

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

3(3)
2016



University of Essex

ESSEX
BUSINESS
SCHOOL



RISEBA

REDINN
Rete Europea Dell'Innovazione

PLBA asociacija
Pasaulio lietuvių bendruomenės



AVADA
Asociacija valdymo ir administravimo mokymosi
Asociation of Management and Administration

EUROPE
for business



Dear readers,

As a business owner and professional consultant, I believe that the International Journal ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES offers a unique opportunity to keep up to date on relevant issues in entrepreneurship and sustainability. Both are hot topics nowadays and deserve the utmost attention, in particular sustainability as we are not only facing global competition, but we are actually competing for resources on a daily basis and we need to ensure we will be able to deliver a better future to the coming generations as the world we are living in we is not ours, we have actually borrowed it from them I truly believe that consolidated efforts of academia and entrepreneurs will let us increase efficiency of both, academic and business oriented efforts, and would ultimately lead us to more humanistic and affluent future in all countries and regions of our small world. Let us continue sharing, discussing and searching for the best solutions for our common sustainable future.

With best regards,

Prof.Dr.Ing. David Luigi FUSCHI

BRIDGING Consulting Ltd, UK
Owner, Director & Chairman



ISSN 2345-0282 (online) <http://jssidoi.org/jesi/aims-and-scope-of-research/>

Volume 3

Number 3

March 2016

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

2016
3(3)

The *Entrepreneurship and Sustainability Issues* ISSN 2345-0282 (online) is a peer-reviewed journal, which publishes original research papers and case studies. It is international journal published cooperating with universities, social companies, consultancies and associations indicated on the cover of the journal. It is published quarterly.

Areas of research include, but are not limited to, the following:

- Conceptual Approaches towards Entrepreneurship
- Entrepreneurship and Sustainable Development
- Globalization Processes Sustainable Development
- Innovations and Technological Development for Entrepreneurship and Sustainability
- Transition Issues and Sustainable Development
- Entrepreneurship and Environmental Sustainability
- Economic Growth and Entrepreneurship
- Economics and Management of Sustainable Organizations and Industries
- Intercultural Communication for Security and Sustainability
- Sustainable Development of Sector Economics
- Sustainable Finance and Investment and Entrepreneurship
- Strategic Management for Sustainability
- Case Studies on Entrepreneurship and Sustainable Development
- Sustainable cities and entrepreneurship
- Organizational studies
- Social cohesion and social innovation
- Public policy, economic security for sustainable entrepreneurship
- Business models and strategic management for sustainable futures
- Social responsibility and sustainable development
- Psychology and entrepreneurship
- Intuitions about contemporary phenomena in business and society
- Social inclusion and entrepreneurship
- Social inclusion and sustainable development of societies
- Life-long learning and sustainable development
- Life-long learning and entrepreneurship
- Women and entrepreneurship
- Creative industries and entrepreneurship
- Case studies

All papers published in the *Entrepreneurship and Sustainability Issues* are indexed/abstracted by:

-
- | | |
|--|---|
| • ECONIS of the ZBW – Leibniz Information Centre for Economics | http://www.zbw.eu/EconBiz |
| • RePEc | http://repec.org/EconBiz |
| • Ulrich's Periodicals Directory | |
| Serials Solutions | http://www.serialssolutions.com/ |
| a ProQuest business | http://www.proquest.co.uk/en-UK/ |
| • Crossref | |
| • Google Scholar | |
| • The European Library | http://www.theeuropeanlibrary.org |
| • Database Lituanistika | http://www.lituanistikadb.lt |
| • Index Copernicus International | |
-

Editorial correspondence including manuscripts and submissions

Prof. dr. Manuela Tvaronavičienė

Tel.: +37068783944

E-mail: submissions@jssidoi.org or
manuela.tvaronaviciene@vgtu.lt

This is an open access journal and all published articles are licensed under a
[Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

ISSN 2345-0282 (online) <http://jssidoi.org/jesi/aims-and-scope-of-research/>

Publisher: ENTREPRENEURSHIP AND SUSTAINABILITY CENTER <http://jssidoi.org/esc/home>

Editors-in-Chief

Prof. Jay Mitra, University of Essex, United Kingdom jmitra@essex.ac.uk

Prof. John Saeed, Reutlingen University, Germany john.saeed@reutlingen-university.de

