovation management actions, knowledge management practices and organizational change operations (Lundvall and Borrás, 2005; Borrás and Fagerberg, 2011). These complex and uncertain processes require specific management, and continuous improvements and investments. Consequently, evaluation tools and methods are required to properly assess these processes and to have a reliable ground on which to make decisions (Papaconstantinou and Polt, 1997; Georghiou and Roessner, 2000; Smith, 2006).

However, in some EU countries, such as Portugal, innovation program assessment and measurement is still a relatively novel activity. Moreover, even in regions with a track record in innovation policy, the evaluation of innovation is far from being straightforward (European Commission, 2005). Innovation is a dynamic and constantly evolving system which is adapting itself to a range of internal and external factors (Georghiou, Rigby and Cameron, 2002; Zahra and George, 2000; Borrás, Fagerberg and Edquist, 2011). It is difficult to know the inherent elements included in the indirect impacts of innovation, but they exist and cannot be neglected when evaluated. There are feedbacks between policies and other innovation related agents that are difficult to measure. Encouraging innovation can stimulate only the direction and intensity of the results, but generally does not produce by itself impacts initially planned.

The indirect impacts are defined as all types of results implicit on the project. Indirect impacts can be related to the same activity generated by the project, provided that they have escaped its initial scope. In this study,
only these were considered in the evaluation study of the acquisition of knowledge and transformation processes. Thus, the concept of spillover only refers to the application of new knowledge generated by the project in a different activity in terms of technology or sector, initially unforeseen in the objectives of the project.

Evaluating a program that is transformative of knowledge offers the unprecedented opportunity to explore the process of building-up of that process. Describing the context and implementation of a broad set of factors is critical, yet inherently challenging, as is assessing their effectiveness. This paper focuses on three characteristics of evaluation activities: 1) the importance of context; 2) the complexity of the interventions; and 3) the identification of the indirect impacts.

Attempts to provide empirical evidence for the existence of such knowledge spanning mechanisms is made in the present study. The goal and the method was to investigate technological learning patterns in terms of knowledge interaction mechanisms through an interview-based exploratory study.

The study presented here is structured as follows. The following section describes the innovation programme that was considered in this study. The conceptual framework that guides the interpretation of the case studies is reviewed in section three. Section four develops the hypotheses. Subsequent sections report the results which correspond to a dialogue between ideas and the evidence grounded on the case evaluation. The last section presents the main conclusions, limitations and questions for future research.

2. NITEC program

The launching of the NITEC (NITEC is an acronym for Research and Technological Development Nuclei in Companies) program is aimed to address a key problem in the National Innovation System (NIS) in Portugal: the low level of in-house technology and innovation capabilities of Portuguese firms.

An additional problem was the weakness of the linkages among the various players in the NIS. Companies with low in-house R&D capabilities had been identified in various policy analyses as an important hindrance to a stronger cooperation among the various actors, namely between Universities and Scientific and Technological (S&T) organisations, on the one hand, and Industry, on the other.

A “NITEC” was defined as a small, permanent team of people fully dedicated to technology endogenisation and development activities, according to a project-based action plan. Those activities were expected to lead to the design of new products, processes and/or systems or to the introduction of significant improvements in existing ones (Portaria n.º 441/2003, 2003; Godinho and Simões, 2013). For financial support purposes, a NITEC should have a maximum of three elements, although companies might establish, at their own expenses, a NITEC with more staff.

The main objectives are the following: (1) to support the creation of in-house R&D competencies in Portuguese companies as well as to encourage companies to enhance such competencies; (2) to support company efforts aimed at improving design and process capabilities as well as the endogenisation of foreign technological knowledge; and (3) to promote company capabilities to develop technologically innovative products and solutions. More specifically, the key objective was the creation (or formalisation) of small R&D groups in companies which had already shown a proclivity to engage into R&D activities or which were undertaking R&D activities on an informal basis. The existence of a dedicated R&D group was expected to make companies more aware of the opportunities stemming from carrying out R&D activities, therefore leading to a steady development of in-house R&D capabilities.

NITECs would contribute to enhance companies’ absorptive capabilities as well as their product and process design and adaptation competencies. They were also envisaged as an instrument to develop and strengthen internal and external linkages. From this perspective, NITECs were not just an instrument of technological but also of organisational innovation.

Overall, the NITEC initiative was positively evaluated. It was recognised that the support to the creation of the small R&D teams was justified in terms of public policy, insofar as it had significantly contributed towards a change in Portuguese companies’ commitment towards R&D and innovation. It was considered that besides
the effect of generating a new managerial perspective with regard to the continued and systematic carrying out of in-house R&D activities, according to NITEC’s coordinator, it contributed towards “an increased capability of companies” to cooperate with S&T organisations.

Figures 1 and 2 show the business activity and the regional distribution of firms that received support from this program. There were a total of 169 SME from different sectors that implemented the NITEC program.

Figure 1: Distribution of companies by business activities

![Distribution of companies by business activities](image)

<table>
<thead>
<tr>
<th>Business Activities</th>
<th>North</th>
<th>LVT</th>
<th>Center</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information and communication tech.</td>
<td>43.86%</td>
<td>36.84%</td>
<td>17.54%</td>
<td>1.75%</td>
</tr>
<tr>
<td>Construction industry</td>
<td>53.33%</td>
<td>40.00%</td>
<td>6.67%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Services</td>
<td>23.81%</td>
<td>47.62%</td>
<td>26.15%</td>
<td>2.38%</td>
</tr>
<tr>
<td>Processing industry</td>
<td>37.04%</td>
<td>12.56%</td>
<td>46.30%</td>
<td>3.70%</td>
</tr>
</tbody>
</table>

Figure 2: Distribution of companies by business activities and by region in Portugal

The figures represent the firms that received support under the NITEC program, and they include firms from the information and communication technology, construction industry, services and processing industry. The services sector represents the commerce and consultancy activities and the processing industry sector consists in the wood, food, energy, metal-mechanic, plastics and electric/electronic activities.

As can be observed in Figure 1, the majority of companies that adhered to the NITEC program were form the information and communication technologies sector. Next, came the processing industry sector, then the services sector and the finally the construction industry. An internal audit of NITEC showed that the projects in the information and communication technologies sector were generally in line with the overall philosophy of the NITEC, which was intrinsically more close to these technologies. As a consequence, this sector was also the more open to absorb the main objectives of NITEC.
In terms of regional distribution, the northern part of Portugal contributed with 53% of the construction industry firms that participated in the programme and with 44% of the information and communication technologies sector firms that participated in NITEC. The Lisbon region (LVT) contributed with 47% of the service firms that participated in the programme, and with 37% of the information and communication technologies sector firms that participated in NITEC. The central region of the country contributed with 46% of the processing sector firms that participated in NITEC, and with 28% of the service sector firms that participated in NITEC. The southern region accounts for 4% of the supported firms in the processing industry and 2% of the firm supported in the ICT and service sectors.

This distribution may somehow reflect the relative weaknesses of some regions in terms of industrial R&D, the North being relatively weaker in terms of the endogenisation of R&D activities in the construction and processing industry, and the centre relatively weaker in the processing industry. The greater participation of service firms from the Lisbon area may reflect a relatively more mature stance from the part of these firms in the Lisbon area compared to service firms in other regions of the country. On the other hand, firms from the ICT sector are predominantly from the North and Lisbon area, reflecting similar trajectories of these companies that are active in a relatively new industrial sector.

3. Absorptive capacity

The concept of absorptive capacity emphasized the crucial role that knowledge plays in business competitiveness. It emerged as a significant concept in the 1980s, in the field of organizational learning. Cohen and Levinthal (1990) were the first authors to determine a proposal for a definition to build a general theoretical framework around its characteristics in business application. These authors define absorptive capacity as “the ability to identify, assimilate, and apply knowledge from external sources for commercial purpose”.

From this perspective, we can derive the implication that the incentive of firms to invest increases with the perception of improvement in the capacity for absorption (Levinthal and Cohen, 1990). Kedia and Bhagat (1988) used the term in the context of technology transfer among nations, and related it to firms’ receptions to technological change. It requires a business to evaluate, assimilate and apply knowledge transmitted from another (Lane and Lubatkin, 1998).

The capacity to absorb largely depends on technological abilities, but varies with the sectors in which the receptor firms operate (Zahra and George, 2000; Hamida, 2013; Camisón and Forés, 2010). It is for this reason that companies in certain sectors are more susceptible to developing abilities, to knowledge flows, technological advances and, consequently, the capacity for absorption, and that may depend, among other factors, upon the degree of concentration in the sector (Kedia and Bhagat, 1988; Newey and Shulman, 2004).

Zahra and George (2000) performed a review and reconceptualization of the concept of absorptive capacity that differed from the traditional concept of Cohen and Levinthal. According to the authors, absorptive capacity is a dynamic capacity embedded in a firm’s routine and processes, which promotes organizational change and evolution. The authors also argued that established absorptive capacity had four dimensions, which they grouped in two main categories: 1) potential capacities, which may be translated in knowledge acquisition and assimilation and, 2) realized capacities, which represent transformation and exploitation of knowledge.

The concept takes into account a new determinant and a new perspective regarding the development of corporate competitiveness. It stresses knowledge, which is equivalent to a firm’s experience, and it is important for developing absorptive capacity, but the authors highlight other points, and argue that external knowledge sources and complementary external knowledge are equally important.

In other words, if for a firm scientific and industrial knowledge is important for driving technological change, then the firm needs to be able to develop both types of capacities. Probably, a firm with a good level of scientific absorptive capacity will be better able to exploit the knowledge from other firm agents.
This paper intends to contribute to the debate on innovation policies, assessing the indirect impacts of an important program, the NITEC program. This program is a Portuguese initiative in innovation for the SME and, at the same time, initiates a new modality of public intervention, supported by international partnerships.

4. Introduction of the hypotheses

The above discussion supports the formulation of two hypotheses concerning the nature of knowledge on innovation programs directed at Portuguese SMEs. In general, the NITEC program achieved its main objectives and it exceeded earlier expectations of the project. Knowledge transfer can be the basis for the generation of new products and knowledge confirming the argument by Zahra and George (2000) about absorptive capacity.

The previous assumptions are the fundamentals for the proposed model and produced two hypotheses:

**Hypotheses 1:** The objectives of an innovation program may not be achieved, but they may cause unexpected results that are important for the increase in innovation capacity of the targeted agents.

**Hypotheses 2:** The increase in absorptive capacity of the agent can produce impacts that are more important than the programmed innovation itself.

Our hypotheses were used in a two phased approach. First, we focus on the conditions that the NITEC program influenced previously in order to orient the firms. Second, we addressed the conditions associated with absorptive capacity that depends on the knowledge transfer variable.

5. Methodology

In order to empirically analyse how companies are changing their innovation activities, in this study we chose a multiple case study approach, as this is particularly appropriate for studying complex acquisition knowledge (Eisenhardt, 1989; Yin 2013). The case study methodology responds to the need to explore a complex reality and the partners’ behavioural patterns in the process of building the partnership.

There are considerable instances in the use of case study to determine the impact of technology development programs (Bozeman and Klein 1999). These studies can give an indication not only of the extent of program success or failure but the reasons for success or failure. A case study can also serve to document success to stakeholders and funding agents, and it provides a sense of context and richness of detail that exceeds virtually every other approach to analysis (Eisenhardt 1989; Bozeman and Klein, 1999; Youtie et al. 1999; Yin 2013).

As part of each company case study, we compiled a detailed background analysis, through a semi-structured interview guide. The evaluation conducted nine face-to-face interviews with executives of enterprises that participated in the NITEC program. The data was collected during the end of 2012 and the beginning of 2013, and involved interviews to the Head Manager of Innovation of the enterprise.

The interview guide was produced on the basis of the BETA evaluation methodology (Bach, 2002). It was elaborated to capture the impacts of NITEC, and according to the following variables: 1. Network capacity in R&D; 2. Business affairs; 3. Organizational capacity; 4. Exchange capacity; 5. Capacity building in S&T; 6. Human resources and capacity building.

Considering the nature of the program and as an ex post evaluation, we consider that there was a minimum time lag for the effects to take place, which was at least five to six years. This is so because after this period, a new and more complete perspective concerning the knowledge impact of the project would probably have emerged. It reflects the relevance of evaluating the program after a long time.

6. Results

The high degree of positive externalities is related to NITEC vocation to be a technological capability program with an important inducement potential inside and outside enterprises. The empirical observation that indirect impacts exists ratifies criticism of the linear model of innovation, since this model does not consider and not allow for those effects (Borrás and Fagerberg, 2011). This model gives theoretical support to most of the ex ante evaluation analysis done by firms and laboratories (Georghiou, 1998). In this case, the effects are expected to result from the project’s initial objectives. However, the indirect impacts, i.e. knowledge acquisition and networking are much more frequent as a result in this program, which means that there are
results that were not expected from the project’s initial objectives. All the enterprises of the sample have strong indirect impacts. Table 1 shows the relationship between the variables that were addressed and operationalized in the interview guide.

In Table 1 the row labels are the variables that are categorized in five broad groups: transfer capacity, capacities in S&T, networking capacity in R&D, organizational capacity and visibility in commercial relations. The five groups were divided into others subgroups, which reveals or measures the interpretation of the impacts of the NITEC program.

**Table 1:** Summary of the descriptive of the variables used in the study

<table>
<thead>
<tr>
<th>Row Labels</th>
<th>Column Labels</th>
<th>Count of Responds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Capacity</td>
<td>Not</td>
<td>18%</td>
</tr>
<tr>
<td>Knowledge absorption</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Learning</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Codified knowledge</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Tacit knowledge</td>
<td>25%</td>
<td>0%</td>
</tr>
<tr>
<td>Dedication to reading</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Participation in conferences</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>Scientific production</td>
<td>44%</td>
<td>0%</td>
</tr>
<tr>
<td>Patents</td>
<td>78%</td>
<td>0%</td>
</tr>
<tr>
<td>Knowledge transfer</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Codified knowledge transfer</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Capacities in S&amp;T</td>
<td>21%</td>
<td>0%</td>
</tr>
<tr>
<td>Equipment installations</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Interdisciplinary</td>
<td>56%</td>
<td>0%</td>
</tr>
<tr>
<td>Change in the management method</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Organizational changes</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Level to integrators</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>New management method</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>New quality method</td>
<td>29%</td>
<td>0%</td>
</tr>
<tr>
<td>Networking capacity in R&amp;D</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Reliability</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Meetings</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>know-who</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>New partners</td>
<td>13%</td>
<td>0%</td>
</tr>
<tr>
<td>Sharing equipments</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Organizational capacity</td>
<td>23%</td>
<td>0%</td>
</tr>
<tr>
<td>Interdisciplinary</td>
<td>44%</td>
<td>0%</td>
</tr>
<tr>
<td>Layout change</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>Change in the management method</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>Change quality method</td>
<td>29%</td>
<td>0%</td>
</tr>
<tr>
<td>Organizational changes</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Level to integrators</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Polyclave</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>Visibility commercial relations</td>
<td>29%</td>
<td>2%</td>
</tr>
<tr>
<td>Commercial relations</td>
<td>13%</td>
<td>13%</td>
</tr>
<tr>
<td>New financial sources</td>
<td>57%</td>
<td>0%</td>
</tr>
<tr>
<td>New suppliers</td>
<td>56%</td>
<td>0%</td>
</tr>
<tr>
<td>New markets</td>
<td>11%</td>
<td>0%</td>
</tr>
<tr>
<td>Reputation</td>
<td>13%</td>
<td>0%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>21%</td>
<td>0%</td>
</tr>
</tbody>
</table>
The percentages refer to the frequency of responses. The responses were inferred from the analysis of the interviews. The answers were classified according to the nature and subjective or perceived importance of the impact of the program on the relevant variable. In Table 1 there are three possible answers. “Not” means that the variable was not influenced when the firm introduced the project supported by NITEC. “Yes” means that the variable was influenced when the firm introduced the project supported by NITEC. “Doesn’t know” means that the influence on the variable cannot be linked to the NITEC programme.

According to Table 1, the variables that involves transfer capacity (learning, codified knowledge, dedication to reading, knowledge transfer, and codified knowledge transfer) were considered by 100% of all interviewee responses as being influenced by the programme. Overall, 82% of the answers confirm that Knowledge Transfer Capacity was influenced by the program. Other variables were also considered as being highly impacted by the programme. They include Visibility in Commercial Relations with 68% of answers acknowledging direct influence of the NITEC programme, Networking Capacity in R&D, with 83% of answers reporting influence directly to the NITEC, and Organizational Capacity, with 77% of answers asserting influence of the program.

This reinforces the idea argued above (Levinthal and Cohen, 1990; Lane and Lubatkin, 1998) that absorptive capacity is a key process in understanding practices among companies and their partners.

All firms and practitioners responded very positively, considering that the development phase of the project and the learning that occurred generated knowledge at the organizational level that increased the absorptive capacity of the organization, and the consequence of that process was not limited to the internal aspects of the firm, but it was reflected in the partnerships that the firm established at the technological, academic and commercial levels, thus establishing the grounds on which the network was formed.

It was expected that patent licensing, know-how or technical assistance contracts would transfer new knowledge created by the project. However, this was not a very frequent form of technological transfer between enterprises and theirs partners. Most of it happened outside these contractual arrangements. It means that the indirect impacts exceeded the border area provided in the NITEC.

The most frequent indirect impact is on Transfer Capacity, a proxy for knowledge transfer, revealing its importance for program evaluation and policy-making. All the evaluated enterprises had this kind of impact. The concentration of technological transfer effects for enterprises indicates that it was by means of a free and informal process of transfer of product and process technology to suppliers that it appropriated the gains of innovation. The external actors (academic, commercial and technological) capitalized these gains by launching new products or new services into the market, and in the form of scientific publications. The technological transfer procedure is known as spill-over in the economic literature.

These results validate and confirm the hypotheses 2, which argues that the increase in absorptive capacity can make an impact more important than the programmed innovation itself. According to the authors Zahra and George (2000) what occurs within the firm is also important for the economy as a whole and recognize that the fundamental knowledge necessary to the firm’s growth exists in its tacit form and is learned by experience, and this interaction forms the concept of absorption capacity.

Pavitt (2000) complements this idea arguing that the firm is an organization and the resources that it manages are the factors driving their growth. Management resources are specific and on them are deposited the knowledge and the experience, with emphasis on information, on the network, on the tacit knowledge and the know-how.

Hypotheses 1 cannot be totally validated, since the main objectives of the program were achieved. On the other hand, the program created results that exceeded its objectives, meaning that there was an involuntary transfer of ideas and techniques. This occurred because the program assumed a central role in endogenous processes, although this aspect was a main objective of NITEC. In any case, the NITEC program contributed to increase the focus on technology development capabilities, even if innovation actually did not, or would not, materialize. The main purpose of the program was to create the ability to deal with them.
Table 2 presents a second set of results concerning the above mentioned variables that attempt to measure the intensity of the indirect impacts of innovation programmes. Table 2 focus the attention on the new partners and the technology transfer specifically concerned to exploit the knowledge generated by NITEC.

Table 2: New partners and technology transfer to specifically exploit the knowledge generated by the programme NITEC

<table>
<thead>
<tr>
<th>Count of Answers</th>
<th>Column Labels</th>
<th>Increased</th>
<th>Indifferent</th>
<th>Indirect 1</th>
<th>Indirect 2</th>
<th>Indirect 3</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer Capacity</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>Tacit Knowledge</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>Capacidade em C&amp;T</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>New quality method</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>Networking capacity in R&amp;D</td>
<td>40%</td>
<td>40%</td>
<td>10%</td>
<td>-</td>
<td>10%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>know-who</td>
<td>50%</td>
<td>50%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>New partners</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>-</td>
<td>100%</td>
</tr>
<tr>
<td>Organizational capacity</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Change quality method</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Visibility commercial relations</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Commercial relations</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>New financial sources</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Reputation</td>
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<td>100%</td>
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<td>100%</td>
</tr>
<tr>
<td>Grand Total</td>
<td>21,05%</td>
<td>21,05%</td>
<td>5,26%</td>
<td>5,26%</td>
<td>47,37%</td>
<td>100,00%</td>
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</tr>
</tbody>
</table>

In this table there are five possible answers: “Increased” means that the capability to be on networks increased after the termination of the NITEC program. “Indifferent” means that the capability to be integrated in networks neither increased nor decreased after the termination of the NITEC program. “Indirect 1” means that the relationships between partners that already existed prior to the NITEC program have strengthened due to indirect impacts from NITEC. “Indirect 2” indicates instances where the partners were the biggest beneficiaries of the impacts. “Indirect 3” means that the impact was not directly related to the NITEC programme, but it contributed to the development of other tools and operations.

In table 2, we emphasize the commercial effects, which were very important, especially for the Information Technology sector. They occur because the execution of the project allowed better knowledge on commercial partners and increased competition. In general, these effects arose from modifications introduced in some high technology equipment or the implantation of a Quality Management System to standardize the service. In this case, the NITEC contributed to increase the commercial partnership. The commercial effects were an important outcome. They were related to the interactive learning that happened with suppliers even when they were not directly involved in the project.

Table 3 categorises modes of knowledge acquisition related to the NITEC programme. Acquisition of certain forms of knowledge is critical for identification and for exploitation of opportunities. For instance, market knowledge acquisition may support entrepreneurial activities, helping firms to determine the value of the new opportunities identified and providing guidance on how to best serve the new markets. In this study, it was observed that the NITEC could enhance the efficiency of exploiting opportunities by facilitating the knowledge necessary for the optimization of process and the functionality of the new products or services. Thus, a firm that does not acquire knowledge from its peer relationships may miss the opportunity to exploit entrepreneurial opportunities more efficiently, which would weaken the impact of these opportunities in performance.

These arguments are coherent with those proposed by absorptive capacity literature according to Levinthal and Cohen (1990), Zahra and George (2000) and Bojica and Fuentes (2012), which define absorptive capacity as an organizational dynamic capability by which firms acquire, assimilate, transform and exploit knowledge. It reflects the ability of firm to recognize the value of new external knowledge, assimilate it and apply it to commercial ends and knowledge creation activities (Kedia and Bhagat, 1988; Lane and Lubatkin, 1998; Hamida, 2013).
The reason for this to happen is because the potential absorptive capacity provides firms with the strategic flexibility to adapt and evolve in dynamic environments, and consequently to gain competitive advantage, by reconfiguring the resource base and deploying capabilities. Indeed, knowledge acquisition is found to influence the firm’s capacity to respond to changes in the environment, and this influence is even stronger when the firm’s strategic orientation is related to R&D activities. Knowledge acquisition enhances the ability to respond appropriately to a dynamic environment by offering the conditions to translate this proactive stance into enhanced performance (Newey and Shulman, 2004).