Executive Editors

Prof. Abel Femi Adekola, University of Wisconsin-Stout, USA adekolaa@uwstout.edu

Editors

Dr. Christopher J. Rees, University of Manchester, United Kingdom rees@manchester.ac.uk

Dr. Richard Haigh, University of Salford, United Kingdom haigh@salford.ac.uk

Prof. Christian Friedrich, University of Applied Sciences, Giessen, Germany christian.friedrich@hfpv-hessen.de

Dr. Renata Korsakienė, Vilnius Gediminas Technical University, Lithuania renata.korsakienė@vgtu.lt

Prof. Inga Žalėnienė, Mykolas Romeris University, Lithuania izalenienė@mrui.eu

Prof. Mohamad Sepehri, Jacksonville University, USA msephr@ju.edu

Prof. Brian Maruffi, Yeshiva University, Fordham University, USA maruffi@yu.edu

Dr. Evelyn Wamboye, Pennsylvania State University, USA efw10@psu.edu

Prof. Fangqi Xu, Kimki University, Japan fxqjo@bus.kindai.ac.jp

Dr. Ing. David Fuschi, Brunel University, United Kingdom David.Fuschi@brunel.ac.uk

Director, Mercy Maclean, Director of Health Psychology Management Org. Services, United Kingdom
mercy.maclean@hp-mos.org.uk

Prof. Sharda Nandram, HAN University of Applied Sciences and Nyenrode Business University, the Netherlands
s.nadram@nyenrode.nl

Prof. Kristel Mari Skorge, Oslo and Akershus University College of Applied Sciences, Norway Kristel-Mari.Skorge@hioa.no

Prof. Salvatore Monni, Rome Tre University, Italy Salvatore.monni@uniroma3.it

Dr. Leonardo Piccinetti, Europe for Business, Brussels, Belgium l.piccinetti@e4business.eu

Prof. Gunnar Prause, Tallinn University of Technology, Estonia gunnar.prause@ttu.ee

Prof. Irina Sennikova, Riga International College of Economics and Business Administration, Latvia
irina.sennikova@riseba.lv

Prof. Natalja Lace, Riga Technical University, Latvia natalja.lace@rtu.lv

Prof. Ona Gražina Rakauskienė, Mykolas Romeris University, Lithuania ona.rakaus@mrui.eu

Prof. Agota Giedrė Raišienė, Mykolas Romeris University, Lithuania agota@mrui.eu

Prof. Danuta Diskienė, Vilnius University, Lithuania danute.diskiene@ef.vu.lt

Dr. Sibylle Heilbrunn, Ruppiner Academic Center, Izrael sibylle@ruppin.ac.il

Prof. Mirjana Radović Marković, Institute of Economic Sciences, Belgrade, Serbia mradovic@gmail.com

Prof. Ing. Zuzana Dvorakova, University of Economics, Prague, Czech Republic zuzana.dvorakova@vse.cz

Prof. Ani Matei, National School of Political Studies and Public Administration, Romania amatei@snspa.ro

Prof. Murtala S. Sagagi, Bayero University Kano, Nigeria mssagagi@yahoo.com

Dr. Kavita Singh, University of Delhi, India kavita@fms.edu

Prof. Pacha Malyadri, Government Degree College, Osmania University Patancheru, India gdcpatancheru@gmail.com

Dr. Ulku Yuksel, The University of Sydney, Australia ulku.yuksel@sydney.edu

*Dr. **Juris Ulmanis***, Experiential Simulations, Canada juris.ulmanis(at)rbs.lv
*Dr. **Sarvar Gurbanov***, Qafqaz University, School of World Economy, Azerbaijan squrbanov(at)qu.edu.az
*Dr. **Mantas Bileišis***, Mykolas Romeris University, AVADA, Lithuania mantas.bileisis(at)mruni.eu
*As. prof. **Virginija Grybaitė***, Vilnius Gediminas Technical University, Lithuania Virginija.Grybaite(at)vgtu.lt
*Prof. **Mehmet Huseyin Bilgin***, Istanbul Medeniyet University, Turkey bilgin(at)ebesweb.org
*Prof. **Levent Kosekahyaoglu***, Suleyman Demirel University, Turkey leventkosekahyaoglu(at)sdu.edu.tr
*Assist.Prof. **Meltem Caber***, Akdeniz University, Tourism Faculty, Turkey meltemcaber(at)akdeniz.edu.tr
*Prof. **Marina Sheresheva***, National Research University Higher School of Economics (HSE), Russian Federation m.shersheva(at)mai.ru
*Prof. **Ramaswamy Ganesan***, King Saud University, Kingdom of Saudi Arabia ganesan_gramaswamy(at)ksu.edu.sa
*Prof. **Bora Aktan***, University of Bahrain, the Kingdom of Bahrain gbora(at)uob.edu.bh
*Prof. **Abuzar Wajidi***, University of Karachi, Pakistan abuzar_wajidi(at)hotmail.com