### Table 3: Results concerning knowledge acquisition and building new partners

<table>
<thead>
<tr>
<th>Sector</th>
<th>Region</th>
<th>New Partners</th>
<th>Tecnological Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Academic</td>
<td>Technological</td>
</tr>
<tr>
<td>Construction</td>
<td>LVT</td>
<td>x</td>
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<tr>
<td>Metal-Mechanic</td>
<td>LVT</td>
<td>x</td>
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</tr>
<tr>
<td>Information Technology</td>
<td>Central</td>
<td>x</td>
<td></td>
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<tr>
<td>Wood</td>
<td>North</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Information Technology</td>
<td>Central</td>
<td>x</td>
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<tr>
<td>Information Technology</td>
<td>LVT</td>
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</tr>
<tr>
<td>Information Technology</td>
<td>North</td>
<td>x</td>
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<tr>
<td>Metal-Mechanic</td>
<td>North</td>
<td>x</td>
<td>x</td>
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<tr>
<td>Information Technology</td>
<td>North</td>
<td>x</td>
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</tbody>
</table>

The NITEC was a very large program that ended six years before the beginning of this evaluation study, namely in 2006. The assessment of the indirect impacts of NITEC involved a great methodological challenge and required a considerable effort for in terms of conceptualization and data collection.

The results offer valuable information regarding the innovation process in Portugal at the time. The study gave a real idea of what indirect outcomes of a large technological program are, a relatively under researched and previously unknown terrain, and confirms the magnitude of the importance of indirect impacts, in particular those related to knowledge transfer, and the need to consider them in future evaluations. This first study offers the opportunity of providing inputs to similar evaluation studies of other large technological programs in Portugal, enlarging the knowledge base about the efficiency of these public policy tools.

The second observation is in relation to the hypotheses 2 and highlights the relevance of the learning process accomplished during the project. The resulting effects are not usually quantified or identified by traditional evaluation methodologies. The case study enabled to identify a special commercial effect originating in the relationship with suppliers.

Our study also revealed that national and international universities and technological institutes were important partners in the program, and they provided significant impacts, displaying a positive and articulate capability to help the Portuguese enterprises.

The study revealed that the NITEC program generated important externalities. It was relevant to clarify the link between absorptive capacity and indirect impact. The case study allowed us to describe the type of indirect impact generated by a technological program.

A limitation of the study was the impossibility to make a survey to research the 150 companies, because of resource constrains and also because some of those who worked in the firms during the implementation of the NITEC programme had moved to another firm, and it was impossible to obtain data on the program. In other cases, the company closed or did not have the NITEC department in the company.
This paper contributes to the discussion about the mechanisms that would contribute to the evaluating process. In future work it would be important to have a comparative approach, researching the modes of technological learning of firms in other similar programs, and to capture the most important indirect impacts and establishing, in a more general framework, their main determinants.

References


Relevant Industrial Innovation Policy for the European Union

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Abstract: The purpose of my PhD research is to propose industrial policy which addresses two problems: EU falling behind USA and Asia in innovation; and widening innovation gap within the Union. Europe is falling behind, because it has wrong policy targets, no relevant industrial policy tools or an institution to oversee policy coordination across Europe. Horizon 2020 innovation and research strategy fell short of what is required to catch up on global and regional level. I define industrial policy as government effort to promote specific industry or sector, support structural changes and innovation to generate spillovers that would lead to continuous economic development and ensure sustainable long term economic growth for the Union. Industrial policy tools should lead to interaction between regions as exchange of knowledge, skills and capital. My research is policy based with policy implication examples from historical data. My proposed policy tools are: a governing institution to oversee and coordinate industrial policy implementation across Europe; a joint information and communication system within the EU to improve knowledge accessibility; development and commercialization support of regional innovation systems for lagging regions; imposition of higher education planning and strategic R&D spending based on regional industrial policy for lagging regions; infant industry protection policies for lagging regions.

Keywords: European Union, Horizon 2020, industrial policy, innovation, R&D, regional development

1. Introduction

The financial and economic crisis of 2007-2009 has highlighted inadequate economic convergence within the EU and lack of international competitiveness. In 2014, Europe is still falling behind other regions (Figure 1), has not recovered from the crisis and the European Commission does not have a clear game plan to deal with all issues. As Stiglitz and Greenwald emphasize in their recent book (2014), continuous learning, R&D and innovation are the most important for a successful economy. However, in 2012 the EU allocated only 2.1% of GDP for R&D spending, while Japan spend 3.7%, China 1.8% and the US 2.8 %, therefore the gap has been getting wider (Figure 2).

Figure 1: GDP growth percentage change. Source: Eurostat, IMF, World Bank

It is commonly agreed now that the EU’s monetary-union rules encompass only a small number of elements. The five Maastricht Treaty criteria (inflation, interest rates, deficits, debt, and exchange rates) were chosen without consideration of different inflationary conditions and institutional arrangements of core and periphery countries. These rules have led to decreased competitiveness, current-account imbalances and a widening core-periphery gap within Europe. For monetary and economic union with single currency and different income levels to work, richer countries need to subsidise catching up of poor countries. It should be done through innovation focused industrial policy, which would solve high unemployment, slow growth, inequality and decreased competitiveness problems in the short and the long run. Industrial policy should encourage spread of good practices in innovation and entrepreneurship across the Union. It should encourage creation of new home grown companies which create jobs and wealth. Industrial innovation policy tools should act as
mechanisms to share and transform knowledge into products and jobs, which are key drivers of country and EU wide competitiveness.

Figure 2: Research and development spending as percentage of GDP. Source: Eurostat, IMF, World Bank.

EU-wide industrial policy should aim to reduce industrial development imbalances with particular focus on periphery regions. It must be remembered that a third of European countries are post-communist with only 20 years of market experience, where state institutions lack the capabilities and resources to implement appropriate industrial policies. Southern and Eastern countries have high corruption and informal economy levels which act as a barrier to innovation and entrepreneurship. These problems can only be solved from outside with relevant EU policies.

The Innovation Scoreboard 2014 (Figure 3) shows that overall Europe is becoming more innovative, but the gap between countries has been widening especially after the crisis (Figure 4). Four countries have been listed as innovation leaders (the same since the first Innovation Scoreboard in 2004) – Sweden, Denmark, Germany and Finland, ten (Central European countries) are followers and the rest are moderate (Southern countries) and modest innovators (Eastern countries). Recent fiscal constrains in Southern and Eastern countries have damaged innovation potential even more, because they all had to cut on public spending, especially on higher education and R&D. As a result, state institutions are unable to attract top talent to join public administration or university and research jobs. Southern and Eastern countries need relevant EU policy changes to stop this vicious cycle of increasing inequality and to help them catch up with the core.

Figure 3: The Innovation Scoreboard Index 2014. Source: European Commission

Since 2010 Europe has 3% R&D spending target listed in Europe 2020 strategy. However, in 2012 only Sweden and Finland spent over 3%, Denmark was at 2.99% and Germany at 2.84% and ten countries spent less than 1% of GDP on R&D (Figure 5).

Based on productivity and economic growth analysis papers of EU KLEMS data (Timmer, Inklaar, O’Mahony and Bart Van Ark 2008) it is clear that European productivity slowed down because of “slower emergence of the knowledge economy” since 1973 (ibid, 25). During last 20 years Asian countries increased their efficiency.
and productivity very significantly, but the US and especially Europe was lagging behind (Figure 6). As a result growth of the EU has been the slowest as well.

**Figure 4:** Innovation gap between innovation leaders and modest innovators. Source: European Commission

**Figure 5:** R&D as percentage of GDP for the EU countries. Source: Eurostat

**Figure 6:** Labour productivity in Asia (Japan and China), the US and the Euro area. Source: Eurostat, OECD, the Conference Board

Current European industrial and innovation strategies increase regional inequality and concentration of available EU funds for R&D. The Regional Innovation Scoreboard 2014 evaluates innovation performance at the level of Member States. It indicates that innovation excellence is concentrated in relatively few areas in Europe. All EU regional innovation leaders are located in only eight countries: Denmark, Germany, Finland, France, Ireland, Netherlands, Sweden and UK. Public financial support is listed as one of the top drivers of regional innovation in the analysis, but most lagging regions were low absorbers of EU R&D funds. This means that two thirds of European countries are not able to use these funds since they lack experience and
Jurgita Stanulyte

qualification. Their industries are not advanced enough to participate in Horizon 2020 or other EU R&D funding schemes.

Periphery countries are under great pressure from core countries and international institutions IMF, World Bank, WTO and European Union Commission to adopt restrictive macroeconomic policies, liberalization of trade and investment, privatization and deregulation. Ha-Joon Chang (2002) in his book “Kicking Away the Ladder” reviews targeted industrialization strategies all over the world during last two hundred years and emphasizes how currently industrialized countries used different tools in the past like infant industry promotion and tariff protection to create their industries. Historical evidence show that all currently advanced economies (the UK, the USA, Germany, France, Sweden, Belgium, the Netherlands, Switzerland, Japan and East Asian countries) used protectionist policies to grow their industries. So why can’t European periphery countries do the same now? It will benefit the whole EU eventually, because it is better to have strong partners in the Union.

2. Literature review

Industrial policy as a public investment plan is becoming a popular topic in recent academic literature and media. The World Bank has been publishing on the topic for a while (Rodrik 2008 and Yusuf 2012), the Bruegel European think tank (Aghion, Boulanger and Cohen 2011) and OECD has also been ‘rethinking’ industrial policy (Warwick 2013). There are many definitions of industrial policy, but most of them fit horizontal/framework or vertical/selective/strategic policy orientation. European economic integration in 1950s began with sector specific coal and steel industry policy. European Coal and Steel Community (ECCS) was established by The Treaty of Paris (1951) by Belgium, France, West Germany, Italy, The Netherlands and Luxembourg and later led to the founding of the EU. With The Treaty of Maastricht (1993) the Union shifted towards horizontal competitiveness policies. Pelkmans (2006) argues that more strategic perspective of industry as a whole should improve economic performance (higher productivity and growth) and liberalization in all sectors because of horizontal innovation, R&D and entrepreneurship policies without ‘picking winners’. However, Pelkmans questions effectiveness of European industrial policy of last 20 years. He talks about implications for the policy making process, for example, one country, industry or company lobbying. Pelkmans emphasise on “lack of coordination in a two-level game” (2006, 42) between member states and the Union as the main cause for underperformance and eroding competition of European industry compared with the US and Japan together with low R&D levels.

The Lisbon Treaty, Europe 2020 and the most recent one Horizon 2020 innovation and research strategy does not address economic divergence problem within the EU and they lack governance mechanisms to impose effective policy implementation in all countries. Mario Pianta (2013) in his recent article acknowledges ‘centre’ and ‘periphery’ within industrial structure in Europe and emphasizes the need for industrial policy for the EU to address better cohesion and reduce imbalances. He proposes three major industrial policy focus areas: environment and energy, knowledge and ICTs, health and welfare. Pianta also advocates for EU level funding of the industry plan, EU level and national level governance arrangements and accountability to the European Parliament. He advises to distribute 75% of total funds to ‘periphery’ countries (with at least half of it going to poorer regions of such countries) and 25% of total funds to poorer regions in ‘core’ countries. He urges to start debates about industrial policy in Europe, but at the same time he understands that political obstacles are huge for such policy implementation.

Alberto Botta (2014) argues that structural asymmetry is the cause for Eurozone crisis and proposes regional industrial policy as a solution. He creates Productive Structure Similarity Index (PSSI) to compare peripheral countries with Germany on diversification and export patterns. The analysis shows that productive development may not be fully reached in peripheral countries. Botta proposes industrial policy based on two principles: it should have strong regional aspect with focus on peripheral countries productive development to ensure regional cohesion and center-periphery convergence; it should include demand-side factors (like productive structure evolution and productivity dynamics) together with supply-side factors. He advocates for considerable expansion of financial EU resources going towards “integrated cohesion-industrial-technology policy” (Botta 2014, 25), EU funded research centers in periphery focusing on applied innovations and join innovation systems between universities and firms. He argues for European industrial development authority (similar to MITI in Japan) to minimize coordination failures and to use European Investment Bank for financing. Botta also favours public subsidies and tax exemptions to productive investment in periphery.
Ken Warwick (2013) reviews new emerging global trends of industrial policy after the 2008-2009 crises in a recent OECD policy paper and suggests comparative advantage-following or comparative advantage-developing industrial policy approach depending on economy’s catching-up or the frontier mode. He also favours government’s role for implementation, but acknowledges practical difficulties: the risk of failure, the risk of rent seeking and potential use of industrial policies for protectionism. The main advice for governments is to implement more facilitative and coordinating role and use ‘soft’ industrial policy horizontal measures with strategic choices. Warwick defines ‘soft’ industrial policy as government and industry working together to set strategic goals and deal with coordination problems. In the paper he explores examples of this approach: cluster policy, investment promotion public procurement and green growth. He also emphasizes better transparency, monitoring, evaluation and sharing of experiences across different areas and countries to increase effectiveness and minimize failures.

Robert H. Wade (2011) advocates for industrial policy as a support for meso-level networks since WTO considers only hard policies (protection, subsidies, and quotas) illegal.

He defines “industrial policy focused neither on the individual firm nor on the geographic region but on networks of firms” (Wade 2011, 223). Wade argues that the US has long practiced successful soft-meso-decentralized industrial policy by ‘separation of powers’ amongst national, state and local agencies. The programs run through R&D funding in selected sectors and build networks between scientists, engineers and venture capitalist. By encouraging firms to form a consortium to pool R&D and manufacturing capacities, a program creates innovation environment where firms “are more likely to compete on the high road (high skills, innovation) than on the low road (cheap wages)” (ibid, 232). Industrial policy as support for meso-level networks could be used by middle-income countries to get out of a ‘middle income trap’.

According to Stiglitz and Greenwald (2014), industrial policy is back to fashion, because it shapes the sectoral structure of economy to maximize social welfare, which is usually neglected by free markets. Currently the EU promotes competition policy, which is not flexible to accommodate socially beneficial industrial policy, since it focuses on maximum efficiency and rivalry between firms in the market. However, some countries in the Union do not have well functioning markets or institutions to have optimal competition, so industrial policy is more beneficial. Industrial policy is more focused on economy as a whole in order to achieve long term socioeconomic goals. Current competition policy is mostly concerned with static efficiency (how resources are allocated efficiently at a point in time) and not dynamic efficiency (how resources should be allocated over a period of time for investment, innovation and R&D).

Mariana Mazzucato (2013) also advocates for public sector role in innovation-led growth for competitive industries. She emphasizes “lack of connection between Keynesian fiscal spending and Schumpeterian investments in innovation” (Mazzucato 2013, 31) in her recent book “The Entrepreneurial State”. She goes over many examples on how US government took a leading role in technology development, especially in an early stage of R&D. Mazzucato argues that firms are too much short-term profit oriented to provide risky investments and ensure sustainable growth and employment in the long-run. She urges Europe to focus on investments for more growth, not austerity measures. Mazzucato advises the EU to allow and help weaker countries to make strategic industry investments that Germany did. Weaker countries desperately need dynamic spillovers in technology, research, education, and training. Europe should create equivalent of the American Recovery and Reinvestment Act and use The European Investment Bank to encourage such investments and generate rebalancing. She advocates for economic and political solidarity to create Eurobonds, which would help high-debt countries to finance investments in future growth.

3. Proposed methodology and analysis

The purpose of my research is to propose an industrial policy which addresses two problems: EU falling behind USA and Asia in innovation; and widening innovation gap within the Union. Europe is falling behind, because it has wrong policy targets, no relevant industrial policy tools or an institution to oversee policy coordination across Europe. Horizon 2020 innovation and research strategy fell short of what is required to catch up on global and regional level. I define industrial policy as government effort to promote specific industry or sector, support structural changes and innovation to generate spillovers that would lead to continuous economic development and ensure sustainable long term economic growth for the Union. The policy tools should lead to interaction between regions as exchange of knowledge, skills and capital.

Jurgita Staniulyte
I agree with Mazzucato (2013), Chang (2002 and 2008), Pianta (2013) and Stiglitz (2014) that firms are too much short-term profit oriented to provide risky investments and ensure sustainable growth and employment in the long-run. Therefore, I will base industrial policy for the EU on active State involvement to ensure economic stability, competitiveness and growth following successful practices from Asian countries and the US. In my research I will step back and analyze how economic conditions in different regions within Europe should change to achieve growth and competitiveness and which industrial policy tools are necessary to help these changes happen. My research is policy based with policy implication examples from historical data.

First, I will use Innovation Scoreboard data beginning with 2000 for grouping countries into regions to analyse their current comparative advantage. I want to draw on a debate between Lin and Chang (2009) whether industrial policy should follow comparative advantage or defy. I agree with Chang that government should push to deviate from inherited comparative advantage towards competitive advantage as far as they can to upgrade the economy. Industrial upgrading is necessary for economic growth and it will not happen through market forces and Lin (2010), based on his knowledge of East Asian industrialization policies, proposes six steps for strategic government intervention and emphasizes support for sectors within existing comparative advantage.

Hence, I will start with comparative advantage as a base and then build on it to propose strategic industry direction in order to reach competitive advantage. I will assess educational, technological and R&D capabilities in preferred sectors and propose mandatory long-term adjustments with infant industry protection policies. History has shown that it is impossible for a periphery country to catch up with a more technologically advanced country without protection of industries in which it does not have a comparative advantage. It seems like current EU industrial and trade policies work as kicking away the ladder (Chang, 1994) by which core countries have climbed up. I will propose adjustments to Horizon 2020 to address these concerns and avoid exclusion.

Industrial policy should be coordinated and governed by one central institution despite political changes, uncertainties and disagreements within the Union. I propose a governing institution the European Ministry of Industry to centrally oversee and coordinate industrial policy implementation as well as R&D and commercialization support across Europe. It should enforce good practices through partnerships and collaborations, industry cluster formation between regions, doctoral student exchange programs and R&D projects involving one member from each region to avoid exclusion. EU should aim towards economically stronger Member States with higher EU funding on industrial upgrading and R&D where it is most needed. It is essential that regions coordinate industrial innovation strategies and don’t see this coordination as competition between them. The governing institution should be accountable to the European Parliament to prevent lobbying from countries, firms and banks. New regional governing institutions will be accountable to the European Ministry of Industry to make sure that industrial policy implementation is on track despite local political changes. I will also propose and define joint information and communication system between the Ministry of Industry, regional industry governing institutions and local governments to improve knowledge accessibility and information exchange.

Results of my industrial policy analysis will be presented in three chapters: global perspective of European industrial policy compared to the US and Asia (1970-2000), regional analysis of industrial policy within Europe (2000-2014), case study of industrial policy application for Lithuania.

4. Conclusions

Recent and historical developments worldwide of industrial policy theory and practice show evidence of a successful government role in selective strategic policy implementation. However, the European Commission should acknowledge that it has wrong policy targets and current monetary union rules encourage core and periphery structure within the Union. For most countries fulfilling five Maastricht Treaty criteria looks good on paper only, it does not ensure sufficient development and overall competitiveness. Periphery countries do not grow to their full potential and innovation gap within countries is increasing. Better understanding of regional differences within the EU is crucial as well as changes of the EU mechanism and political will to correct ‘design faults’. Proposed industrial innovation policy will act as a cure for post-crisis Europe and as a mechanism for sustainable long-term growth and employment.
References

A Discussion of Community of Practice and the Construction of Organization Core Competence: A Case Study of BS Supplementary Education Group

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Abstract: The importance of core competence has been well discussed by many researchers, but how core competence can be developed still open to debate. The development of core competence is highly relevant to the environment where firms reside, co-constructed by the members of organizations, and has the nature of ‘becoming’. Hence, this study aims to explore how core competence is developed based on Wenger’s ‘communities of practice’. A single case study, BS group, is selected, for the theory-building purpose. Ten interviews were conducted; and narrative approach was adopted as the analytical method. Our findings are Germinal learning in community; Participation in and Stages of the Negotiation of Meaning, and Negotiation of meaning constructs Core Competence.

Keywords: learning, core competence, knowledge organization, community of practice, narrative inquiry

1. Introduction

Organization core competence is essential for the initiation of organization renewal and strategic reform (Ljungquist 2007). As Prahalad and Hamel (1990) suggested, organization core competence is established in the process of organizations internal collective learning and knowledge. Core competence can be coordinated and integrated with various technology and abilities within the organization. It is not possessed by particular members, but spread among them (Hamel & Heene 1994; Yang et al. 2010). Organization members learn from their daily experiences within their working place. Hence, the core competence is established through the experiential learning of organization members.

Precedent research has contributed on how we can identify core competences within an organization, but how core competences can be produced is still under investigated. Learning mechanism within an organization is a good departing point for us to explore how core competences are established within firms. Hence, in this paper, we will tackle this issues by introducing the perspective of social learning. In this perspective, learning is not merely an individual cognitive process, but is about the process of social context and development.

Community of practice (CoP) in social learning emphasizes social interaction and group cognition. It believes the creative products of work are co-constructed through meaning shared by members (Heo & Breuleux 2008). An organization can be seen as becoming a community through members’ common context and histories. Wenger (1998) suggested community members construct the historical context for their actualized community through negotiation of meaning on the dual elements of participation and reification. Meaning is created through individual participation, sharing artifacts, thoughts, and subjective interaction.

In this paper, our contribution is that we articulate and explore “how” organizational capability is are developed and constructed by a CoP. Based on a case study of BS group; we will explain how organization members learn within the organization, and how the core competences are developed through these learning activities.

2. Literature review

In a knowledge economy age, enterprises do their best to search their competitive advantage to keep competitive strength themselves (Vorhies and Morgan, 2005). The popular perspective is resource-based that address the firm assumed as bundles of resources (Prencipe, 2000) must create and keep core competence.

In general, many management literatures divided core competence into two terms such as competency and capabilities (Prencipe, 2000). Some studies consider competency is from individual level to discuss how personal capacity affects firm’s competitive strength (e.g. Lahti, 1999; Grant 1996; Tippins and Sohi, 2003). The other term “capabilities” is more complex and fuzzy. Leonard-Barton(1992) mentioned that capabilities is a set
of skill, knowledge, recourse organizing, coordination of activities and use of assets to keep organization learning and improving. In fact, both of terms are used interchangeably and they have been indicated the foundation of firm’s completeness. (Prencipe, 2000)

According to Prahalad and Hamel (1990) mention, competency or capability is the key recourse of core competence. They defined so-called competency or capability is a process of collective knowledge learning and a kind of capability to coordinate various production techniques and integrate multiple fields and has three characteristics: (a) it must be difficult to be replaced; (b) it cannot be sold and bought on the market; and (c) heterogeneously distributed across firms. In addition, it could not restore on a single organizational member or a team, rather than spreading on any organizational members (Hamel and Heene, 1994). In other words, leaning is a big issue and organizational competency or capability is a collective learning process for organizational members to concern how to organize skills, knowledge, activities and assets to make firm become the best.

Searching past studies, many management and economists scholars want to use quantitative methods to solve a very important question is “what component of competency or capability, and try to build a content framework. (e.g. Lee et al. 2007; Tadas et al 2013; Bucur 2013; Ozgur 2013; Sun 2013; Vaicekauskas 2013). Due to mention from Prahalad and Hamel (1990), learning plays an important role to build organizational competency or capability. There are, however, a few studies to inquiry and articulate “how” organizational competency or capability is constructed. Therefore, this paper’s aim is to narrative this learning dynamic process by narrative approach.

3. Research method and design

3.1 Narrative as a method

This study adopted the ‘narrative approach’ to explore how core competence of BS group was developed under the lens of COP. As many studies suggested, narrative approach is a suitable method to study the COP because narrative method contributes to explore the interactional space in which speakers actively negotiate their personal and community actions. (e.g. Moore, E. 2006). In this study, we use the BS group as a single case to explore how core competences were established within the organization. Our data is collected through interviewing with senior instructors and managers. Unstructured interviews were administrated for establishing the life experiences of these individuals. Ten interviews were carried out, each interview last between 30mins and 2hrs. The detail of the administration of interview is shown in Table 1. The interview data was, then, coded by three researchers, and separated into several core themes in line with the COP concepts. The coding scheme, developed by different researchers, was further modified forth and back until it reaches the construct validity.

In order to study how core competence is established through collective learning, we selected BS group as our field of investigation. BS group is a private education service provider. The background of BS will be introduced in the next section.

Elaborate on them. This study talked with every person interviewed for more than two hours on average and created a verbatim transcript to be analyzed. Below is a precise listing of interview data:

<table>
<thead>
<tr>
<th>Table 1 Interview listings</th>
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<tbody>
<tr>
<td>Person interviewed</td>
</tr>
<tr>
<td>Board Chairman W</td>
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<tr>
<td>General Manager Y</td>
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<tr>
<td>Manager C</td>
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<tr>
<td>Co-manager E</td>
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<tr>
<td>Co-manager H</td>
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<td>Instructor Y</td>
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<td>Instructor C</td>
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<td>Instructor L</td>
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<td>Instructor H</td>
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<tr>
<td>Instructor F</td>
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</tbody>
</table>
3.2 About BS

BS Supplementary Education Group was founded by W in 1988. At the outset, founders provided advanced math courses for gifted students at elementary and junior high school levels. In 2009, BS became the first public listed supplementary education company, trading in the OTC (over-the-counter) market. BS has expanded its territory from southern Taiwan to other countries, such as Malaysia and Canada, and has 80 directly operated branches, and 200 exclusively employed instructors.

4. Competence-building in BS gifted mathematics Cram School

4.1 Renewal from crisis

In 1988, W worked for a teaching tape publisher. When this company went bankruptcy, he wanted to compensate the customers for the committed service, and started to provide tutoring service for these customers’ children. In his mind, all those teaching materials were developed by him. Therefore, he still could help these children to study math even without the teaching tapes.

This tutoring service was provided for his previous customers without charge. Three months later, many parents told him that students presented higher interest to study math, and started to introduce new students to W. W and his friends realized the private tutoring service might be a business opportunity, and founded the BS Cram School.

However, W and other co-founders had different views on how to run this business. Moreover, the set-up cost for a new cram school was not high. Some co-founders broke away with BS and establish their own business. In order to stabilize the operation of BS, W made a bold move. He assembled all the administrators and teaching assistant (TA), let them know the crisis facing by BS, and promote these TAs as instructors.

Co-manager E, who was one of the senior instructors, named this period as “teaching assembly” phase. “All the TAs became instructors. However, no one really had prior experience. When class was dismissed, all the TAs assembled together. They put together the workable teaching materials from various sources. They started to categorize different quiz to form different course units, and developed a standard teaching material together. The production of teaching materials was also an opportunity for these new instructors to share their classroom experience and solve their own issues. For instance, an instructor felt frustrated because he had difficulties to draw attention from students, other instructors started to contribute with their own solutions, such as ‘opening with jokes or install some plots from popular TV programs. Solutions usually came out from these informal chats. More amazingly, these solutions usually worked’ W was also frequent participate in these activities. In his observation, this was a good exercise for instructors to “learn from peers”. He, then, decided to formalize this practice as “teaching workshop”. Every Tuesday morning, all the instructors were assembled to discuss and share their own teaching techniques. W also shared his secret on how to teach math to students, and let these new instructors familiar with the “BS way”.

4.2 Teaching excellency and teaching training (TT)

TT is very important to BS’s instructors, and this is particularly the case with newly arrived instructors. If they have just recently become a part of the BS organization there is a large volume of proprietary teaching knowledge and skill which must be learned and made applicable; unique among these is “diagram explanation method.” If new instructors have not learned diagram explanation, in many cases they cannot use traditional algebraic logic in making inferences, let alone teach elementary school children.

In order to establish a climate for teach excellence, TT is a crucial activity for junior and senior instructors to exchange their teaching experiences and improve their teaching techniques.Instructor C is a good example to demonstrate the fruit of such an activity. When she was a rookie in BS, she has no ideas of how to prepare for the class. She spent considerable time on practicing the quiz-solving process before the class. However, in class, it became a nightmare. She had to check the note right after the demonstration for ensuring she got the right answers. What made it even worse is that she found students could not understand her explanation of the behind principles because she could not explain it in a fluent manner.
During the TT meeting, General Manager Y shared his insight on how to prepare class. He said: “when new instructors prepare lessons they should make an effort to use diagram method logic and “think” about one quiz at least three times. The first time is to solve the quiz properly. The second time the instructor should think of how to explain the quiz’s solution. The third time the instructor must think of how to explain it so that the students will understand.”

This insight inspired C to reflect on how she prepared her class. She started to consider how to use logic the students could understand in teaching them rather than simply solving the quizzes for the students in a way they could not readily understand. From that time, this method became the main work flow for C in preparing classes.

Teaching meeting is the occasion where discussion flows around and stimulates the further reflections among instructors. This training was firstly initiated when BS started to separate its courses into different levels. And, TT is performed weekly, not only strengthening instructors’ lecturing skills, but also providing an educational atmosphere in which participants can continue their training. At the training site, many different approaches to quiz-solving were presented. These approaches shared a common principle - diagram explanation method. At training, senior instructors acted as conveners and provided the road maps for TT. Hereafter, teaching demonstration was crucial in these trainings. Junior instructors had to demonstrate their quiz-solving process with blackboard and explained the behind logic. Senior instructors and other peers played the role of students. After the demonstration, participants started to review this process from different angles and exchanged their ideas. Instructors usually had different strengths and weakness. For instance, some might be good at developing diagrams, while others might be good at developing application quiz. The differences of strengths and teaching preferred teaching styles enabled the participants to examine the demonstration from different perspectives and contribute various ways to teach particular mathematic concepts. They could explain to instructor on stage which concepts or teaching methods are most likely to cause students to make mistakes, and how to provide a more appropriate explanation. Finally, the convening instructor would sum up the issues brought up in the training, and wrapped up all the possible routes to the participants. The demonstrating instructors had to record these suggestions, and develop a new way for explain this concept. In the next training session, they had to demonstrate their newly developed approach in the training session.

In this manner, instructors could continuously try out different teaching methods and practices. For this reason, there is a strong impression concerning the quizzes instructors are responsible for. In addition, after sessions every instructor fills out a learning questionnaire in order to record the teaching methods they use in class as well as their explanations. These are archived once every teaching period for each grade, and are set into a book so that instructors can look at other instructors’ teaching methods and explanations.

For example, such as Figure 1, C was assigned to one math quiz at one time: line a and b combined had a length of twenty. We know the end section of line b is 4. What is the length of line “a”?

![Figure 1](image1.png)

**Figure 1** Line diagram explanation

C, who was still a new instructor, did not know how to use diagram explanation logic to explain the answer. As such, she only used traditional algebraic logic concepts which supposes “a” as x, with the front section of b also being x. Therefore, line b was x+4, and a+b=(x+x+4) =20, and this allows us to arrive at a=x=8. In traditional algebra this is a standard way of answering the question, and is it not incorrect. However, senior instructors offered their own insights: because the target students were in elementary school, lower than fifth grade, they
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had not learned the notion of an unknown number. Thus, they had no way of understanding this explanation. For this reason, the senior instructors suggested using the diagram explanation method to explain the quiz. As in the Figure2, first extend an imaginary line from a so that it is as long as b. Elementary school students have learned the concept of averages, so it is only necessary to make a and b the same length \((20+4)/2=12\), and say 12-4=8=a. And, it is possible to arrive at the length of a.

This is a transformative process. C discovered the algebraic method she used, and elementary school students could not understand. Through the process of attending TT and discussing these methods with other, C changed her way of teaching. In TT, in a similar mode, senior and junior instructors provided their own solution methods and explanations with respect to the same quiz. If three people provided explanations for one quiz, and each of them possess sound logic, then instructors would have three ways of solving and explaining that quiz.

Many new diagram methods were discovered in the process of these discussions. For example, BS had a diagram explanation method called the “scale method,” which Board Chairman W figured out in Japanese books. Later, W discussed it with General Manager Y. Y remembered it and brought it to the TT meeting to teach other instructors. The instructors from the north looked at it and discussed it. They felt this method would be good for solving more complex quizzes, as it would not be necessary to use formulas in explaining.

4.3 Managing excellency and assignment group (AG)

General Manager Y (hereafter Y) started as an instructor, and then was promoted in succession to the Xiaogang branch school manager in Kaohsiung and, later, area manager, and finally, he became general manager. He had an experience to save the Xiaogang branch was in danger of closing and made profit. That outstanding performance won him the praise of the Board Chairman, who wanted him to become the northern region manager and increased market share there. With capital raised jointly by shareholders and BS opened four branches in the north Taiwan. And, Y was made responsible for coordinating the operation of each branch.

BS encountered an operational bottleneck within one year as the competition in the Taipei market was intense, and Y was forced to spend advertising money at a rapid pace. After six months, one school was forced to close because of deficits. Then, a meeting was held with Y and other managers to determine why the first branch was unable to attract more students and grow. After discussing the matter, Y came to several conclusions: First, the school was located in an area where it was not easily visible, and there was a limit to capital. In addition, the rent for first floor store fronts in Taipei is relatively high, so that branch was set on the second floor; as the entrance was in an alley which was extremely difficult to enter, many potential customers could not find it. Second, Management lacked of managerial experience, and they did not know how to operate the branch. Third, the regional manager plays a critical role and should assist the branch manager. However, while Y was an excellent manager in the south, he did not know how to disseminate his managerial experience in instructing managers in school branch operations. Faced with the above problems, limited resources, and the necessity of leading a new group of branch managers, Y considered how to delegate his responsibility to others, as well as the possibility of allowing branch managers to learn branch school operation methods. Y suddenly flashed from TT he could create “assignment groups”.

Faced with the extremely competitive environment of the supplementary education industry in the north, Y discovered the generally used advertising flyers were a waste of recourses and did not necessarily have the intended effect. Thus, he decided to use an alternative. First of all, the BS advertisement was printed on the tissue package. These tissue packages could be placed in many places of business. For example, noodle stands and convenience stores, where those passing by could pick them up. Tissue was a necessity of life which most members of the public will take, and when they used the tissue they would see the BS advertisement, and this more likely to achieve the goal of advertising. Later on, other school branches started to utilize this method as well. In addition, BS has an internal magazine for organization entitled “BS Education.” Originally, this magazine was circulated within the company for reading by members. One day, Y had a sudden thought; these magazines could be placed in beauty shops or clinics. At first many female branch managers thought this was not a good idea and told Y: “This idea would not work as a woman experience. No one went to have our hair washed, get a facial, or get a permanent to read such a serious magazine. Most of all liked to read gossip magazines.” Y explained he knew clients would not look through the magazine. However, when they could see
the cover, this would provide exposure for BS. As a result of this short dialog the managers started to reexamine the function of printed advertising in attracting students. In addition, Y observed mothers were the potential customers to advertise for, because they had more opportunities to go outside to do many activities, such as buy breakfast, lunch or go shopping. For this reason, they were more likely to see BS’s advertisements, while fathers were only responsible for providing the tuition. Mothers became the main medium of activities to attract new students. Finally, Y believed students should only have to travel a short distance to get to school. Because BS did not have an additional budget to provide transportation for students, they would to attract students in areas where transportation to and from the schools was the most convenient. Y said that BS locked in on a five mile walking distance radius of 5 miles as their core area for attracting students. He discovered this method clearly raised BS’s visibility and increased effectiveness in attracting new students. While it was not possible to teach all of these methods to every manager, new managers could learn his sales strategies through the function of AGs very quickly. These activities for attracting students, and related skills, became the “community strategy” for BS.

5. Concluding analysis and discussion

As the length limits, the following analysis uses second case as an example.

5.1 Germinal learning in community

The existing business model of BS faced challenge of exodus of celebrities. Hence, the Chair of board, Wong, was forced to turn TAs into instructors. During this crisis, Wong and these TAs formed a COP for teaching excellency and the survival of BS. BS’ survival did not matter to Wong, but also to these TAs as this was the place they made for their living. This goal can be interpreted as an enterprise of the community (Wenger 1998). We can find that TAs were willing to participate in these meetings, while other senior instructors, Wong included, were willing to share their ‘secret’ teaching skills. Social energy emerged, and enabled these participants to join such training meetings. In the meantime, such a community was stimulated by Wong. We can see Wong as the leader of this COP and as a mediator to link this joint enterprise to the members of COP.

The ongoing interaction between these participants was the venue for community members to learning from practice. They connected together, adjust the meanings of their practice, and negotiate these meanings with other members. This reflects Wenger’s (1998) idea that community members create the meaning of actions through interactive participation. Participation can be defined as the process by which the individual creates the interactive knowledge of social relationships within the social context he or she is located in. Reification is the concrete actualization of individual meaning in communal practice, and is crucial for the engagement in the community. Through the interaction of participation and reification the individual becomes involved in a negotiation of meaning which allows for an exchange concerning the embedded experiences of the community members. In the case of BS, the meaning of TT and AG was not just a part of organizational system, but rather but was the place to trigger teachers’ learning activities and the place to negotiate the meaning within the community.

The participants who mutual engaged in TT and the AG naturally established an operational COP. A conventional top-down training design would be too hegemonic, and counter-innovative. However, in BS’ approach, the novice instructors play the role of as ‘teacher’ to demonstrate their quiz-solving process, while other instructors, senior and junior both included, play the role as students. This design made quiz-solving activity was not just an experience of any individuals, but a shared and co-created experience among the community. The diversity of teaching approach was developed in such a process. Although participants may still have different ways to solve the quiz, they still worked within the principle of ‘graphical method’.

For example, in our second case, C was a novice and an outsider with limited teaching experience. She had only a vague idea of ‘the BS way’ and could only use the algebraic approach, which she learnt in past, to solve
the quiz for students. During the demonstration in teaching meeting, she found her method was not sound enough. However, she started to get the idea of the ‘graphic method’ during the demonstration of other members in TT, and became familiar with this method. She also applied this method at other types of quiz. In other words, through the align-imaging-realign process, C began to understand the BS graphical method, and develop her own graphical method. This example showed that how COP worked. Individual participants may have their own approach to teach, but they create different ways to apply the graphic methods in different domain and different ways to demonstrate quiz-solving with graphic.

5.2 Participation in and stages of the negotiation of meaning

Either C or Y has three stages involved in TT’s and operation’s negotiation of meaning. (As the length limits, the following is use C as an example). The first is the **blind learning meaning negotiation**. This stage involves forced participation in the organization. Prior to TT it is necessary to first obtain BS’s lecture topics and think about how you want to explain the quiz. Afterward, instructors prepare to give a teaching demonstration on stage. During TT it is necessary to lecture in front of other junior and senior instructors, to answer questions, and to take directions from these instructors. This routine made C feel TT participation was simply another part of work. What is more, she did not understand the meaning of TT participation. However, since this phase involves legitimate peripheral participation, we cannot say it held no significance for her. Rather, it provided her with the first visualizations of the COPs. With the accumulation of TT participation experience C entered the second stage: **alignment learning meaning negotiation**. C still held onto the traditional algebraic logic in teaching and describing how to answer questions. She believed if quizzes could not be solved through algebraic logic, then they could not be solved period. In TT she wrote out the solution process and logic concerning the quiz in “see details in the story” in detail on the blackboard and explained it. When the senior instructors started discussing the quiz with C learning was triggered. The senior instructors also provided feedback on her teaching commentaries, and wrote down the methods for carrying out diagram explanation method. For C, who brought her long held quiz solving logic when she started to participate in TT, the diagram explanation method provided a spark which allowed C to see and consider quiz solving from a different perspective. C started to record the explanation methods, as well as the methods from the other instructors in instructor training. After training finished C used this logic to reconsider the quiz discussed in class, as well as other quizzes related to it. In this stage of meaning negotiation C started to move away from the first stage of negotiation concerning blind study, as she had experienced that BS’s actually was unique from what others thought.

The third stage is **reflection learning meaning negotiation**. Through TT class notes and recordings, C was able to anchor the logic of diagram explanation method. She used this logic to continue solving other quizzes in the lecture as well. Afterward, she attempted to explain it to herself and imagined she was talking to an elementary student and asking herself whether or he or she would understand her explanation. During this stage C attempted to transform the diagram explanation method she learned during TT into something of meaning to her. In addition, in the following TT session she further discusses diagram explanation logic with other instructors. Hereafter she continued to participate in TT.

Stated further that, in both teaching’s and operation’s COP, the negotiation of meaning within these communities is temporal and dynamic; meaning it is not fixed. For the individual, the negotiation of meaning temporarily serves as learning “cornerstone” to develop their knowledgeability, and for the COP, that serves as its temporary regime of competence. The individual’s knowledgeability and the community’s regime of competence will expand and improve based on time and the entrance of different members; examples include various teachers who are good at solving different types of quizzes and managers who have different expertise in management and instruction. As such, the regime of competence is the result of dynamic negotiation of meaning and reformed by its ongoing consultations. The individual and community’s learning move parallel as they both members and the community interact with respect to competence.

5.3 Negotiation of meaning constructs core competence

Competence is embedded within practice; practice is constructed through meaning of negotiation. Community members continue with regular and routine activities, and continue to be entrepreneuring, to aggregate, and to anchor every stage of meaning negotiations. The community co-constructs a tentative and unique meaning through negotiation which is significant and dynamic. This is then embedded within the community and becomes its regime of competence. This would include diagram explanation and community path strategy. With respect to the community, and the practice within it, a concrete learning track or track paradigm is created for
members by this practice (Wenger 1998), and members continue to negotiate competence based on this path. As such, the learning track is an important factor in meaning negotiation becoming a regime of competence. In each stage of meaning negotiation the learner gradually modifies, carves out, and reforms the regime of competence as a result of his or her contact with meaning negotiation at each stage facilitated by the learning track.

As AG as an example (As the length limits, the following is use Y as an example), core competence for AG is community path strategy. Y and the managers in the AG are anchored by every observation of salesmanship strategies in the northern market. For example, advertisement tissue packages, the location of printed advertisement, the choice of student recruitment object, branch school location choices, core areas for student recruitment, and other strategies. While this might seem like a standard operational flow, in fact it subsumed within it is the core regime of competence.

Diagram explanation method and community path strategy are BS’s competitive advantage as a community. Those competences distinguish them from other competitors in the supplementary education business. It is also the critical factor which separates it from “remedial education” which is not part of a school curriculum.

Reference


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Masters Research papers
Entrepreneurship in Nursing Care: Perspectives, Incentives and Barriers in the Portuguese Context

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Abstract: In recent years, the importance given to entrepreneurship in Portugal has become notorious, especially as a way to fight or alleviate the difficulties occurring in the labor market, namely the high unemployment rate, job scarcity, and the precariousness of labor contracts. Given this scenario, the Portuguese government has advocated the emergence of entrepreneurial activity in order to identify new and interesting business opportunities, and, consequently, stimulate the economy and help solving the serious problems of unemployment. The health sector has been thought of as a new context for the emergence of those business opportunities. Some important changes took place following the government measures to lower costs in healthcare. Such measures had a severe impact on hiring and working conditions of many health professionals, namely nursing staff, forcing these professionals to rethink their career paths. Additionally, there is a growing demand for nursing services which seems to justify the need for entrepreneurial activity among such professionals. The present study aims to analyze the perceptions of a group of 18 nursing entrepreneurs from the North of Portugal that participated in semi-structured interviews in order to explore the main incentives and barriers to the implementation and survival of entrepreneurial activities in the Portuguese economic context. The content analysis suggests that entrepreneurship in nursing care seems to be characterized by a prevailing individual approach, since the success of the entrepreneur is viewed as being strongly dependent on a personal and psychological profile that affects the economic viability of the venture. Such a profile is not exclusively technical and instrumental, but also includes expressive and relational skills, that gives special importance to work in the community and the idea of nurturing others. The study findings also revealed a paradoxical positioning between two major perspectives in the nursing entrepreneurship: a) an economic perspective centered on the need to make profit and ensure financial viability; and b) a social perspective focused on the humanism of nursing vocation and concern for the patient. Six main categories of incentives and obstacles to nursing entrepreneurship have been identified: logistical support, financial support, bureaucracy, marketing strategies, the role of institutional and government services, and the national economic context. This study aims to contribute to the development of knowledge and practice of entrepreneurship in nursing care by addressing political and economic measures that can more effectively meet the needs of nurse entrepreneurs.

Keywords: entrepreneurship, health, nursing care, perceptions, incentives and barriers

1. Introduction

In recent years, entrepreneurship has become a matter of great interest in the Portuguese political agenda. The negative effects of the current economic and financial crisis has significantly affected the Portuguese economy, with a major impact on the unemployment rate of the country. The entrepreneurial activity, and the emergence of new and interesting business opportunities, is perceived by the government and wider society as a means of achieving economic recovery and solving the serious problem of unemployment. In today’s political discourse, entrepreneurship can also mean a shift in social security and employment duties, from state organizations to individual and private responsibility. Entrepreneurship also stands out as a driver of creativity, innovation and expertise in the business sector.

In the Portuguese health sector, and more specifically in nursing care, entrepreneurship has recently emerged as a strategy to overcome the shortage of job vacancies in hospitals and other health services. The privatization of Portuguese health care has increased the precariousness of labor contracts and the degree of uncertainty in nursing jobs. As a result of corporate downsizing and health care restructuring, these professionals began searching for different employment options and are expanding into different work domains to continue their nursing career (Abreu, 2007; D’Epiney, 2008; Rocon and Munhoz, 2008; Boore and Porter, 2011).

The present study aims to address the issue of nursing entrepreneurship in Portugal. What can lead Portuguese nurses to respond to this call for greater entrepreneurial initiative? What is the profile of the nurse entrepreneurs? What are the main incentives and barriers they encounter when acting entrepreneurially? The
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relevance of conducting research on nursing entrepreneurship becomes even more crucial due to the paucity of empirical studies on this subject.

The proposed research has an exploratory nature, and makes use of a qualitative methodology based on interviews conducted with micro, small and medium Portuguese entrepreneurs working in nursing care. This study is intended to deepen our understanding of nursing entrepreneurship by highlighting the incentives and obstacles that permeate this activity, thus contributing to the reformulation of policy, entrepreneurship from the organization’s point of view, and getting closer to the real needs of entrepreneurs. The main objective of this study is to explore the perceptions of Northern Portuguese nurses concerning entrepreneurial activity, and uncover the main benefits and hurdles to its implementation.

2. Entrepreneur/entrepreneurship: Conceptual developments and theoretical approaches

Studies on entrepreneurship (Dinis and Ussman, 2006; Palma, Cunha and Lopes, 2007; Palma, 2008; Torres, 2010) reveal an evolution in the definition of the construct. Schumpeter, a major reference in this area of research, presents the entrepreneur as an individual with the unique ability to make new combinations, able to introduce discontinuities in the equilibrium of the economic system and produce innovation. The author has also introduced the notion of a “creative-destructive” process and highlighted the role of entrepreneurs in economic development (Filion, 1999).

However, other authors have questioned this approach because they consider that this definition does not clarify whether the innovation involves the creation of a new organization or not, which leads to a lack of consensus in the scientific community regarding this concept (Dinis and Ussman, 2006).

Against this backdrop, some authors believe that the problem with the definition of entrepreneurship relates to the multidisciplinary approaches to the concept (Low and MacMillan, 1988; Sarkar, 2010). Each discipline tends to develop its own view of entrepreneurship, making it difficult to find a common and a shareable definition (Sexton and Landström, 2000; Palma et al, 2007; Palma, 2008). At the same time, other authors argue that it is within the multidisciplinary approaches that derives its conceptual richness (Steyaert, 2004; Sarkar, 2010).

The set of conceptualizations of entrepreneurship has undergone an evaluation and/or have been constantly reformulated over time until the present day, thus contributing to its diverse and sometimes contradictory character.

In this sense, when analyzed from an economic perspective, entrepreneurship requires setting up a business or developing an existing business whilst always bearing in mind the underlying concepts of opportunity, wealth creation and innovation, as well as the influence and/or relationship with the market (Shane and Venkataraman, 2000; Davidsson, Low and Wright, 2001; Gartner, 2001; Global Entrepreneurship Monitor, 2010).

This (economic) perspective also appears to be focused on the entrepreneur subject, and his/her personal and psychological dimensions, which define the entrepreneur as someone confident, with high autonomy and a strong internal locus of control. An entrepreneur is someone who is able to create something new that adds value through his/her effort and dedication, and also risk-taking (Sicsú, 2001; Reynolds et al, 2001; Ferreira, Santos and Serra, 2010).

The concept of social entrepreneurship has received particular attention from scholars in recent years. For Certo and Miller (2008, p.267), this concept moves away from the economic perspective associated with entrepreneurship as it implies the recognition, evaluation and exploration of opportunities that result in social value, involving the fulfillment of basic needs such as food, education and medical services to the most needy parts of the population (Austin, Stevenson and Wei-Skillern, 2006). Nevertheless, some authors argue that both types of entrepreneurship – business and social - can coexist within a single organization (Certo and Miller, 2008), thus creating a hybrid concept. This happens when an organization demonstrates, at the same time, a concern with achieving profit and social value (Certo and Miller, 2008).
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According to Austin et al. (2006) commercial and social entrepreneurship differs in their mission performance measurement, and resource mobilization. In this sense, commercial entrepreneurship is primarily concerned with private gains. This performance is measured in terms of financial performance (such as profitability and sales growth) and, because of this, the commercial entrepreneurs expect more capital in return and their employees to give financial benefits to the organization.

In contrast, social entrepreneurship is concerned with creating social value and its performance measurement is less standardized, making it more difficult to measure the social value (and the results). Social entrepreneurship usually encounter more difficulties in mobilizing financial and human resources because the main goal is not profit. And most social enterprises are not able to pay high salaries to their employees, who are expected to be more concerned with creating social value rather than earning a lot of money (Certo and Miller, 2008).

Peredo and McLean (2006, p.56) argue that the principal premise of social entrepreneurship is creating social value (almost exclusively) which implies the recognition and exploration of opportunities through innovation, tolerance to high-risk situations and persistence in achieving their goal. It is the commitment to create social value that distinguishes social entrepreneurship from other forms of entrepreneurship. Following this reasoning, an entrepreneur is defined as a person, a member of a group or an organization who intends to creatively reach a social goal (Peredo and McLean, 2006).

3. Contextualization of entrepreneurship in Portugal and in nursing care

3.1 Entrepreneurial activity in the national context: Incentives and barriers

Due to economic instability and recession, Portuguese government agencies have agreed measures of cost containment and restructuring to be applied to all sectors, with healthcare being no exception (Portuguese Observatory on Health Systems, 2011). These measures associated with the aging of the Portuguese population, newly emerging diseases and the increase in chronic diseases has led the hospital to reshape itself and its mission to meet the needs of the population and reach financial and practical sustainability. To achieve this purpose, hospitals have transferred their care function to other facets of the nearest health community (e.g. Continuing Care Units, home care services).

With this shift, the image and recognition of nurses have changed in order to promote a closer relationship between the provider and the user and/or family. The nursing professionals had to rethink their traditional role and find other ways of providing care to the population, which involves greater specialization and technological innovation (D'Espinney, 2008).

With these changes in the health sector, one should add the need for new forms of employment for nursing, in order to meet the decrease in job vacancies in hospitals and public health services deriving from the financial crisis in the sector (Roncon and Munhoz, 2009). There is also a growing supply of nursing services that has resulted in increased emigration of portuguese nurses (National Statistical Institute, 2009). This scenario seems to legitimize entrepreneurship in nursing care as a way to overcome such adversity in health care (Abreu, 2007).

Despite the efforts that have been undertaken, in Portugal there is still a long way to go until people receive all the health care they are entitled to. Thus, according to Abreu (2007), we can and should invest in entrepreneurship as a means of employment and, at the same time, as a way to create and deliver quality and more accessible health care services to the population (Abreu, 2007).

In this sense, the changes occurring in the labor market, in terms of new forms of employability and career management changes associated with increased insecurity, can foster the need to search for other professional alternatives and solutions, and consequently, a greater focus is given to self-employment (Henrique and Cunha, 2008).

The potential for entrepreneurship to contribute to the economic recovery and ameliorating the unemployment problem has resulted in various incentives and economic, technical, financial and structural support, aiming to facilitate and/or promote new entrepreneurs to enter the market and/or society. Such
incentives and support have focused on facilitating ease of access to physical infrastructure (physical resources, communications, raw materials), providing support to commercial services, such as accounting, legal, consulting (Global Entrepreneurship Monitor, 2010), and promoting the emergence of lines of credit to support entrepreneurial projects.

Despite this increasing interest in entrepreneurship, in Portugal there is still the so-called latent entrepreneurship. In other words, there is a willingness to undertake entrepreneurial activities, but that is not put into practice due to some factors such as: 1) high social aversion to risk; 2) a shortage of skills amongst entrepreneurs; 3) financial and administrative barriers; 4) a lack of knowledge about how to start a business; and 5) the prevalence of necessity entrepreneurship (European Commission, 2007). Additionally, some authors also consider the following obstacles to be important: 1) an inadequate educational system (Araújo et al, 2005); 2) weak integration with existing entrepreneurial initiatives and a lack of information (Araújo et al, 2005); 3) a strong culture of seeking employment in the public sector and large private companies (Araújo et al, 2005; Henrekson, 2005); 4) the absence of entrepreneurship support programs; 5) high taxes (Araújo et al, 2005; Henrekson, 2005); and 6) excess bureaucracy and regulations (National Statistical Institute, 2006).

4. Empirical study: Nursing entrepreneurial activity in the North of Portugal

4.1 Methodological analysis and characterization of the population

Given the proposed objectives and considering the exploratory nature of the study, we conducted our research through a qualitative methodology. Thus, as a way to operationalize the objectives outlined, we interviewed nurse entrepreneurs from Northern Portugal face-to-face, using a semi-structured script. The interview was designed to gather information regarding their view on entrepreneurship in nursing, and incentives and barriers to nurses entrepreneurs.

These qualitative meetings (Fernandes, 2011) took place from November 2012 to August 2013, most of which occurred in the workplaces of the study's participants, with an average duration of 46 minutes. Eighteen entrepreneurs from Northern Portugal, most of them graduated in nursing, married with children, predominantly male, and with a mean age around 40 years participated in the research. At an early stage, we obtained the contact details of nurse entrepreneurs through information gathered on the Internet, from the Portuguese Health Regulation Authority and from the Nurses Council. Subsequently, we have asked the first nurses interviewed to refer other nurses who might fit the research aim. The names and contacts of other nurse entrepreneurs were provided usign the snowball sampling (Noy, 2008). According to this author, this technique can enhance our social knowledge due to the quality of the interactions established, and has emerged as a way of gaining access to new participants and as a means of enriching the group of participants in our study..

The entrepreneurial projects undertaken by our interviewees provide general health services (44 %) and only 22% are targeted solely for nursing care. Most of the companies are of a private limited type, and have been in the market between 1 and 5 years. In the process of establishing the company, we can see that a large percentage rely on the involvement of several nurses (55%), with a relatively small percentage of employees, mostly employing two.

4.2 Analysis and discussion of results

4.2.1 Perceptions of entrepreneurship/entrepreneur

The first category of analysis refers to "perceptions of entrepreneur and entrepreneurship" and reveals the prevalence of economic and individual approaches associated with entrepreneurial activity. When questioned about their definition of entrepreneur/ship, a dominant interpretation which favors a prospective market, with underlying profit, and wealth for the renewal/innovation, coupled with a business idea, the sense of personal satisfaction, job creation and business wealth and integration into the labor market has emerged.

(...) I would say that the entrepreneur is a person who is able to take initiative to develop something beyond what we normally do. He/she is able to be creative, to create his/her own space, his/her own business in a given area (...). (Interview 6).
The dominant approach presents the ideal entrepreneur as someone who is able to step outside their "comfort zone", to venture, to take risks to achieve their dreams and obtain personal satisfaction. Entrepreneurship tends to emerge through these individual attributes, as the materialization of a dream, something desired and obtained through proactivity, determination, initiative, creativity and individual effort but also through expressive and relational characteristics. This is where the ability to provide a service to the community, in a constant attempt to share acquired knowledge, is assumed by some interviewees as an aspect of personal satisfaction and enrichment, since it produces health gains for the population.

(...) Is the ability that nurses have to extrapolate out of the public service a private service in order to help (...). (Interview 9).

In this sense, some of the interviewees argue that the entrepreneur must seek a balance between making a profit and the prospect of serving others, the client, and the community. Additionally, they consider that focusing solely on profit-making prevents any entrepreneurial activity, thus showing a certain inability to see health as a business.

The concept of social entrepreneurship, often associated with entrepreneurship in health, tends to emerge when the ability to consider health as a business is associated with questions regarding the image of a company based solely on the economic perspective.

Based on this assumption, the study participants believe that entrepreneurship in nursing care has specific features which may bring some limitations to this area, since the "product" is different. Thus, for most respondents, one aspect that reinforces the uniqueness of entrepreneurial nursing care initiatives relates to the fact that it means "dealing with people" in a delicate and fragile stage of illness, which requires humanization and empathy towards others.

(...) To undertake in nursing is much more difficult than any other area because we face the person, in fact, in a stage ... in its greatest frailty (...). (Interview 13).

According to the interviewees, entrepreneurship arises as an opportunity to develop their professional activity based on their own beliefs and values and, in some ways, to express the ability of autonomy often compromised in nursing care. In this sense, home care is seen as the area where nursing care can find its place in the market, showing a constant concern with the quality of services provided.

(...) I’ve always dreamed, not in being a manager, but to have, to be able to say that I provide nursing care according to my personal style, according to what I have outlined, planned (...). (Interview 13).

Another perception of entrepreneurship is as a consequence of collective action and a shared sense of belonging. Pragmatically, this definition is clearly visible in the extract from an interview when he/she focuses on the shortage of nurses investing in this area, considering the lack of networking among nurse entrepreneurs to be a disadvantage. This interviewee claims that within an environment of cooperation and mutual aid more ambitious goals could be achieved, as well as valuing the importance of an entrepreneurial culture in nursing care.

(...) Unfortunately, there weren’t so many nurses predisposed to this (...) there was never much associative spirit in this area (...). (Interview 9).

In this approach, support networks and affective networks seem to play a crucial role in understanding the entrepreneurial act since many respondents highlighted the lack of family support in their entrepreneurial activity. However, other participants felt the influence and/or "legacy" of family in this decision making, viewing entrepreneurship as part of their daily life.

It was in this context that most participants considered it important to give support and/or collaborate with another person in the project, in other words, not managing the project alone and sharing decisions and responsibilities. The existence of at least two people involved in the project was understood as an ideal situation.
4.2.2 Support/conditions that facilitate and/or promote entrepreneurial activity

The category labelled as "support and conditions that facilitate and/or promote entrepreneurial activity" highlights support mechanisms of an economic and institutional/technical nature. This type of support includes: 1) logistical support, in other words, the presence of one or more institutions that provide advice and insight to entrepreneurs on what and how they should in order to minimize the risks associated with a decision based on a lack of theoretical and practical knowledge; 2) economic aid at an early stage, and the need to establish partnerships as a means of disseminating credible services, which may lead to an increased customer base; 3) the need to have a parallel profession that ensures the economic viability of the project and the financial stability of the entrepreneur, since profits are greatly reduced at an early stage; 4) the process of bureaucratization in the creation of the company; 5) the relevance of the initiatives undertaken by government agencies, although these benefits are considered temporary and precarious; and 6) the support of the Nurses Council.

In terms of relational support, some interviewees considered that an entrepreneurial advantage lies in increasing the quality of labor relations, with both partners and collaborators, to the extent that it is believed that this process is relational, and entails a constant relationship with each other.

(...) Besides being my partner is my friend (...) And we have a very, very positive relationship evolved and much more from the moment we decided to become partners, a sizable trust, only then is also that certain things are also possible and have a camaraderie with one another quite large as well (...). (Interview 18).

4.2.3 Barriers to entrepreneurial activity

When we refer to the difficulties encountered in the course of entrepreneurial activity, we can make a distinction between economic and technical/institutional barriers and barriers of a relational nature (as noted in the previous section about support and conditions facilitating entrepreneurship).

The economic and technical/institutional obstacles that have been reported can be summarized as follows: 1) a lack of dissemination of opportunities and projects encouraging entrepreneurship, considering that there is no equal "accessibility" of information for all, which can lead to loss of aid and/or valuable incentive; 2) the inability of services to provide a prompt answer that delays and complicates the entrepreneurial process; 3) excessive bureaucratic processes that may cause difficulties in the setting up and implementation of the business; 4) a lack of information concerning these bureaucratic processes which also implies an additional effort and commitment from the person responsible for the project; 5) a lack of criteria and rigor required in regulations that leads to unfair competition; 6) the excessive taxes that burden the companies; 7) a difficulty in disclosing the services they provide; 8) a difficulty in establishing partnerships and hence in transmitting a credible and trustworthy reputation to customers and partners, which presents itself as an obstacle in building an image with its customer base; 9) the current economic environment understood as a factor with great negative influence on the business's viability; and 10) the low return obtained through entrepreneurial projects.

(...) The people, many of them have difficulty, not only to pay, but to realize the value they pay (...). (Interview 18).

The relational and/or obstacles of a personal nature tend to focus on: 1) the lack of an entrepreneurial culture and the absence of a network of emotional support that can frustrate the entrepreneurial project; 2) the affective dimension, since the respondents mentioned that they often felt frustrated, tired and unmotivated, questioning whether, in fact, the investment and effort would be justified; and 3) the need to sacrifice their personal life and family to devote, almost exclusively, to the entrepreneurial project.

5. Conclusion

The purpose of this study was to analyze some perceptions of entrepreneurship in nursing, namely the way they approach entrepreneurship and entrepreneurs, and the incentives and obstacles that might arise and to some extent stimulate or inhibit entrepreneurial activity of Portuguese nurses. To investigate these issues we chose to conduct interviews using a snowball sample.
The nurses interviewed presented a definition of entrepreneurship that favored the economic perspective and a certain individualist approach. From this underlying economic perspective emerges a definition of entrepreneurship associated with business, the creation of employment and corporate wealth and entry into the labour market.

However, from the individualist perspective, the nurses interviewed felt that the entrepreneur should possess a set of specific qualities to succeed in business. In this sense, they defined the entrepreneur as someone who appreciates what he/she does, has intrinsic motivation, a thorough understanding of oneself and one’s capabilities, a high internal locus of control, and an ability to get out of their "comfort zone". Someone able to venture out and take risks to achieve their dreams and get personal satisfaction. Entrepreneurship is thus understood as the embodiment of a dream, something desired by proactivity, determination, initiative, creativity and individual effort.

In view of the above, we see a certain connection between the individual and economic perspective. Through the definitions provided by our interviewees, entrepreneurship emerges as being predominantly associated with the business idea and the need for personal satisfaction.

Nevertheless, another approach was also found, albeit in a minority, that emphasized the idea of entrepreneurial activity as a result of shared activities, giving special attention to the support of family, friends and network partners in decision-making.

In view of this collective vision, the need for greater cooperation between nurses and entrepreneurs has been found. To achieve more ambitious goals in this area, the nurses interviewed have valued the existence of an entrepreneurial culture in nursing. Entrepreneurship was regarded as something beneficial and necessary in society. The majority of our respondents believe that the entrepreneur must find the balance between profit and the perspective of serving the customer, the community.

Many interviewees demonstrated a certain “inability to view health as a business”, that calls for the concept of social entrepreneurship often related to entrepreneurship in health (Austin et al, 2006). Entrepreneurship in nursing was perceived and portrayed as a way of nurses demonstrating the autonomous side of the profession, since it allowed them to provide care according to their beliefs and values. Care at home seems to be the area where nurses can find their “niche market” and keep a constant concern with quality of care.

The present study was also intended to analyze various facets of entrepreneurship, reinforcing the notion of a multidimensional construction, based on economic, cultural and individual perspectives of entrepreneurship.

The incentives perceived as drivers of entrepreneurial ventures can be summarized as follows: the administrative and/or bureaucratic restraints; economic aid; the existence of a parallel profession; the
establishment of partnerships; the relevance of the undertaken by government agenciesand the support of the Nurses Council. Some participants highlight the beneficial role of relational support. They argue that entrepreneurship can increase the quality of relationships at work, particularly with the partners and collaborators, to the extent that it is believed that this process is above all relational, i.e., implies a constant interaction between people.

When we look at the difficulties encountered by nurses in our research, they devote special attention to: the inability of the services to provide an answer to the needs of nurses entrepreneurs, the excessive bureaucracy and excessive tax burden, the difficulty in establishing partnerships and the current economic crisis; the lack of an entrepreneurial culture, the lack of emotional support network and the need to give up moments and family projects.

6. Limitations of the study and suggestions for future research

While research on entrepreneurship in nursing is not new, it is still in its infancy in Portugal. Despite all the attention devoted to entrepreneurship, there seem to be few examples of nurses entrepreneurs. The decision on the best way to locate nurses that have started their own business was quite challenging. We began our search on the internet, but official available data on nurses entrepreneurs (from the Portuguese Health Regulation Authority and the Nurses Council) was scarce and did not seem to meet our purposes. A snowball sample was used because these individuals were difficult to locate. Our interviews were restricted to the North of Portugal due to time and financial constraints. Since our study has focused exclusively on northern nurses entrepreneurs, future research should consider individuals from other geographical locations. Comparing nurses entrepreneurs’ perceptions would deepen our understanding of the specific challenges they face when it comes to starting an entrepreneurial venture in different parts of the country.

References


Non Academic Papers
New Formats of Work With Creative Entrepreneurs and Sociocultural Project Initiatives

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Abstract: Creative entrepreneurship is entrepreneurial activity in the field of creative industries (crafts, architectural projection, visual arts and the gallery business; film and video, media, advertising, literature and publishing; software and computer games, Internet and new media; and performing arts and entertainment, music and recording). A creative entrepreneur aims to build and use creative and intellectual capital, and this often implies some social effect. Current creative entrepreneurship and socio-cultural project initiatives in Moscow’s cultural policy are considered an important resource for territorial development, which: enhance the city’s competitiveness in the global innovative products market; contribute to finding resources for the development of the economic and social potential of the territories; contribute to increasing the quality of human life and the quality of a city’s innovation environment; play a vital role in the saturation of socio-cultural and leisure spheres of city life; offer modern competitive content for cultural institutions and public urban spaces; attract the creative class. Moscow is experiencing an acute shortage of public spaces and areas for creative and intellectual leisure activities. The city’s remote areas are not covered by any kind of cultural offerings since these are mostly concentrated in the centre. One of the priority areas of Moscow’s cultural policy is the transformation of former Soviet houses of culture into modern multifunctional cultural centres. Problems being faced by these new cultural centres include changing their audiences, harmonising relations with the local community, creating a comfortable creative and intellectual environment including in problem areas and so on. The development of Moscow as a global city, as a centre of innovation, creativity and modern lifestyles, is only possible with the development of modern management mechanisms to support significant cultural projects and institutions and creative entrepreneurship. The trend is that public funding resources for Moscow’s cultural institutions should be aimed at supporting contemporary cultural projects and the inclusion of new people in cultural processes. The Project Centre “Creative Moscow” was created in August 2013 at the initiative of Moscow’s Department of Culture. Its tasks include supporting creative industries and sociocultural project initiatives in Moscow through the implementation of educational projects, professional competitions, and the organisation of professional activities.

Keywords: creative industries, creative entrepreneurship, cultural projects, state support, cultural institutions

1. Creative industries and creative entrepreneurship in the modern world

The creative industries are a sector of the economy that deals with the development of creative products, their manufacture and sale. Every part of the sector drives the innovation-based (creative) economy, and it is one of the most dynamic sectors of world trade. According to the UN Creative Economy Report, the annual growth of the creative industries sector in the world’s GDP since the beginning of the 2000s averaged 8.8 percent, while the contribution of copyright-based creative industries averages 5.2 percent; the employment share of the copyright-based creative industries sector averages 5.36 percent of total employment.

In the majority of countries with a developed economy, creative industries are a priority of urban cultural policies. This is largely connected to the fact that at the beginning of the 21st century, it was cultural and creative resources that drove the economic development of European cities as a way out of the economic crisis caused by the economic restructuring of cities.

Creative industries include such branches as film, music, visual arts, performing arts, the art gallery business, fashion, publishing, advertising, design, architecture, computer technologies and so on. Creative industries combine business skills with cultural practices based on creativity and intellect. Companies like “Yandex”, FLACON design-zavod, book shop “Falanster”, Art. Lebedev Studio, social network Vkontakte, the bureau SPEECH, Afisha Picnic festival are outstanding representatives of Russia’s creative industry enterprises.

Creative industries have the potential to

- stimulate a new type of economy, and increase a country’s competitiveness in the global innovative products market. Today’s innovation-based (creative) economy is primarily based on highly-skilled labour, and the cities and territories that are striving to retain their economic leadership are competing for highly-qualified personnel as a primary resource;
form and strengthen regional and local identities. It is no secret that there is a big problem in Moscow and other large cities linked to the fact that urban areas lack their own "personality". It is precisely culture that can offer territories a new image, an image that would become a serious tool in the city’s intra-urban marketing;

- search out resources to develop a territory’s economic and social potential and diversify the economy. The cultural sphere is no longer a subsidised sphere; it is able to give rise to new products and services. In this context it is about the economics of culture, the development of the so-called “third sector”. In all developed countries today, culture is regarded as an extremely important factor in social development;

- improve a person’s quality of life and self-employment. Industry sectors related to the sphere of cultural production provide people with jobs, and this does not only apply to creative disciplines;

- work for the social cohesion of society. This kind of interaction between cultural production and the social sphere happens in two ways. Firstly, the more actively different cultural groups communicate, the less conflict there is linked to group isolation. Secondly, as a result of this communication, the urban environment is often changed through art. This trend is included in the cultural policy strategies of various countries; and

- help preserve cultural traditions and the cultural enrichment of the population. This refers to both traditional and new cultural institutions. In addition, Russia’s cultural heritage traditionally holds great importance within the country, but at the same time this resource is of interest to international markets. Conceivably, the sector has considerable potential for the future commercialisation of its products.

Creative industries are also an important resource for the sociocultural development of territories, the creation of new jobs, and the conditions for creative people to realise their potential. Thus the development of Moscow’s suburbs as well as new territories is closely linked to the creation of new jobs that are attractive to modern city dwellers.

The development of the creative industries has been a topic for discussion in Russia since 2003, but it is only now that work has begun to support the capital’s creative industries at the level of Moscow’s Department of Culture. “Creative Moscow”, a centre for the support of sociocultural project initiatives whose objectives include supporting the creative industries in Moscow and developing the area through culture, began its work in the autumn of 2013. The launch of these initiatives makes the discussion around the issues of developing creative industries and creative entrepreneurship particularly relevant.

At present, entrepreneurship in the spheres of the film industry, design, architecture, publishing and book distribution, the art gallery business, applied arts, media etc. is growing more rapidly than traditional manufacturing sectors. Moreover, the backbone of this business is the small- and medium-sized enterprises that are geared towards manufacturing these creative products and services (i.e. products and services in the sphere of creative industries).

Market share of the SME segment in Russia is estimated at 13-17% compared to 70% in EU. General socioeconomic problems of Russia businesses find their reflection in creative industry sector as well. These problems include:

- Government interference into the affairs of private business.

- Lack of fair competition.

- Poor development of small and medium businesses.

- Negative impact of the weak economy and unreasonably high costs.

There are also a number of problems experienced by the creative industries: “young markets”, preference of import, the conflict between culture and commerce, poor education and deficit of human resources, deficit of quality creative products, lack of sate CCI support programs.

Supporting creative industries and creative entrepreneurship is particularly important for Moscow, since these entrepreneurs do not only introduce new goods and services to the market, they also contribute to and help ensure that the images and symbols of both the city and the country are reproduced and distributed internationally.
As well as this, the development of creative entrepreneurship is closely linked to improving the city’s appeal, and creating the conditions for creative people whose business ideas will boost the city’s cultural diversity and economic stability to realise their potential.

Decisions to be made: the modernisation of education in the field of creative industries, political and legislative solutions to support the creative industries, the support of infrastructural and network projects, and the development of collaborations between state cultural institutions, private project initiatives and creative enterprises.

2. The creative city of Moscow: A new cultural policy

The city’s original functions both as a fortress town and a port town have lost their relevance in the 21st century: modern cities need to strive for new economic, political and sociocultural models. In the age of innovation, an indicator of a city’s success is its ability to competently manage human capital and talent. For thousands of years, cities were the place where cultural events were held. As well as this, cities were and still are the place where innovative processes in business and production are developed. The realisation and understanding that these two processes — culture and innovation — are closely linked and have a direct influence on each other only came at the end of the 20th century, however. According to the expert Charles Landry, in order to fully develop the urban environment, one needs to go beyond the well-established notion that creativity is the prerogative of the artist, and that innovation is predominantly of a technological nature. Creativity and innovation are obviously intertwined: innovation is nothing more than the practical realisation of a new idea developed through creative thinking. Creativity and innovativeness in the urban context should turn into a holistic, integrated process that encompasses all aspects of urban life.

From the moment they emerge, creative industries promote a positive image of cities and their competitiveness. As such, urban planning manager F. Wood sees the city as a unique product that requires its own unique ‘packaging’.

Creative industries should become one of the main priorities of urban policy, as they fulfil significant social functions for society and urban development, including education, territorial development, and an improvement in the quality of human capital. Measuring the number of people employed in this sector is a priority for the assessment of the creative industries’ contribution to urban development.

It is essential that a programme be developed for the balanced development of retail, providing favourable conditions for the formation and development of small cultural businesses and restrictions on the construction of large shopping centres. For the development of industrial policy and support for the sciences in Moscow, entrepreneurship needs to be developed that operates across the creative industries, modern technology and business design.

Attracting investment to the creative industries sector, and the varied support of creative entrepreneurs (economic, financial, expert) according to their individual needs, should be a priority of the city’s cultural policy, as well as its policy in the field of industry and the sciences. Conditions need to be created for the development of creativity and innovation, for communication between creative entrepreneurs, and for the support of local community development initiatives, especially in the outskirts of Moscow.

Developing the infrastructure of creative industries at the state level is an important aspect in the modernisation of state funded cultural institutions and their transformation into cost-effective areas that offer a unique and competitively viable product or service to the city’s cultural market.

Based on the priority areas of Moscow’s cultural policy, an important aspect is the transformation of traditional cultural institutions into modern multifunctional cultural centres and creative spaces that meet the needs of the city’s population. In Moscow today, creative entrepreneurs and private project initiatives in general are seen as the main partner of cultural institutions (libraries, cultural centres, museums, parks etc.) that increasingly tend to use a multifunctional approach to their activities planning. The most striking examples in Moscow are: Gorky Park, the ZIL Cultural Centre, the children’s club ‘Mama’s Place’, etc.
Table 1: The distribution of areas in parks

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<tr>
<th></th>
<th>Gorky Park</th>
<th>Sokolniki Park</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area</td>
<td>109.7 ha</td>
<td>600 ha</td>
</tr>
<tr>
<td>Area used by entrepreneurs (non-permanent retail facilities)</td>
<td>48,450 m2 (4.4 percent of the total area)</td>
<td>4,102 m2 (0.07 percent of the total area)</td>
</tr>
</tbody>
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The most sought-after areas of entrepreneurial activity in Moscow’s parks:

- “Catering / Cafés”
- “Ice cream”
- “Souvenirs / Arts and crafts”
- “Soft drinks”
- “Confectionary / Baked goods”

The most impressive creative projects being carried out in Gorky Park:

- “Oh, my Gorky Park” (uniforms for ice cream sellers) – a project between Gorky Park and the “Oh, my” clothes label
- “Work Station” Coworking – a work area for designers, architects, programmers, artists, and photographers.

In 2013, work was organised with entrepreneurs from small- and medium-sized businesses in Moscow’s cultural centres.

Cultural centres identify the demand for the following types of services:

- Lecture cycles;
- Creative and dance studios;
- Mass cultural events;
- Food and vending machine services.

The most impressive creative projects being carried out at the ZIL Cultural Centre:

- “Artemy Lebedev Cafe” (an affordable place to eat for visitors and employees)
- “AZ-BU-KA” School for Early Development (recreational and educational services for children)
- “Art Design Workshops” (teaching socially-oriented entrepreneurship and contemporary arts to children and young people)
- Fashion Factory ZIL (teaching about the development of Russia’s creative industries in the sphere of fashion, the creation of an experimental young fashion industry platform for young professionals)
- Mama’s Place (a mother and baby club)
- “Seminotka” (musical and educational training for the whole family)
- School #1 (a language school)
- “Bolshaya peremena” (a theatre festival for children and young people)

One of the priorities of the city’s cultural policy is to position Moscow as a city with a well-developed leisure infrastructure, especially in areas outside of the city centre. Decentralisation is manifesting itself in the desire of state structures to support (including by way of grants) creative and sociocultural projects and businesses in remote areas of the city. According to research by the Moscow Institute of Socio-Cultural Programmes, just 8
percent of people living in Moscow go to cultural events outside of their own area, while the majority prefer to visit cultural institutions in the city centre. In order to attract creative professionals to the city’s suburbs and encourage high-quality cultural offerings, the Government of Moscow launched the Moscow Cultural Centres project, which has set itself the task of creating five cultural centres based on former Soviet houses of culture located in remote areas of the city.

![Projects at the ZIL Cultural Centre](image)

**Figure 1:** Projects at the ZIL Cultural Centre

The systemic creation of public communication spaces for creative entrepreneurs (clusters, business incubators, coworking areas, consultation centres) could be a way of supporting the creative industries in Moscow, including within non-functional industrial areas.

While on the subject of creative clusters, three important levels of creative industry development need to be taken into account.

- Contemporary entrepreneurship at the intersection of creative industries, modern technologies and business. This line combines modern technologies, knowledge and business design, and could be supported by educational programmes allowing for the formation of finished projects and teams, and a combination of traditional education with business incubator methods.

- Territorial communities and urban spatial planning. This line is associated with the consolidation of people according to territory. The establishment of local territorial clusters is proposed. The government should act as the customer.

- Social responsibility. The need to attract investment (both private and public) to support the creative industries sector.

### 3. New formats to support creative entrepreneurs: The Moscow experience

“Creative Moscow”, a centre for the support of sociocultural project initiatives whose objectives include supporting the creative industries in Moscow and developing the area through culture, was established in the summer of 2013 at the initiative of Moscow’s Department of Culture to implement measures to support the creative industries in Russia’s capital.

The creation of the Centre can be considered an important step towards the establishment of a public-private partnership in the sphere of culture, enabling the development of modern management mechanisms to support important cultural projects and institutions. Owing to the support of the creative industries sector at the state level, it will be possible to:

- overcome the gap between the cultural demands of those who live in the city and the existing cultural infrastructure;

- fill cultural institutions and parks with contemporary and competitive content;

- create new jobs in the sphere of small- and medium-sized entrepreneurship, and help young creative people realise their potential.

The Centre’s objectives and activities:

- educational programmes, advice and public events aimed at improving the professional abilities of creative entrepreneurs and the creators of sociocultural projects. The inclusion of cultural projects supported by the Centre in Moscow’s business support infrastructure.
Promoting the best projects to the international market: organising international work experience, and organising events at an international level.

The Centre’s educational programmes are offered as a part-time training programme at the Creative Entrepreneur School.

Young professionals in the humanities, independent creative professionals and budding creative entrepreneurs usually do not have sufficient knowledge and skills to start and develop their own business, have no idea where and how to obtain support for their endeavors, where to start from, who to turn to for advice. Fairly often the supply of educational products is limited, the programmes are not practice-oriented and do not meet the needs of creative entrepreneurs: universities offer long-term cultural management programmes or numerous business management programmes, which do not cater for the specific problems of creative business projects. At the same time, creative professionals need up-to-date information and skills to convert ideas into money. Implementation of social and cultural projects is also impossible without advanced business skills and knowledge. This particularly concerns copyright and intellectual property protection, which are essential for the creative industries.

Creative Entrepreneur School project, which aims to provide practical assistance to startups within the creative industries in the stage of project launching and business development. The Creative Entrepreneur School offers lectures, relevant business cases, videos, professional research, advanced interactive education and advisory support of leading Russian experts. The school addresses the problems of choosing a legal entity type, intellectual property protection and copyright, business registration procedures, partner search and work with donors and sponsors. The School materials are based on the Russian practices of small business support, current legislation and domestic business success stories. The School is comprised of the following original courses: “Creative markets”, “Project-making in Creative Entrepreneurship”, “Business Models of Creative Entrepreneurship”, “Resource Support of Creative Projects”. The School programmes is designed in a way that the participants contribute to their projects stage by stage during the 4 months of learning about different topics. As a result of training, the participants get prepared to implement business projects within the creative industries. Many graduates have already successfully implemented their projects, started their own businesses and found their niches in the cultural market.

Distance learning is increasingly popular in Russia in general and in Moscow in particular. It is an alternative format enhancing learning opportunities and making on-line consultations easier. The Creative Entrepreneur School employs Moodle system, which is used by universities, schools, companies and independent lecturers on more than 50 thousand websites in 200 countries. The School focuses on communicative teaching methods: forums, chat rooms, online consultations, which allow discussing the training material and getting expert advice and support. The training program involves regular off-line consultations and lectures with cultural planning experts, legal professionals, teachers and tutors. For this reason the Creative Entrepreneur School is also an active communicative platform. The School brings together creative businessmen and managers of cultural projects, and these professionals form the foundation of the professional community, which is to become a significant resource for the creative industries in Moscow.

The Project Centre “Creative Moscow” also sees the promotion of Moscow’s projects to the international market as one of its objectives. The Centre is the Russian partner of a global start-up competition for creative entrepreneurs called the Creative Business Cup, which involves more than 40 countries. The winners from each country will participate in the international final which is to take place in November 2014 in Denmark as part of Global Entrepreneurship Week. Participants will present their business concepts to an international jury and will compete for the title of world’s best entrepreneur in the field of creative industries. The goal of the Creative Business Cup is to improve the business competencies of creative entrepreneurs worldwide.

Entrepreneurs from the fields of advertising, architecture, performing arts, fashion, film, multimedia, crafts, literature and publishing from 15 regions around the country took part in the Russian stage of the competition.

The Russian stage of the competition was won by Andrew Khusid with his online whiteboard and collaboration project realtimeboard.com. In November, the realtimeboard.com project was presented at the International Finals of the competition during Global Entrepreneurship Week, alongside other winners from a total of 43 countries, and proceeded to the semi-finals. Talking about the competition, Andrew Khusid said: “It was
interesting to take part in the competition. The best teams from more than 40 countries were presented at the world finals and I managed to reach the semi-finals, where there were just 16 of us remaining. The competition gave me the opportunity to make new and interesting connections, both in Russia and worldwide, as well as a familiarity with the entrepreneurial ecosystem of Copenhagen.”

The Creative Industries Agency, in cooperation with the Project Centre “Creative Moscow”, recently announced the 2014 competition for creative entrepreneurs and business projects. The creators of the best five business concepts will be chosen, and these five winners will have the opportunity to take part in the competition’s national finals in Moscow in August 2014, where they will present their business concepts to an independent expert jury. The winner of the National Final will be selected, and will go on to represent Russia at the International Finals of the competition in Copenhagen in November 2014. The Creative Business Cup looks for new and original business ideas with strong market potential that create networking opportunities and engage in collaborations internationally. The competition also increases awareness among investors about the business opportunities that the creative industries have to offer.

Figure 2: Creative Business Cup, International Final 2013

The Project Centre “Creative Moscow” is a new institution in Moscow that reflects the main areas of the city’s cultural policy in its activities and is committed to developing the city’s creative entrepreneurship through educational programmes and the organisation of international projects. Creative entrepreneurship and private sociocultural initiatives are becoming an important resource for the city’s territorial development and the establishment of a leisure infrastructure, including in remote areas of the city.

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What’s the secret? An Australian Perspective on Partnerships for Change

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Abstract: As a sunburnt country with droughts and flooding rains, rainforest and deserts, cities and the outback, Australia has a highly complex environment with widely variable issues across the landscape. In the 1990s, the Australian government supported a move to catchment-based natural resource management, which has built over a decade of learnings in how to achieve societal change at catchment scale under a range of different models. As one of the 56 regional bodies, Condamine Alliance have tested many innovative approaches, and have compiled invaluable insider knowledge on what has worked and what hasn’t throughout this period. Natural resource management projects in the Condamine catchment have been built on partnerships in their truest form—everyone has “skin in the game”, everyone invests (time and/or money) and everyone benefits. These partnerships ensure the buy-in and ownership necessary for success, and increase the buying potential of any individual investment. This partnership approach has also facilitated focusing on real priorities, as those involved need to all value an activity for it to happen; no one gets their outcomes for free. This legacy of ownership supports the continuation of work after the projects move on to other issues, with networks and skills left behind to maintain and expand upon the outcomes over time. From 2-year flood recovery projects to 10-year multi-award winning river recovery programs, the Condamine catchment has seen significant investment in improving the condition of its natural resources. The catchment-based partnership approach has built the region’s capacity in a way that provides legacy way past the direct environmental benefits to the catchment and into the resilience of the catchment community. These challenges and successes of these activities and of the broader Australian approach, can provide important learnings of relevance to other regions and nations across the world.

Keywords: Australia, catchment management, partnerships, change

1. Introduction

The health of the environment across the globe is in decline due to human activities, with rising species extinctions (Proença & Pereira, 2013), risk of desertification (Núñez et al., 2010), and natural disasters (IPCC, 2012). Humans have played a critical role in this decline, and must play a critical role in its reversal if our species is to survive into the future.

“The Economics of Ecosystems and Biodiversity (TEEB) study, hosted by UNEP, estimates that, if deforestation and land use change continue as at present, the world will suffer losses in “natural capital” worth between 1.3 and 3.1 trillion Euros. That is more than the financial capital wiped off Wall Street and London City Banks in 2008, the worst year in their history. And it will happen every year.” (Langdale, 2010, p. 18)

This paper explores Australia’s regional approach to natural resource management, and provides a snapshot of the challenges, successes, and learnings of this national experiment. It first establishes the global trend towards community-level collaborative approaches to improving natural resource management, then explores the Australian situation, and provides a case study in the model adopted by the regional natural resource management organisation, Condamine Alliance.

2. Regional natural resource management

Community-based natural resource management has existed across the globe in various formats since the 1980s (Prager & Vanclay, 2010). The community-based model is held to have developed as a bottom-up approach that brought local issues into focus for collaborative action.

3. Australia’s approach

The Australian continent includes a wide variety of landscapes, with highly complex and interdependent natural resource systems. As poet Dorothea Mackellar so vividly phrased it, Australia is “a sunburnt country, a land of sweeping plains, of rugged mountain ranges, of droughts and flooding rains” (The Estate of Dorothea Mackellar, 2011). Since European settlement of the continent began in 1788, the landscape has changed dramatically. Critical political changes recognising the decline in the nation’s natural resources occurred in the 1990s, and involved the signing of bilateral agreements by the Australian and State/Territory governments for
This approach involved the recognition—and in some cases creation—of 56 regional natural resource management organisations (regional bodies) across the country, with regional scale planning and investment programs developed by each for their allocated area of responsibility (refer to http://nrm.gov.au/about/nrm/regions/index.html for regional summaries, noting that recent State government changes have led to boundary changes for regions in New South not yet reflected in the summaries). The models adopted in each State and Territory varied, with some adopting statutory arrangements and others non-statutory. The regional approach was initially implemented as a grand experiment (Lockwood, Davidson, Curtis, Stratford, & Griffith, 2009), which since inception has provided significant material for analysis of the approach’s successes and failings (e.g. Robins & Dovers, 2007; Taylor, Robinson, & Lane, 2009; Wallington, Lawrence, & Loechel, 2008).

The challenges facing Australia’s regional NRM organisations can be grouped under four headings:

- Stability and longevity,
- Science and Impact,
- Engagement, and
- Knowledge management.

The nature of the challenges within each of these groupings are outlined below.

**3.1.1 Stability and longevity**

Stability and longevity challenges are those that impact on the momentum, constancy, and legacy of activities undertaken by the regional bodies. These challenges include:

- a general heavy reliance on government funding, which is inherently changeable with policy and election cycles (Dovers, 2013; Lockwood et al., 2009; Robins & Kanowski, 2011);
- reliance by some regional bodies on State/Territory government staff/researchers as key technical advisors and as knowledge and information providers (e.g. Richardson, 2012), access to which changes as government staffing policies ebb and flow; and
- for statutory regional bodies, government cycle influences on organisational structure and purpose. Restructure can lead to internal knowledge and skills loss (Hillman & Howitt, 2008).

**3.1.2 Science and Impact**

Science and impact challenges are those that affect the technical appropriateness of activities, and understanding of activity outcomes. One of these challenges is difficulty in accessing and interpreting the best available science as the basis for program design, for example:

- variable/lack of investor desire to fund research and development within natural resource management programs (e.g. Australian Government, 2013b);
- lack of access to, and lack of resources or skills to interpret, the latest science presented in relevant journals (Land and Water Australia, 2006); and

A second challenge relates to difficulties in assessing the impact of activities on the natural resources. For example, Richardson (2012) identified the following overarching barriers to effective monitoring and evaluation by regional bodies:

- investors’ general short-term program focus on outputs (e.g. number of participants, length of fencing etc.) rather than outcomes (also Lockwood et al., 2009);
- long timeframes before changes in the natural resources are evident and measurable (e.g. regrowth of native vegetation can take decades).
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- variable capacity to include monitoring longer term resource condition change within funding agreements; and
- complexity of system interactions leading to issues in isolating program impact from other influences (e.g. seasonality and other programs’ effects).

A final challenge is the difficulty in balancing political agendas and scientifically identified priorities. Conflicts between these two agendas can take investor focus away from natural resource priorities and increase the complexity of communication requirements placed on regional bodies to explain priorities to their communities.

3.1.3 Engagement

Engagement challenges are those that impact on the involvement of regional stakeholders in natural resource management programs. These challenges include:

- due to many of the issues listed above, challenges in obtaining and retaining stakeholder trust (Lockwood et al., 2009);
- mismatches between regional priorities and the investors’ scales of priority, which may be quite different (Crabb & Dovers, 2007);
- in States with statutory regional bodies, the mix of regulatory roles and engagement with the same stakeholders for voluntary action can lead to trust issues (Lockwood et al., 2009);
- unaligned boundaries across stakeholders (Herr, 2007, as cited in Larson & Brake, 2011) and natural resources, which adds to the complexity of management, engagement and priority-setting;
- lack of whole-of-government approach to support decision-making (Mitchell, Norton, Grenfell, & Woodgate, 2007); and
- mismatched devolution of power compared with task responsibilities (Lockwood et al., 2009).

3.1.4 Knowledge management

A key knowledge management challenge for the Australian natural resource management sector as a whole, is the lack of collaborative information systems (within the regional body network, at State and national program levels, and including private sector data) to support cross-regional sharing of activity records, impact information and learnings (Fero, Duncan, & Spry, 2013; Lockwood et al., 2009; Roberts, Seymour, & Pannell, 2011). Such a system (or systems) could compound the rate of program improvement over time to greatly increase efficiencies and outcomes.

3.2 Successes

Despite these many challenges, some valuable successes have been achieved.

3.2.1 Stability and longevity

Successes in the area of stability and longevity include:

- many government funding programs have moved from annual negotiations to 3-6 year agreements. This provides better continuity and the ability to stage engagement around community interest and capacity, while retaining the flexibility to address emerging issues (e.g. Australian Government, 2013a; Department of Environment, 2013);
- in non-statutory states, the separation from government has allowed some regional bodies to maintain structural stability and internal decision-making around organisational focus (e.g. refer to Condamine Alliance case study);
- the regional plans, developed in collaboration with stakeholders have provided consistent regional focus that supports identification of commonalities between community and investor priorities; helping maintain momentum towards longer term targets when shorter term investor changes occur; and
- governance practices and business models of the regional bodies have matured over time, with some individual results approaching broader business best practice standards (Vogel, 2013).
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3.2.2 Science and Impact

Successes in the area of science and impact include:

- Australian government funding of dedicated research projects to support regional plan updates to incorporate climate change adaptation and mitigation, which is building relationships between regional bodies and researchers and focusing research outcomes on regional knowledge needs (Department of Environment, 2014);
- Australian government adoption of a single online data capture portal, MERIT (refer to https://fieldcapture.ala.org.au), which supports the capture of the geographic locations and nature of funded activities, and resource condition data (where possible) for longer term analysis of impact; and
- Specific examples exist across the country that show positive impacts and new scientific knowledge from regional body activities. One example is the River Rescue program discussed in the Condamine Alliance case study.

3.2.3 Networks and engagement

One great success achieved through the regional approach was seen in the rapid response to the 2010/11 floods in Queensland. These floods affected more than 78 percent of the State (an area bigger than France and Germany combined) and over 2.5 million people, with damage estimated as totalling more than $5 billion (Queensland Floods Commission of Inquiry, 2012). In Queensland, the regional bodies in affected areas quickly instigated response support programs with their communities (e.g. establishment of volunteer clean-up crews; acquisition of satellite and aerial imagery; and undertaking field surveys for damage assessments and recovery planning) and later received funding from the Queensland government to implement recovery activities. The community networks of the regional bodies allowed quick access to affected landholders and facilitated the rapid flow of information and support to assist with recovery efforts.

The networks held by some of the regional bodies provide great capacity to direct information and engagement to very specific target audiences with confidence. In many regions, the regional body “knows someone, who knows someone, who knows someone; so you can get to the person you really want to engage. This depth and breadth of networks has never existed with such strength” (pers. com. P. Hamilton, 17 April 2014).

3.2.4 Knowledge management

Successes in the area of knowledge management include:

- Spatial data portals being implemented by some states (e.g. NSW) and some national investment programs (e.g. Biodiversity Fund and Caring for Our Country) for whole-of- state or program natural resource management activity data collection;
- Annual national conference for natural resource management knowledge sharing (refer to http://www.conference.nrmregionsaustralia.com.au/); and
- National and State-based communities of practice among practitioners, which facilitate the sharing of opportunities and learnings, and the identification of common interests where collaboration can lead to efficiencies.

4. Condamine Alliance case study

One of the smaller of the 56 recognised natural resource management regions of Australia, the Condamine catchment covers approximately 25,000 km² (Condamine Alliance, 2014)—almost twice the size of Northern Ireland. It lies at the headwaters of the Murray-Darling Basin (Australia’s food bowl; refer to Figure 1) and contributes 12.5 percent ($1.26 billion in 2011-12) of Queensland’s agricultural production (Australian Bureau of Statistics, 2013a). The catchment includes the city of Toowoomba (the second largest inland city in Australia), is home to around 200,000 people (Australian Bureau of Statistics, 2013b), and contains a range of land uses including manufacturing, livestock, intensive animal industries, cropping, horticulture, forestry, tourism, mining and other emerging industries (Condamine Alliance, 2014).
Figure 1: Condamine catchment

Condamine Alliance was established in 2002 as the regional body for the Condamine Catchment, and is a not-for-profit, private company with around 20 staff (Condamine Alliance, 2014). The company was established by its member organisations, which included local government and local community groups. The Board of directors has evolved from its initial member-only basis, to a combination of member representatives and skills-based directors, which has supported improvements in company governance (Condamine Alliance, 2013).

4.1 Business model

Condamine Alliance was set up to operate using a partnership model that utilises the skills and capacity existing within the catchment community to deliver its programs. The decision to use existing organisations and networks for delivery rather than build internal staff teams for this, was made with legacy and flexibility in mind. By supporting local groups and individuals in their core business, the catchment community retains the skills in legacy should the regional natural resource management ‘experiment’ ever be shut down. With access to a wide variety of skills and networks through these partners, who are operating their businesses and activities under other funding streams as well as ours, Condamine Alliance retain the ability to call upon whichever skills were necessary for each program without incurring retention costs between programs. With the breadth and complexity of the catchment’s socio-environmental systems, it is critical to be able to call upon a much broader range of skills than would be possible to maintain within the organisation.

Around 80 groups/organisations partner with Condamine Alliance (Condamine Alliance, 2013) each year, including experts in soft skills (e.g. communications, rural and urban engagement, Indigenous engagement and culture); information, communication and technology (e.g. information & communications technology, geographic information systems, data management); technical natural resource management (e.g. soils, vegetation, agriculture, surface and ground water, pests and weeds, environmental monitoring, geomorphology); and business practice (e.g. auditing, evaluation, company governance, financial management, business development).

4.2 Challenges

In addition to the systemic challenges discussed earlier, the key challenges affecting efforts to improve natural resource management in the Condamine catchment can be grouped under the following three headings:
4.2.1 Community engagement

Community engagement challenges experienced by Condamine Alliance include how to:

- engage beyond the traditional stakeholders to reach wider than the already ‘converted’;
- follow the engagement history of individuals and organisations over time and use this information to better align with these stakeholders’ priorities;
- establish our own profile in the community when they primarily interact with our partner organisations on our behalf; and
- overcome community perceptions of how projects should be run (based on how they were run in the past) when those approaches have been shown to be no longer appropriate.

4.2.2 Investor engagement

Investor engagement challenges experienced by Condamine Alliance include how to:

- balance community/regional priorities with investor priorities—some regional priorities just don’t fit, so who funds it?;
- overcome the political desire to focus on quick wins (low hanging fruit) when investment in the more complex issues is equally important;
- engage non-traditional investors to diversify and stabilise investment potential, and to broaden ownership of the issues and solutions; and
- overcome investor stereotypes that lead them to desire certain inclusions in projects that the community doesn’t feel is appropriate or priority (e.g. urban Aboriginal communities may not wish to undertake field labour on projects despite national stereotypes that say they should).

4.2.3 Knowledge management

Knowledge management challenges experienced by Condamine Alliance include how to:

- capture project data easily at the right level of detail for useful evaluation and corporate knowledge;
- capture community contributions towards natural resource management plan targets that are funded separate to Condamine Alliance programs— to see the true picture of regional progress;
- access and learn from current research and other organisations’ learnings to improve program designs, governance etc.;
- efficiently manage organisational knowledge, including storage, analysis and accessibility of the learnings for broader public benefit; and
- make others aware of what we’ve learned so they can learn from it too.

4.3 Successes

Successes have been achieved in the Condamine catchment in each of the areas listed as national challenges.

- Stability and longevity
- Science and Impact
- Engagement

4.3.1 Stability and longevity

A key successes in the area of stability and longevity in the Condamine catchment is the stability, flexibility, and legacy that the partnership business model has realised. The organisation has a quite stable workforce, with some staff members nearing anniversaries for 10 years of service. By accessing existing community skills
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and expertise on a project-by-project basis, the organisation has great flexibility to change direction between projects without impacting on its internal stability. Supporting locals to undertake projects and strengthen their networks also provides a strong legacy within the community, which has led to the organisation being recognised for good community and stakeholder engagement and partnerships (Marketshare, 2012).

Program-level stability and longevity successes can be seen in the establishment of the River Rescue program’s demonstration and restoration reaches, where individual, science-based reach rehabilitation plans have been developed to focus investment over 25-year timeframes. This approach, coupled with targeted engagement processes, has led to strong investment of time and money by government (local, State and national), private companies, and local landholders (Condamine Alliance, 2012). The positive outcomes of this program are discussed further as science and impact successes.

4.3.2 Science and impact

One of the flagship projects of the Condamine catchment is the River Rescue program and it’s Dewfish Demonstration Reach, which has received multiple awards (i.e. Australian Riverprize, the national Banksia Award for Water and the United Nations Prime Ministers Award for Water) for its successes in improving the reach’s condition and the resultant improvements in native fish populations. This program was built on a strong science base, with a 25 year rehabilitation plan and a quality monitoring program that has allowed the assessment of the impact of program activities on the native fish populations.

Condamine Alliance has also developed strong relationships with researchers at various universities. Projects generally focused on improve our understanding of the natural resources and their interactions, or tested new approaches to impact assessment. Examples of some of these projects include:

- Systems modelling using Bayesian Belief Networks to support natural resource management plan target development (Australian National University – current project)
- River blackfish genetic, population and distribution research (Griffith University);
- Participant resilience impact assessment of on-ground flood recovery works (University of Queensland);
- Climate change modelling, as input to natural resource risk assessments (University of Southern Queensland);
- Analysis of potential for use of standard photo imagery for use in assessment of native vegetation condition, which aimed to determine if such systems could reduce field work costs (University of Southern Queensland).

4.3.3 Engagement

Key engagement successes in the Condamine catchment have been those related to the partnerships involved in the award winning River Rescue program, and in the region’s flood recovery programs as discussed above.

4.3.4 Knowledge management

Important knowledge management successes for the Condamine Alliance include the development of an online field data capture portal (refer to http://root.ala.org.au/bdrs-core/condamine/home.htm) within the Atlas of Living Australia’s infrastructure and an associated mobile phone app for ease of data entry; and the development of an online library catalogue (refer to http://metadatasearch.condaminealliance.com.au) for long-term storage of information about natural resource management publications and data from a wide range of sources for longevity and ease of access as these publications are often lost as governments and programs change over time.

4.4 Key learnings

Through all the years of action and evaluation, there have been some key learnings that can be taken from the Australian experiment. From the literature, these learnings include:

- Maintain autonomy through diverse funding sources that increase autonomy and longevity (Lockwood et al., 2009; Prager & Vanclay, 2010), and an identity distinct from related government agencies (Lockwood et al., 2009)
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- Ensure good governance through effective administrative procedures and institutional arrangements (Prager & Vanclay, 2010), and monitoring and evaluation that focuses on outcomes rather than outputs (Lockwood et al., 2009);
- Ensure power is devolved to match the assigned tasks (Lockwood et al., 2009), shared through cooperation at multiple scales (Larson & Brake, 2011), and balances cooperation and competition (Lockwood et al., 2009);
- Maintain focus on what’s really important through long term thinking (Larson & Brake, 2011) that allows for creation and sharing of knowledge to tackle the complex issues (Measham, 2013), and considers the complexity of the systems involved (Cotching, Sherriff, & Kilpatrick, 2009);
- Balance the value placed on local and scientific knowledge in decision-making (Larson & Brake, 2011; Lockwood et al., 2009) and include all relevant stakeholders to build ownership and comprehensive issue identification (Prager & Vanclay, 2010);
- Invest in the socio-economic and human aspects required for long-term change (Dovers, 2013), including effective staff training (Prager & Vanclay, 2010);
- Understand your stakeholders; what you can expect of volunteers (Prager & Vanclay, 2010), how they like to communicate (Cotching et al., 2009);
- Implement programs that change the social meaning of land management practices (Minato, Curtis, & Allan, 2012), turn participants into champions (Cotching et al., 2009), and build trust (Sharp, Thwaites, Curtis, & Millar, 2013);
- Get the most out of available information through effective knowledge management systems (Land and Water Australia, 2006; Lockwood et al., 2009), systematic use of available information (Land and Water Australia, 2006; Seymour et al., 2008), use of local experts to translate the science (Cotching et al., 2009), and ensuring systems facilitate two-way information flow through and between organisations (Land and Water Australia, 2006; Prager & Vanclay, 2010; Roberts et al., 2011);

From the Condamine Alliance experience, key learnings include:

- Pairing community focus and professional, business delivery has delivered the strongest successes for natural resource management in the Condamine catchment;
- A true co-investment model where all players are responsible for successes and failures; everyone has ‘skin in the game’; local businesses are supported; and the legacy of skills, knowledge, and outcomes remain in the catchment; is an effective and efficient approach to regional delivery;
- A small core team with a strong partnership business model is efficient, flexible, and responsive; and eminently suitable to natural resource management; and
- It costs a lot to protect our natural assets. We cannot keep investing in short term cycles, but rather need to take the long view and invest for systemic, long-term change—it shouldn’t be about the ‘low hanging fruit’; the quick wins.

5. Conclusion

Australia’s national experiment in regional natural resource management has spanned more than a decade, and while it has seen (and continues to see) many challenges, there are valuable successes, and learnings that can be used to inform similar approaches in other countries. Challenges continue to exist around the impacts of government policy and election cycles, incorporation of current science, monitoring and impact evaluation, and knowledge management. Successes include strong community networks in many regions, new science, and specific natural resource impacts. Learnings are many and varied, covering institutional governance, knowledge management, engagement, and program design.

References

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Work in Progress Papers
The Role of Social Media for Business and Service Systems

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Abstract: Social media has an enormous impact on all kinds of businesses. In this paper, we discuss that social media and applications have the potential to trigger social business processes by changing value chains and hereby challenge existing business models. In our view, based on further developments, social business models will evolve where service is exchanged for service. In this paper we describe these social businesses using the service systems theory and S-O-logic. Our target is to develop a scientific basis for social business research in order to understand, how social media applications modify traditional business approaches.

Keywords: social business, service science, rhetorical practices, social network systems, social media

1. Introduction

Inspired by the success of social media, currently all kinds of businesses make use of its potential to enhance business processes. For example, recent technological advances in intranet systems have shifted organizational communication from conventional channels to such company wide web-based platforms (Huang et al. 2013). Furthermore, the rise of social media has an impact on business external collaboration such as for customer integration and communication according to the Social Customer Relationship Management (SCRM) approach – the transformation from business to social business.

We want to provide first approaches towards Social Business (SB) for a discussion within an academic discourse. The following paper attempts to outline definitions, uses and enhancements of SB. Finally, we will provide a brief outlook towards the potential and perspective of social business.

2. Social business

SB has two meanings, deriving from the different meanings of the word social. Prior to the existence of social media, the concept “social” was mainly targeted at society and implies a moral dimension of society. With the advent of social media applications, the semantic layer of social was extended by another concept of social, revolving around the use of social media applications, understood as Social Network Systems (SNS). Accordingly, there are similar approaches for defining SB.

2.1 Social businesses maximizing social profit

SBs in a traditional sense (not focused in this paper) were aiming at maximizing social profit (See Figure 1). They had and still have a strategic orientation towards social goals, e.g., sustainability and fairness. The profit remains "in the business – to finance expansion, to create new products or services, and to do more good for the world." (Yunus and Weber 2009).

2.2 Social business – social media integration

According to Hinchcliffe and Kim, social business design is defined as “[t]he strategic application of social computing to enterprise challenges” (Hinchcliffe and Kim 2012). Further, “[a] Social Business is a business that embeds ‘social’ in all of its processes, connecting people to people, people to information, and data to insight” (Carter 2012). The concept of SB introduced by these authors is a very recent approach with huge impacts on all business organizations, methods and supporting tools. Finally, the focus altered from social media to a business context – to SB. Moreover, SB even creates value in practice, e.g., in marketing and innovation approaches (Kiron et al. 2012), but is not well explored and systematized yet. According to Kiron, technology, too, is not yet mature enough to support SB value (Kiron et al. 2012).

3. State of the art

The following chapter outlines the approaches which constitute the definitions of SB presented in the previous chapter and form the basis for our SB approach.
3.1 Rhetorical practices and SNS

3.1.1 Rhetorical practices

In a recent elaboration, Huang et. al discussed the role of social media in establishing new ways of communicating and performing rhetorical roles in organizations. Their argumentation builds on the intellectual tradition of rhetoric in organizations, and analyses in detail the adjusted use of social media in changing the flows and dynamics of organizational rhetorical practices (Huang et al. 2013). The authors come to the conclusion that “further inquiry into organizational rhetorical practices can enhance our understanding of power distribution and redistribution in digital communication” (Huang et al. 2013). Furthermore they also suggest that embracing the interactive and participative features of social media can increase the opportunity for different actors to contribute to, and draw on, available rhetorical resources (Huang et al. 2013).

3.1.2 SNS

Likewise, Richter and Koch discussed the potential uses of SNS (e.g. corporate MSN) in businesses for the purpose of optimization of business-internal innovation and knowledge management. The persistent success of internet-based SNSs (e.g. Facebook) was one of the reasons for many enterprises to consider possibilities of adapting this kind of social software for integration into their intranets (Richter and Koch 2009). Reports of other enterprises showed that SNS foster a successful, efficient and effective collaboration among personnel (Richter and Koch 2009). Thus, not only the knowledge of employees as factor of production but also as strategic resource moves into focus and thus gains a strategic significance with respect to innovation strength and competitiveness (Richter and Koch 2009). In their study, the authors differentiated between restricted SNS, only used business internally and open SNS which are based on the underlying conditions considering the group of end user (Richter and Koch 2009). However, only restricted SNS were central to their study. In a nutshell: SNS bear the potential to improve and foster internal collaboration considerably and thus, foster innovative capability of a business.

3.2 SCRM

Current developments show that employees and customers are highly integrated in SNSs and use them for rhetorical practices. Especially, customers search for information about products and services are exchanged via social networks. (Foster et al. 2010; Alt and Reinhold 2012). Consequently, a growing interest emerged paving the way for a new approach, the SCRM, “to strengthen customer relationships, to reduce costs and to unveil new customer segments” (Reinhold and Alt 2012).

Social media transforms traditional CRM processes into (mass) collaborative processes, with benefits for both – customer and company (Greve 2011), or as Reinhold says: “Social Media [...] can be used to enhance traditional CRM processes.” (Reinhold and Alt 2012) The enhancement includes four basic types of the usage of social media on company side. It is used for the provision of context, the analysis of content, as channel for transactions and as a platform for cooperation (Reinhold and Alt 2012). Hence, social media has not only changed business internal communication and cooperation but can be applied to business external processes including various actors. Hence, companies’ mass usage of social media, may change SNS as we regard it into SB.

3.3 Business process management (BPM)

SNS may also “represent[] a class of web-based applications that support the management and exchange of information, identity and network management as well as interaction and communication” (Pflanzl and Vossen 2013) . Vossen and Pflanzl take SNS applications to another management domain, namely to the domain of business processes. Pflanzl and Vossen investigated the challenges of the use of “social (media) software and its underlying principles” to actively involve[ing] all relevant stakeholders into a BPM endeavour” (Pflanzl and Vossen 2013). In other words business processes are managed via the use of social media and thus business performance can be maintained.

4. Theoretical basis for social business

The presented SCRM and social BPM approaches show, how social media influences business strategy and approaches. Finally, all business management approaches depend on successful collaborative processes
between different actors. Thus, SNS can be used to connect different people (resources) for different purposes. The fundamental result is that SNS services facilitate a network-driven or service-driven business. In a Service-Dominated Logic, service is defined as “the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself” (Vargo and Lusch 2004). Besides, the defined service is a basal unit of economic exchange, where “service is exchanged for service” (Vargo and Lusch 2006). These exchanges can be analysed as a service system, “which is a configuration of resources (including people, information, and technology) connected to other systems by value propositions” (Stephen L. Vargo et al. 2008).

Within all business processes and activities, service is exchanged with service, and the service chain is made transparent to all actors. The value of the product at the end of the service chain is not created by a simple value-added chain, but it results from a network of actors which collaborate within a complex service chain. The cooperation is based on an acceptance of different value propositions (see Vargo and Lusch’s FP 7 in Vargo and Lusch 2008a) of different actors and the transparency to all actors. Hence, social business is a phenomenon that needs to be discussed within a service science. SNS services enable a better usage of complex networks of actors within a business approach. Moreover, they have impacts on all management approaches, like supply chain, resource management or process management. It can be highlighted, that social business is more than only “[t]he strategic application of social computing to enterprise challenge” (Hinchcliffe and Kim 2012). A social business can be defined as a business strategy, supported by integrated social services and applications, designed to engage all business stakeholders in a collaborative conversation in order to create value in service chains, as a complex service system.

5. Further research

The approaches presented in chapter 3, SNS and RP, showed the influence social media had on business internal communication and effective and efficient collaboration among personnel. However, both approaches left questions such as the user potential of SNS in an inter-company application (B2B), and the relation between social media and customers unanswered. The SCRM and the social BPM approach partly answered these open gaps and showed that SNS connects different resources (people and information) with each other to a service system and thus co-creates value. SNS services enable a better usage of complex networks of actors within a business approach. However, all those approaches leave room for further investigations. Further research on SB is needed. Firstly, it needs to be explored where and how SB is used in practice and how it can enrich rhetorical practices among all actors. Secondly, also boundaries and enablers for SB need to be regarded. Thirdly, a framework for the holistic description of SB phenomena has not yet been developed and the question, how SNS can be adapted by other management approaches, is very important for a better and systemically development and evolution of the SB and the SNS.

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Abstract: This paper studies current provision of enterprise and entrepreneurship education at one university and provides recommendations for curriculum development across several different subject areas. The paper reviews the Quality Assurance Agency for Higher Education (2012) report Enterprise and entrepreneurship education: Guidance for higher education providers; and the recent All-Party Parliamentary Action Group for Micro Businesses report (2014) An Education System fit for An Entrepreneur. The former report highlights the importance of four factors concerning the students learning experience (enterprise awareness, developing an entrepreneurial mind-set, developing entrepreneurial capability, entrepreneurial effectiveness) and relates these to graduate outcomes (behaviours, attributes, skills). The approach of this research is to map existing delivery in three subjects against the above factors and consider what gaps can be plugged and how. Thus the approach is largely a mapping exercise but includes primary interviews with four senior managers (n=4) and a sample of students (n=42) to elicit their feedback on changes in delivery. The results provide a basis for curriculum development planning applicable to the particular subjects involved. However, implications are stated for how other subject areas can innovate in three key areas of HE provision (teaching, learning, and assessment) in order to improve the effectiveness of entrepreneurs and the employability of graduates in general. The value of the report is in highlighting key aspects of current delivery that can be improved through enhanced student learning, and improved delivery, around the theme of enterprise and entrepreneurship education.

Keywords: Enterprise education, Entrepreneurship education, innovation in learning and delivery, experiential learning, learning by doing

1. Introduction

What will the university of the future look like? Predictions include (Ernst & Young, 2012) that many universities will become unviable. Those that survive have been classified as: ‘Streamlined Status Quo’, ‘Niche Dominators’ and ‘Transformers’. Even the first category, the broad based teaching and research institutions, will need to transform the way they operate. The real transformers though, according to the above report, will be private providers and new entrants merging with media, technology, innovation, venture capital, etc. Perhaps these transformers could be described as ‘entrepreneurial’.

This trend is also recognised by the Times Higher Education Awards for the most Entrepreneurial Universities (2013). At first sight, one could easily conclude that most university entrepreneurial activity is taking place in the business school (60% according to NCGE below). However, this paper demonstrates that entrepreneurial activity is taking place across traditional subject disciplines and schools. Indeed, the main premise of the paper is that Enterprise Education has a place in teaching and learning across the university not just in traditional business disciplines.

Support for the need for Enterprise and Entrepreneurship Education comes from a wide variety of sources. The United Nations regard Entrepreneurship and its concomitant education as vital to economic growth and development (UNCTAD, 2012); and Wilson (2008), European Foundation for Entrepreneurship Research, states that Entrepreneurship education is the first and arguably the most important step for embedding an innovative culture in Europe. Indeed, the European Commission (2011) regard the developing of entrepreneurial mindsets as becoming embedded in policies across Europe; and Gibb et al (2013) provide an excellent review of implications for Higher Education Institutions across the world. For the UK, the NCGE [now NCEE, National Council for Enterprise Education] (2010) national survey of 126 HEI’s found that enterprise and entrepreneurship is more embedded in strategic policies; with more students engaged and more start-ups (average 28 per HEI) than the last survey in 2007 – up 27%.

The QAA (2012) provide guidance on what this enterprise and entrepreneurship education should look like. Whilst the guidance is not prescriptive, the guidance is designed to complement the UK Quality Code for Higher Education which all providers of UK higher education are required to meet. Of particular significance is
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that the guidance is intended to help academics, educators and practitioners seeking to embed enterprise and entrepreneurship across the curriculum. As such:

- Enterprise education is defined as the process of equipping students (or graduates) with an enhanced capacity to generate ideas and the skills to make them happen.
- Entrepreneurship education equips students with the additional knowledge, attributes and capabilities required to apply these abilities in the context of setting up a new venture or business.

Even more significant is that the above is considered a prerequisite for:

- Entrepreneurial effectiveness – the ability to function affectively as an entrepreneur in business.

This sets a policy framework for universities to tackle the entrepreneurship agenda; and provides a basis for identifying gaps in current provision. Thus, universities can map current provision and set an agenda for change based on how well their provision is meeting the needs for entrepreneurship in wider society. In fact, if a university is to pay more than lip service to such recommendations then importantly the guidelines also emphasise:

- Entrepreneurial mind-set – the self-awareness, motivation and self-discipline to apply enterprising and entrepreneurial qualities in different contexts.

QAA (2012) encapsulate the above in a model, see figure 1.

![Figure 1. Developing Entrepreneurial Effectiveness](image)

The above figure usefully highlights the transformative process necessary to move from awareness to application. The figure also highlights learning both inside the curriculum and learning outside the curriculum. All HEI’s can benefit from recognising that they need to link theory to practice to provide students with the most relevant and up-to-date skills. Nevertheless, the All-Party Parliamentary Group for Micro Businesses (2014:12) conclude ‘there is still much to do to offer the entrepreneurs in the UK the support they need to help them thrive rather than just survive.’

Brunel (2013) go a step further and provide a model which more clearly links possible programme structure with potential delivery outcomes. Thus figure 2 is more innovative in this regard.
The Brunel programme offers several different pathways with the option of a six month placement to provide professional development. Of particular significance is that the programme is jointly run by the Institute for the Environment, School of Engineering and Design and Brunel Business School. And Brunel considers two ingredients essential: firstly, the mind-set and ability to play a key role in building a sustainable world; and secondly, hands-on experience. Time will be needed to evaluate the success of the programme (new in 2013) validated by a colleague from Middlesex University. However, early signs are positive.

Thus innovation in programme design and delivery is taking place. And this is the back-drop to designing and delivering similar programmes at Middlesex University – the mini case-study for this paper.

2. Research questions

RQ1: What is the current provision of enterprise and entrepreneurship education at Middlesex University?
RQ2: What are the gaps between this provision and that expected to be offered by QAA?
RQ3: What is the feedback from students on current provision based on the QAA guidelines?

2.1 Methodology.

RQ1 was tackled initially with a trawl through the excel spreadsheet of all university courses. This content analysis was quite hit-and-miss given the hundreds of courses on offer, the evolving nature of programmes and modules, and the fact that course or module titles do not give an adequate picture of exactly what the course covers nor about how it is delivered. Nevertheless, this exercise is a useful first step to familiarising one with the myriad of courses on offer by one HEI and potential contact points for further reference.

RQ2 was tackled by interviewing key personnel in the university, familiar with course provision, and able to give a fuller understanding of current and planned provision. Three Deans responded to this invitation and all were able to provide a much more comprehensive response than the simple content analysis.

RQ3 was tackled by designing a questionnaire for students based on the QAA guidelines. An incentive was provided with the offer of a prize (chocolate) for all those completing the on-line questionnaire; and software was used to prevent students submitting multiple entries. N=43 final year UG business students responded to the survey from a course total of N=139 giving a response rate of 31%. The research is limited to the extent that only UG business students participated. However, the findings do reveal for the first time feedback based on QAA rationale.
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3. Results

3.1 Snapshot Interviews

RQ1 and RQ2 have been combined to reveal the following narrative. Middlesex University Business School offers by far the most frequent number of courses on entrepreneurship, with the largest numbers of students participating. Courses offered include Business Start-Up for final year UG’s, Venture Development for PG’s and Entrepreneurship in Practice as part of a new programme for Economics students. The Dean of the Business School was able to add that new plans have been laid to provide Sustainable Products and Eco-Entrepreneurship as new modules for the 2014/15 academic year in recognition of the ever pressing agenda to tackle the problems caused by climate change (Royal Society, 2014) and resource depletion and environmental degradation in particular (Royal Society, 2012).

These latest innovations have been aided by the appointment of a new SL Eco-entrepreneurship, one of the first such appointments in the UK. This also build on the success of The Institute for Work Based Learning, now affiliated to the Business School, allowing individuals to negotiate customised pathways to University awards; including the Doctorate in Professional Practice used by entrepreneurs to develop their thinking.

Interestingly The Deputy Dean of The School of Art & Design did not cite any courses entitled enterprise or entrepreneurship but did state that all their programmes included placement modules; with all UG and PG programmes making use of multiple ‘live’ project briefs and simulation projects throughout the student journey; with plans for a progression of modules dedicated to enterprise; and creative entrepreneur learning strands as an option for UGs to develop contextual and critical awareness. Thus, enterprise and entrepreneurship in general is regarded as a necessary component of professional practice – despite ‘enterprise’ and ‘entrepreneurship’ not necessarily being directly referred to.

The School of Science & Technology reported their most recent success, to provide an excellent example of how work across subject disciplines is leading to better outcomes for graduates. In this case, one student won the Enterprise Challenge, an on-line competition run by The British Council and Virgin Atlantic in partnership with Zenith Bank. Creative Technologies master’s student from Nigeria won with a business plan for a mobile app called Verdant, designed to help crop farmers in the face of the global food crisis. The student secured a mentoring session in London with Sir Richard Branson and a £5000 grant. Critical to his success, the student stated, was being able to work with Industry as part of one of his modules.

3.2 Questionnaire

The results of RQ3 are summarised in a series of graphs. Ten questions were asked based on the QAA guidelines:

Q1. How much has this course helped you improve your entrepreneurial skills?
Q2. How much do you think this course increased your employability?
Q3. To what extent does the course provide opportunities for active learning (rather than passive learning as with lectures)?
Q4. To what extent are the knowledge and skills you are developing on the course helping you be more adaptable to a changing business environment?
Q5. To what extent would you say the course is innovative?
Q6. To what extent does the course use or encourage the use of multimedia communication?
Q7. To what extent does the course encourage you to become more self-reliant and resilient?
Q8. To what extent does the course encourage you to learn from mistakes or failure?
Q9. To what extent are you considering starting a new business or self-employment as a result of participating in this course?
Q10. To what extent do you think this course, or similar, should be taken by non-business students within the university?

The rationale for the questions is based on what the QAA (2012) believe are the fundamentals for educating the entrepreneurs of the future. Q1 & Q8 focus on the skills necessary to become an entrepreneur: practical, social and conceptual skills. These skills can be operationalised by educators through opportunity recognition.
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exercises e.g. studying a product/service or industry or social issue and brainstorming potential solutions; problem solving exercises e.g. case study material to draw out and develop creative, novel or innovative solutions; video clips to help identify risks and the completion of risk templates; leading and managing a defined project e.g. identifying team talents and strengths/weaknesses, resourcing and motivating the team, building capacity and trust, persuading and negotiating outcomes. Students should be able to reflect on what has been learned, in particular the mistakes made or obstacles encountered and how they were overcome; pitching or presenting to entrepreneurs or potential investors to network and forge relationships.

Q2 & Q9 focus on entrepreneurial effectiveness with a clear link to graduate employability. Is the student more employable as a result of developing their enterprise awareness and entrepreneurial skills? This includes employment in general or self-employment in particular. For example, some students will become more aware of the opportunities available to them by participating in curricular and extra-curricular events. Curricular events include choosing modules or strands of learning that provide unique or interesting combinations of subjects e.g. combing science and art based subjects, media and business, health and education, etc. Effectiveness skills can also be developed by undertaking ‘live’ projects e.g. consulting to a local business or social enterprise – perhaps even with a small financial budget. Students can also attend trade shows, exhibitions, seminars by entrepreneurs, social and cultural events that inspire and motivate students to find new and interesting ways of tackling problems.

Q3 focusses on the student learning experience. Do students have to sit and listen to traditional lectures with little opportunity to interact or ask questions? Are students presented with a variety of learning opportunities in place of the traditional lecture/seminar format? This can include on-line activities for the students to research news items of interest, or electronic trails / treasure hunts. Business simulations provide a more hands-on opportunity to practise and make mistakes, and receive feedback on performance from peers and tutors. Students can thus be engaged in running their own business – drawing on expertise or other resources as they see fit. Specific software can be used that generates ‘live’ performance data, or tutors can develop their own scenarios for student participation. The fundamental emphasis is on ‘active’ rather than ‘passive’ learning.

Q4 & Q7 focus on whether the student is learning to be flexible and adaptable. This is part of the mind-set needed to be an effective entrepreneur; where often solutions are tried and fail on successive occasions and the entrepreneur needs to retain confidence to persevere. Students need to be challenged to re-set goals, building confidence in their ability to control situations that are ill-defined or appear haphazard. Experimentation is key; where students can try and test various options – perhaps with several options offering potential solutions or perhaps no options providing solutions. Self-insight can be developed through checklists and inventories or peer and tutor feedback, such that open and honest feedback is generated or received on strengths and weaknesses, and what types of business or social issues they are motivated to tackle. For example, the student might decide that environmental or social issues are foremost in their mind and they have or would like to acquire the ability to tackle a particular environmental or social problem. In fact, eco-innovation is quickly becoming a hot topic for budding eco-entrepreneurs (Moon, 2013, 2014). Personality that is founded on ethical values will tend to lead to concern or compassion that can be translated into such entrepreneurial activity.

Q5 focusses on whether the students feel the course is innovative in its own right. If educators are to encourage creativity and innovation then probably the best way to do that is through more creative and innovative approaches to learning. Of course, what the student regards as innovative might not be the same as what the tutor believes is innovative; especially if the educator does not have the resources to provide what their ideal would be. Innovations can though be via small steps; and the educator has to start somewhere – even if these small steps are not immediately recognised. The educator is charged here with re-examining their own approach to teaching and learning. Perhaps they decide to enrol on a PGCHE course or engage with CPD activity. Tutors might decide to use a more ‘blended’ approach to learning, or even ‘flipping’ the role of tutor and student entirely, as appropriate; and what experiential approaches they have the skills to try out. The tutor needs to consider the student perception or reaction to such changes; and whether the innovation has been properly explained to them from the outset.

Q6 focusses on learning technology such as the use of multimedia. The innovation here might be to move away from the usual power-point presentations and consider new ways of presenting to students. Even if
power-point slides are used, presentations can be made more stimulating through inclusion of video-clips, or quizzes. However, mobile phones can now be used for voting on topics, for texting ‘live’ questions or responses. Smart phones and tablets can be used to research ‘live’ topics and provide more up-to-date, perhaps up-to-the-minute material for discussion and review. Knowing how to navigate through the wealth of information on the world-wide-web though is a skill in its own right; and there is an enormous role here for the tutor to determine potential pathways or negotiate with students which paths to try out. This could include social media, music, books, film, the real world around us, historical artefacts, etc.

Q10 focusses on whether students, subject to silo disciplines, are themselves thinking with silo mentality. Or are the students able to recognise the benefits of cross-disciplinary or multi-disciplinary learning? Do they think that enterprise and entrepreneurship education is just for the business student or do they think that all students can benefit for such education? If students only see the relevance of enterprise and entrepreneurship to business then they could be missing out on potential collaborations and partnerships. Without knowing how enterprise and entrepreneurship is defined or regarded in various disciplines then students might not realise that such skills and expertise exists in all disciplines. For example, in art and design or media and performing art or science and technology, the emphasis might be more so on developing the skills for professional practice rather than enterprise or entrepreneurship per se.

Table 1.

Table 1 indicates that, whilst over 60% of the students felt that the course helped improve their entrepreneurial skills a lot, there is a significant minority who did not feel this – indicating plenty of room for more in-depth review of how to develop these skills.

Table 2.

Table 2 indicates that over 40% of students felt that the course increased their employability a lot and over 50% slightly. This indicates the need to relate more clearly pathways that the students can follow e.g. business idea, further research, product development and the links to self-employment, intra-preneurship or gaining venture capital.
Table 3 indicates that over 60% of students felt that the course provided opportunities for active learning. However, a significant minority felt this was only slightly. Thus, again plenty of room for further investigation and improvement.

Table 4 indicates that over 50% felt that they were becoming more adaptable to a changing business environment – with over 30% stating ‘slightly’. This could be demonstrating a need for the tutor to re-consider the balance between the ‘experiential’ emphasis on skills development and the ‘experience’ emphasis on students learning about the world outside.

Table 5.
Table 5 indicates that over 60% felt the course was innovative.

Table 6 indicates that over 50% of students felt the course used or encouraged the use of multimedia communication. However, nearly 40% only felt this slightly which indicates room for improvement.

Table 7 indicates that nearly 80% felt the course encouraged them to be more self-reliant and resilient.

Table 8 indicates that over 50% felt the course encourages learning from mistakes or failure. However, over 30% felt this only slightly which is worthy of further investigation.
Table 9 indicates that over 60% were considering starting a new business or self-employment.

Table 10 indicates that nearly 40% felt that this Business Start-Up course should be taken by non-business students – though over 30% felt this only slightly and several students did not feel this at all.

4. Discussion

The results of this research demonstrate how one university is tackling the enterprise and entrepreneurship agenda. QAA (2012) guidelines envisage more courses being offered on enterprise and entrepreneurship. However, this research clearly shows that courses are being offered not necessarily with enterprise or entrepreneurship in the title. The starkest evidence of this is with schools offering professional practice. Even here though some progression is now being considered to enable students to relate theory to practice in more innovative ways.

Ideally there is collaboration across schools and disciplines. Universities can no longer best serve students by operating in silos. Working across subject boundaries enables students to see links and integrate knowledge and skills from different domains; and to integrate this learning with broader needs of society. This is the model provided by QAA (2012) with their proposed integration of learning from within the curriculum and outside of the curriculum. Nevertheless, despite pockets of excellence e.g. Brunel, Huddersfield, Middlesex, much more needs to be done to break down disciplinary and functional silos in universities to enable cross-disciplinary and multi-disciplinary learning to take place.

The above points are reinforced by decades of learning and development theory. QAA (2012:8 emphasise the need for creativity and innovation in teaching and learning. QAA (2012:9) emphasise ‘learning for’ rather than ‘learning about’. QAA (2012:16-21) place ‘students at the heart of the system’. QAA (2012:22) refer to
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‘pedagogical experimentation’. QAA (2012:22) refer to ‘constructive alignment’. QAA (2012:24) refer to ‘active’ rather than ‘passive’ learning. QAA (2012:24) refer to ‘on-line learning’. And there is a great deal of support in the literature for these tenets.

For example, the ‘creative curriculum’ is an accepted educational practice (e.g. Belinda Allen’s work at the University of New South Wales, see figure 3). Fry et al (2009) cite the importance of ‘learning for’ (e.g. Lucas and Milford) and ‘assessment for learning’ (e.g. Sambell). Roger Fox (1983) has written extensively about ‘student centred learning’, ‘active rather than passive’ and the need for more ‘experimentation.’ Kolb (1984) stresses the importance of both ‘cognitive’ and ‘affective’ learning. And, these concerns are now being related to e-learning (e.g. Brenton in Fry et al, 2009) as new forms and uses for learning technologies are being developed, such as VLEs (Virtual Learning Environments) and MOOCs (Mass Open On-line Courses).

Figure 3. The creative graduate.

5. Conclusions

This paper concludes that even more active learning is needed in the curriculum given the need for entrepreneurs to develop creativity and experimentation. Recent research by Bocken et al (2014) focussed on the ‘fuzzy front-end’ of eco-innovation where creativity and experimentation were deemed particularly important. University faculty can do much more to move away from traditional lectures and seminars to workshops that develop creative thinking and problem solving skills; with active experimentation and the opportunity to learn from mistakes.

Assessment at universities can be based on out-dated academic protocols and outdated module narratives e.g. where formative assessment is replaced by summative to justify academic content and provide a degree of control by the academic over the achievement of learning outcomes and progression of students. It is all too easy to write traditional exam type questions and set projects or essays that tend to examine knowledge over skills. Thus, there is plenty of room for self-assessment, peer assessment, formative and continuous assessment. This is particularly pertinent with entrepreneurship where new product design and development is needed; and hands-on business planning and development skills. For example, ‘pitching’ ideas and plans to a panel of entrepreneurs can hone skills far more effectively than writing a classic business plan in isolation.
The time has come for more multi-disciplinary and more multi-media learning. Business Schools, Science & Technology, Social Science, Health Education, Media and Performing Arts all have their own methods of teaching and learning; and much can be learned from the practices of different schools. However, much more concerted action is required to construct opportunities for learning that are outside of traditional subject disciplines. The university of the future is inevitably more ICT led – with VLEs and MOOCs replacing many traditional university campuses. In fact, there is even discussion of going beyond VLEs. Universities that do not embrace these new forms of learning will quickly be left behind as new providers develop their own content and do not rely on traditional academic material (and uninspiring classrooms or lecture theatres).

With enterprise and entrepreneurship education there is a need for current universities to integrate their provision both vertically and horizontally. That is, internally between subject disciplines and externally with practitioners. QAA (2012) provide the policy basis for doing this. Ernst & Young (2012) provide the vision of the University of the future. The UKs All-party parliamentary group for micro businesses (2014) provide support for the steps required. Entrepreneurs and academic–practitioners are beginning to impact on traditional forms of educational provision by recognising and acting on the need for more creativity and experimentation; with doses of reality providing the more relevant context.

This paper has provided primary research on one sample of students at one university. The results demonstrated that innovation in teaching and learning is possible and there is the potential for improving graduate employability and entrepreneur effectiveness. However, better links to outcomes outside of the university are needed to evaluate real progress. Students can benefit from awareness-raising and skills development but they also need the mind-set to thrive – especially if some of the complex problems facing society e.g. social and environmental are to be tackled. The results of this paper go a small way in demonstrating implications for teaching, learning and assessment as regard Enterprise & Entrepreneurship Education.

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Fine-tuning Entrepreneurship Education: How do Programs Impact Entrepreneurial Characteristics in Students?

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Abstract: Entrepreneurship education is no longer about developing technical skills in business. It is also about strengthening a positive mindset in potential entrepreneurs and contributing to building an enterprise culture in the community. Universities are in a unique position to not only influence and shape the attitudes towards entrepreneurship for new venture creation, but also to develop an entrepreneurial perspective that students can apply to the multiple roles they will play in life. In Latin America, a region where entrepreneurship is becoming a desirable career choice and early-stage entrepreneurship is mostly headed by young people, an increasing number of universities are integrating entrepreneurship education and promoting strategies for developing a supportive culture. Such efforts should come accompanied by an assessment of the approach and impact of programs, a key element for identifying gaps in their design that may hinder effectiveness. This paper reports findings as part of a larger study on the entrepreneurial characteristics of undergraduate students. The purpose is to examine the impact of an entrepreneurship course on 10 entrepreneurial attributes (creativity, initiative, self-confidence, work energy, perseverance, leadership, risk taking, need of achievement, tolerance, problem management skills). The mandatory course, based on an experiential learning approach, focuses on three core areas: a) academic, applying learning materials and activities to provide technical knowledge; b) motivational, aiming at the development of entrepreneurial competences; and c) institutional, providing support through laboratory infrastructure and business incubators. A 50-item questionnaire was designed in-house and administered to 327 undergraduate students at Tecnologico de Monterrey, a private university in Mexico. Participants responded the survey before and after the course in order to compare entry and exit results. Findings indicate that creativity, risk management, self-confidence, and problem management skills were the most positively impacted by the program. These results allow for the preliminary conclusion that exposure to a formal and structured program can modify characteristics considered as desirable in entrepreneurs, and can be regarded as encouraging that university entrepreneurship programs can contribute to developing enterprise competences. Studies such as this highlight the value of performing assessments on the impact of entrepreneurship education to ensure achievement of its objectives.

Keywords: Entrepreneurship education, entrepreneurial attributes, universities, entrepreneurship

1. Introduction

Entrepreneurs are the actors in the economy who take the initiative to engage in any necessary activities for the pursuit and materialization of opportunities, and who also have the tenacity to push ideas into reality (Kuratko 2005; Shaver et al 2001). These individuals with the capacity to identify market opportunities, innovate, and create new businesses have become valuable assets in a changing environment in which accelerated innovative activity, technology development and job creation are the challenges posed by the knowledge-economy of the twenty-first century (Boyles 2012; Cooke and Leydesdorff 2006; Jack and Anderson 2002).

In this context, entrepreneurship education plays a key role in promoting entrepreneurial skills and behaviors which respond to economic and societal concerns through programs aimed at the development of an entrepreneurial perspective in students, which, as Kuratko (2005, p. 578) states, may be “exhibited inside or outside and organization, in profit or non-profit enterprises, and in business and non-business activities for the purpose of bringing forth creative ideas”. That is, entrepreneurship education is a means to equip young individuals with the competences required for the 21st century, and which may be manifested not only in the creation of a business, but in many other roles that individuals play throughout their lives (European Commission 2012; Fayolle and Klandt 2006).

Many universities throughout the world, particularly with greater force since the 1970s, have incorporated entrepreneurship into their formal programs (Katz 2003), leading to the establishment of entrepreneurship education as a taught discipline within higher education (Henry 2013). In Latin America, a region where entrepreneurship is becoming a desirable career choice and early-stage entrepreneurship is mostly headed by young people (Amoros and Bosma 2014), an increasing number of universities are integrating
entrepreneurship education and promoting strategies for developing a supportive culture. The authors believe that such efforts should come accompanied by an assessment of the approach and impact of programs, a key element for identifying gaps in their design and implementation that may hinder effectiveness. Impact should not only be measured by the number of new ventures created by students, but also the change in behaviors, attitudes and intention for entrepreneurial activity.

As part of a larger investigation on the entrepreneurial attributes of students, an exploratory quantitative study was conducted with the objective of identifying whether exposure to an entrepreneurship program, based on an experiential learning approach, has a positive impact on 10 entrepreneurial attributes drawn from the literature. A survey questionnaire was administered to undergraduate students in a private university in Mexico before and after the course in order to compare entry and exit results. Our study contributes to gaining insight into entrepreneurship education in Latin America, a rather understudied region.

The remaining sections of the paper will first review the literature on the attributes and behaviors of entrepreneurs. Then, the research design and methodology will be presented, followed by the empirical results and their discussion. Finally, we draw conclusions on the fourth and last section.

2. Considerations on how to promote key entrepreneurial characteristics

2.1 Entrepreneur and entrepreneurship

The terms entrepreneur and entrepreneurship have been defined from different disciplines, and the effort has even been compared to trying to define the heffalump, a metaphor posed by Peter Kilby in 1971. Based on the literature review on what defines an entrepreneur, we define the entrepreneur as “a person that can be considered to have the skills to create and initiate a business making use of his/her competences for resource optimization and problem solving in an innovative way, taking advantage of opportunity areas that others have not identified, as well as the capacity to work hard and persevere towards the achievement of his/her goals” (Alcaraz-Rodriguez et al. 2014).

Following Shane and Venkataraman (2000), entrepreneurship is understood as a process, not a one-time event, that does not require the creation of a new business; that is, it can occur even within an existing organization, and involves the presence of opportunity and the presence of entrepreneurial individuals

2.2 Entrepreneurial attributes and behaviors and methods of entrepreneurship education

This study adopts a social psychology perspective, which studies personal and situational factors that have an impact on individual social behavior (Shaver, 2010). Its interest is in how people think, learn, and reason with respect to social information; it holds a strong link with personality psychology as one of its fundamental principles is that “behavior is a function of the interaction between the person and the environment” (Kassin, Fein and Markus, p. 14).

Contributions by research conducted from a psychological perspective in recent years have identified variables such as cognitions, emotions, motivations, and behaviors, as well as contextual factors, that influence an entrepreneur’s success (Baror 2000; Kalkan and Kaygusuz 2012). This poses the didactic and pedagogical challenge of stimulating such entrepreneurial behaviors in students to turn ideas into action, besides providing the skills that would enable them to run and manage a business (European Commission 2012).

As Fayolle and Klandt (2006) state, the modern paradigm for entrepreneurship education is a focus on culture and behaviors without neglecting the traditional focus on new venture creation. In many instances, entrepreneurship education has evolved beyond the traditional business context to integrate entrepreneurship to other disciplinary fields, as well as to include a diversity of pedagogical methodologies (Mars 2013). The main pedagogical approach has traditionally been classroom-based, focusing on business planning and supporting funtional knowledge for the new venture creation process (Fayolle 2013); however, this has proven inappropriate to enhance motivation and competencies in students for entrepreneurship and innovation (Blenker et al. 2006).

If the aim of entrepreneurship education at the university is to improve and encourage an entrepreneurial mind-set that would allow those new generations to identify and act upon market opportunities, the student
has to become an active and equal partner in the learning process to put knowledge into action (Corbett 2005; Blenker et al. 2006). Experiential oriented methodologies are believed to be suitable for such an objective, as for the entrepreneur understanding derives from personal experience and learning by doing (Hynes 1996). In experiential learning theory, learning is the process of creating knowledge, which is derived from the experiences of the individual (Kolb 1984), and may provide a balanced mix of formal and informal delivery aspects of entrepreneurship education for skills building, attribute development, and behavioral change (Hynes 1996; Mars 2013).

A chronological review of findings from different authors allows to identify the different entrepreneurial traits that have been highlighted in the literature (Table 1). Behavioral traits can be best developed through real life experiences through which experiential learning may come about, such as market awareness, confidence, creativity, alertness, energy, among others (Chell 2008).

**Table 1. Entrepreneurial traits based on the literature**

<table>
<thead>
<tr>
<th>Date</th>
<th>Authors</th>
<th>Traits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1848</td>
<td>Mill</td>
<td>Tolerance to risk</td>
</tr>
<tr>
<td>1917</td>
<td>Weber</td>
<td>Source of formal authority</td>
</tr>
<tr>
<td>1934</td>
<td>Schumpeter</td>
<td>Innovation, initiative</td>
</tr>
<tr>
<td>1950s</td>
<td>Hoselitz, Sutton, Hartman,</td>
<td>Tolerance to ambiguity, innovation, resource coordinator, desire to be responsible, source of authority</td>
</tr>
<tr>
<td>1960s</td>
<td>McClelland, Davids, Atiken, Collins et al</td>
<td>Risk management, need of achievement, ambition, independence, responsibility, self-confidence, leadership, innovation, risk management</td>
</tr>
<tr>
<td>1970s</td>
<td>Palmer, Hornaday and Aboud,Winter, Borland, Liles, Gasse, Timmons</td>
<td>Risk management, autonomy, power, acknowledgement, innovation, independence, need of power, internal locus of control, need of achievement, personal values oriented, self-confidence, goal-oriented, innovation, creativity, acceptance of change, risk management</td>
</tr>
<tr>
<td>1980s</td>
<td>Schultz, Stacey, Welsh and White, Mescon and Montanari, Bary, Dunkelberg and Cooper, Casson, Schumpeter, Sexton and Bowman, Fernald and Solomon, Burch, Winslow and Solomon, Hawkins and Turla, Scherer, Gibb</td>
<td>Adaptation to change, risk management, capacity to learn from mistakes, perseverance, need of achievement, responsible, persistence, perseverance, self-confidence, orientation towards action, orientation towards growth, independent, imagination, originality, creativity, working skills, self-control, hard-working, optimism, orientation towards excellence, slight sociopath, initiative, flexibility</td>
</tr>
<tr>
<td>1990s</td>
<td>Waddock and Post, Shaver and Scout, Sexton and Bowman-Upton, Krueger and Branezal, Hutt, Stenberg, Warner, Williams and Horvath</td>
<td>Vision, leadership, vision, oriented towards the future, self-confidence, independence, working skills, opportunity seeker, responsibility, goal-oriented, learning oriented, practical intelligence</td>
</tr>
<tr>
<td>2000s</td>
<td>Baronet, Entrialgo, Kueummerle, Sternberg, Fuentes de Peña, Murrey</td>
<td>Capacity for multiple association, originality, creativity and innovation, proactivity, rebel against established rules, decision-maker under uncertainty, leadership, successful intelligence, energetic, high self-esteem, organized, competitive, focused, flexible, perseverance, tenacity</td>
</tr>
</tbody>
</table>

Source: Alcaraz-Rodriguez (2011)

For this study several characteristics were identified as commonly reported in the literature for successful entrepreneurs: innovation and creativity, initiative, self-confidence, energy and work capacity, perseverance, leadership, risk acceptance, need of achievement, tolerance to change, and problem management skills (Alcaraz-Rodriguez, 2011). It was also identified that the same concept would be named differently by different authors.

Here, we understand innovation as the process of bringing something new to existence; it is related to the capacity of association, combination, and restructuring of elements within a cultural context. Creativity is closely linked to innovation. Some authors have highlighted that creative and innovative individuals possess a high self-esteem, are tolerant to frustration, are perseverant, question the established rules, are extrovert and introvert at the same time, and enjoy being successful (Csikszentmihalyi 1996; De Tienne and Chandler 2007; Lee and Rogoff 1997).
Entrepreneurs act upon opportunity to initiate a new activity that may be beneficial or necessary (Shane and Venkataraman 2000). Thus, initiative is a distinctive quality in successful entrepreneurs, as it allows detecting opportunities and actively developing projects around them. In the same manner, perseverance appears in the literature a key trait found in entrepreneurs (Chye 1996; Kalkan and Kaygusuz 2012). Despite failure, these individuals sacrifice what is necessary in order to achieve their goals, and continue working despite several failed attempts.

The typical entrepreneur invests many hours of the day on a project, therefore these individuals follow the task to its end, requiring high levels of energy and a capacity to work. They are organized, hold high quality standards, respect and acknowledge hard work as a means for achieving desired goals (Chell 2008).

One of the traits that is considered one of the big three, is need of achievement. McClelland (1987) established it as a basic characteristic of entrepreneurs, as it represents the desire to do things well, of being successful and reaching standards of excellence. This also requires in individuals high levels of tolerance to change, which implies an adaptability to new situations, manages uncertainty, and strives to overcome challenging situations (Chye 1996).

Entrepreneurs must portray leadership to their employees, clients, and suppliers as it is as important as the quality of the product or service they provide (Vacaflor 2011). According to Freiberg (2007), leadership is a dynamic relationship between leaders and collaborators in which both are propelled to higher levels of motivation by the real and intentional changes. It requires teamwork, a vision of the future, passion, integrity, trust, and curiosity.

3. Research design and methodology

Since 1990, Tecnologico de Monterrey, a private university in Mexico, undertook the mission of including in all its programs a course that would promote and develop knowledge, skills, values, and attitudes in students that would contribute to their personal and professional development in the future. Thus, Development of Entrepreneurs emerged from this university-wide movement as a mandatory course for all majors offered in the 32 campi distributed throughout Mexico.

Applying the experiential learning method, the program focuses on three core areas: a) academic, with learning materials and activities to provide technical knowledge; b) motivational, aimed at developing entrepreneurial competences; and c) institutional support provided by the university’s laboratory infrastructure and business incubators. Activities include workshops for identifying opportunities and project development, as well as for personal development through which the student could first identify his or her weaknesses and strengths.

The expected outcome from the course was a project with a certain degree of viability for implementation. Improvements in design, didactic techniques, technological platforms, evaluation methods, support resources, and activities have been implemented over time; however, the evaluation of the course in terms of its effectiveness in developing entrepreneurial competences had not been done.

3.1 Sample

A quantitative study was conducted with the objective of identifying the impact of the course Development of Entrepreneurs on entrepreneurial characteristics. A survey questionnaire was administered to 327 undergraduate students at Tecnologico de Monterrey who responded the survey before and after the course in order to compare entry and exit results. Out of the initial group of respondents, 156 questionnaires were collected back at the end of the semester. Participants were students in their junior year, between 19 and 22 years of age. The hypothesis relates to the impact of the entrepreneurship program on skills and abilities:

H1: The formation process of the mandatory course promotes and develops certain basic entrepreneurial characteristics (that is, there are significant differences between the mean entry and mean exit values for each characteristic).

A two-sample t-test assuming equal variances was performed to ascertain whether the entrepreneurship course was effective in developing the 13 entrepreneurial characteristics.
3.2 Measuring instrument

The questionnaire was designed in-house following Churchill (1979) and Schwab (1980) for the process of evaluation instrument design. A review of the literature on entrepreneurial characteristics was first conducted, from which the following were selected to be evaluated in this study: creativity, initiative, self-confidence, working skills, perseverance, leadership, risk management, need of achievement, tolerance, and problem management skills. The next step was to identify surveys that aimed at measuring those characteristics, selecting those that provided items that best suited the purpose of this study.

Once the questions were defined, each was validated by a group of 25 experts in the areas of linguistics and psychology with over five years of experience in entrepreneurship education. The survey instrument was then tested for reliability using Cronbach’s alpha obtaining an overall value of 0.916. The items with the highest correlation value were creativity, self-confidence, perseverance, need of achievement, and problem management skills. The item with the lowest value was tolerance.

Once the questionnaire was validated for reliability, a pre-pilot was administered to a sample of two groups of undergraduate students in their junior and senior years, between 19 and 22 years of age with the following characteristics: one set of students with evident entrepreneurial profile (owners of a business with over two years in the market), and another set with no engagement in entrepreneurial activity (not business owners, no participation in extracurricular activities, and not any entrepreneurial plans for the future). The instrument proved effective in differentiating among most of the entrepreneurial characteristics. The final survey was integrated by 50 questions using five-point Likert-type scales (1= strongly agree; 5= strongly disagree). Data was analyzed using SPSS 15.

4. Results and discussion

Our hypothesis proposed that students that took the entrepreneurship program would report an improvement at the end of the course in the entrepreneurial characteristics being evaluated, that is, scores will be significantly different. Homocedasticity is validated. A paired t-test analysis reported the existence of differences in mean scores (Table 2). A Pearson’s correlation was run to determine the correlation between variables with moderate and strong values found at $p < 0.01$.

Table 2. Paired sample statistics, comparison of results for each entrepreneurial characteristic

<table>
<thead>
<tr>
<th>Moment of survey application</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>327</td>
<td>19.62</td>
<td>3.324</td>
<td>.184</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
<td>20.18</td>
<td>3.359</td>
<td>.269</td>
</tr>
<tr>
<td>Initiative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>327</td>
<td>20.89</td>
<td>3.167</td>
<td>.175</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
<td>20.71</td>
<td>4.968</td>
<td>.398</td>
</tr>
<tr>
<td>Self-confidence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>327</td>
<td>20.17</td>
<td>2.911</td>
<td>.161</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
<td>20.53</td>
<td>3.049</td>
<td>.244</td>
</tr>
<tr>
<td>Working skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>327</td>
<td>21.50</td>
<td>2.594</td>
<td>.143</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
<td>21.15</td>
<td>2.679</td>
<td>.214</td>
</tr>
<tr>
<td>Perseverance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>327</td>
<td>20.69</td>
<td>2.520</td>
<td>.139</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
<td>20.53</td>
<td>2.427</td>
<td>.194</td>
</tr>
<tr>
<td>Leadership</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>327</td>
<td>19.13</td>
<td>2.827</td>
<td>.156</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
<td>19.62</td>
<td>2.872</td>
<td>.230</td>
</tr>
<tr>
<td>Risk management</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>327</td>
<td>23.14</td>
<td>2.637</td>
<td>.146</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
<td>22.61</td>
<td>2.480</td>
<td>.199</td>
</tr>
<tr>
<td>Need of achievement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>327</td>
<td>18.46</td>
<td>2.620</td>
<td>.145</td>
</tr>
<tr>
<td>2</td>
<td>156</td>
<td>18.35</td>
<td>2.873</td>
<td>.230</td>
</tr>
<tr>
<td>Tolerance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Findings cannot conclusively lead to accepting the null hypothesis that the course had no impact on the entrepreneurial characteristics of students (no difference in mean scores before and after the course) (Table 3); however, these results suggest that for these students, experiencing the course did positively impact the entrepreneurial competences of Creativity, Risk management, Self-confidence, and Problem management skills.

There is stronger evidence that the course had a greater impact on Creativity, Risk management, Self-confidence, and Problem management skills (Figure 1). Results show that Creativity is the characteristic most positively impacted by the course. There is evidence that the entry value of the mean (M=19.62, SD=3.32, N=327) experienced an improvement as shown by the exit value (M=20.18, SD=3.35, N=156). The 95% confidence interval for the difference is (-1.196, 0.79).

The pre-course mean for Risk management was 19.13, with a standard deviation of 2.82. The post-course mean was 19.62 with standard deviation of 2.87. However, this difference was not statistically significant, $t(481) = -1.77, p > 0.05$. Evidence also shows that the course improved the characteristic of Self-confidence; there was a difference in scores for entry values (M=20.17, SD=2.91, N=327) and exit values (M=20.53, SD=3.04, N=156); $t(481) = -1.24, p > 0.05$. Though the mean score was higher after the course (entry mean of 19.65 versus exit mean of 19.72), for Problem management skills the differences were not statistically significant at $p < 0.05$ with a $t$-value of -0.21.

Previous similar studies to identify the impact of entrepreneurship programs on intent and attitudes have given mixed results. Galloway and Brown (2002) conducted a study to estimate the extent in which entrepreneurship education at Strathclyde University had an effect on career intentions for students, and business creation for graduates, from different areas in the long term. Their findings revealed that 78% of surveyed students aimed to have a business, and that for alumni, an impact was evident given that 30% were self-employed and three-quarters of participants already employed ten people or less.

For Uruguay, Krauss (2011) analyzed five entrepreneurial attitudes of students after three years of study. She applied a questionnaire to students from different undergraduate programs, and results showed that students from entrepreneurial families and those who had work experience had higher levels of overall entrepreneurial

| Problem management skills | 1 | 327 | 19.65 | 3.188 | .176 |
| 2 | 156 | 19.72 | 3.071 | .246 |

Note: 1 indicates the beginning of the semester; 2 indicates the end of the semester.
attitude, and that after two years of academic experience, need of achievement and internal locus of control were lower than at the beginning.

Kickul (2006) conducted a study using correlational analysis to demonstrate that an entrepreneurship course on new opportunity initiation and creation built in undergraduate students the characteristic of alertness and self-efficacy in particular. His findings show that self-efficacy was associated with entrepreneurial alertness, and that their levels were related to the tasks involved in searching for new ideas and innovations for a new venture.

Table 3. Paired samples t-test, comparison of means

<table>
<thead>
<tr>
<th></th>
<th>Levene’s test for equality of variance</th>
<th>T test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
</tr>
<tr>
<td>Creativity</td>
<td>.853</td>
<td>.356</td>
</tr>
<tr>
<td>Initiative</td>
<td>1.609</td>
<td>.205</td>
</tr>
<tr>
<td>Self-confidence</td>
<td>2.589</td>
<td>.108</td>
</tr>
<tr>
<td>Working skills</td>
<td>.080</td>
<td>.777</td>
</tr>
<tr>
<td>Perseverance</td>
<td>.723</td>
<td>.396</td>
</tr>
<tr>
<td>Leadership</td>
<td>.026</td>
<td>.871</td>
</tr>
<tr>
<td>Risk management</td>
<td>.724</td>
<td>.395</td>
</tr>
<tr>
<td>Need of achievement</td>
<td>.575</td>
<td>.449</td>
</tr>
<tr>
<td>Tolerance</td>
<td>3.359</td>
<td>.067</td>
</tr>
<tr>
<td>Problem management</td>
<td>.090</td>
<td>.764</td>
</tr>
</tbody>
</table>

5. Conclusion

The authors believe that, nowadays, given that empirical research supports that entrepreneurship positively contributes to economic development in terms of employment creation, productivity growth and high quality innovations (van Praag and Versloot, 2007), entrepreneurship education should also provide students an understanding of their role in the economy and society, and promote entrepreneurship as a viable career option (European Commission, 2012; Galloway and Brown, 2002).

As Elmuti et al. (2012) mention, the consideration to be made by educators is not whether or not entrepreneurship can be taught, rather the manner in which it should be taught. Experiential learning methodologies in entrepreneurship courses may prove effective for developing entrepreneurial competences since it allows students “to discover new outcomes from their learning” (Corbett, 2005, p. 482), and that both start-up entrepreneurs and those individuals responsible for strategic renewal in large organizations “must learn from their experiences and seek out new opportunities” (p. 482) in order to succeed.

As with other disciplines, entrepreneurship education curricula should be always fine-tuned to the requirements of the context in which universities are embedded, particularly in developing regions in which entrepreneurial activity may become an important engine for social mobility, but demands individuals to rapidly adjust to the changing economic environment. This is one of the reasons for the relevance of assessment of programs and student progress in the development of entrepreneurial skills and behaviors.

This paper presents results that are part of a larger investigation. Findings from the current study can be interpreted as positive, as data suggests and allows for a tentative conclusion that exposure to a formal and
structured entrepreneurship program promotes entrepreneurial traits. The measuring instrument proved effective to detect the level of each entrepreneurial characteristic. However, a revision of the instrument’s design is called for in order to ensure its further effectiveness. The limitations derived from findings being reported as group results suggested and encouraged further research taking into consideration for data analysis variables such as geographical location, gender, major, and semester.

For other Latin American universities which look to adopt a cross-curricular approach to entrepreneurship and promote an enterprise culture as Tecnologico de Monterrey is doing, studies such as this highlight the value of understanding how students view entrepreneurship by performing evaluations on the impact of teaching methods and programs, and seek to adapt the curriculum and resources to make entrepreneurship education more effective.

References


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17-18 September 2015

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