CONTENTS

Volume 3 Number 3 March 2016

Gunnar Prause.

E-RESIDENCY: A BUSINESS PLATFORM FOR INDUSTRY 4.0? 217

Anatoli Beifert.

REGIONAL AIRPORTS' POTENTIAL AS A DRIVING FORCE FOR
ECONOMIC AND ENTREPRENEURSHIP DEVELOPMENT –
CASE STUDY FROM BALTIC SEA REGION 228

Laima Gerlitz.

DESIGN MANAGEMENT AS A DOMAIN OF SMART AND SUSTAINABLE
ENTERPRISE: BUSINESS MODELLING FOR INNOVATION AND
SMART GROWTH IN INDUSTRY 4.0 244

Serene Dalati.

THE IMPACT OF SERVANT LEADERSHIP ON LEADERSHIP
SUSTAINABILITY: EMPIRICAL EVIDENCE FROM HIGHER EDUCATION
IN SYRIAN UNIVERSITIES 269

David L. Fuschi, Manuela Tvaronavičienė.

A NETWORK-BASED BUSINESS PARTNERSHIP MODEL
FOR SMEs MANAGEMENT 282

Manuela Tvaronavičienė.

START-UPS ACROSS THE EU: CONSIDERATIONS ABOUT
SUSTAINABILITY ASPECTS 290

Publisher



The International Journal

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

ISSN 2345-0282 (online) <http://jssidoi.org/jesi/aims-and-scope-of-research/>

2016 Volume 3 Number 3 (March)



„The paper was published with support from the Baltic-German University Liaison Office from funds of the German Academic Exchange Service (DAAD)”

E-Residency: A BUSINESS PLATFORM FOR INDUSTRY 4.0?

Gunnar Prause

*Tallinn University of Technology
School of Economics and Business Administration
Akadeemia Tee 3, 12618 Tallinn, Estonia*

E-mail: gunnar.prause@ttu.ee

Received: 16 November 2015; accepted 20 January 2016

Abstract. E-government is a popular topic on the political agenda and many countries are working on the development and improvement of e-services. But e-government is more than the provision of public services electronically – it also means the implementation of consequent process-oriented procedures supporting management and organisational structures within public and private institutions. Until now the customers’ needs, especially the requirements of entrepreneurs and small and medium-sized enterprises (SME) in the context of international supply chains have not been in the focus of most e-governmental service developments. This may change with the spread of Industry 4.0 which aims for the fusion of the virtual and the physical world paving the way to smart production and logistics solutions touching the entire supply chain from product design and development, operations management and logistics to distribution. But Industry 4.0 also requires new business models and structures together with new concepts for managing information and business administration. A first big step towards the implementation of such Industry 4.0-oriented business concept is embodied by the Estonian development of “e-Residency”, which might be an appropriate e-business approach for Industry 4.0 and which takes into account the perspective of internationally operating entrepreneurs and SME’s. Currently, companies start to gain first experience with concepts like production in networks or smart logistics and they begin to develop new organisational structures and models to benefit more from the opportunities that the new technology offers. The paper addresses the research question of how the e-residency concept might facilitate the development and implementation of Industry 4.0 and how entrepreneurs and SMEs may benefit more from new Industry 4.0-related business models by using the e-residency platform of Estonia.

Keywords: e-Residency, Industry 4.0, e-Services, SME, Supply Chains

Reference to this paper should be made as follows: Prause, G. 2016. E-Residency: a business platform for Industry 4.0?, *Entrepreneurship and Sustainability Issues* 3(3): 216-227.

DOI: [http://dx.doi.org/10.9770/jesi.2016.3.3\(1\)](http://dx.doi.org/10.9770/jesi.2016.3.3(1))

1. Introduction

Government seems to be a major factor influencing the development of SMEs development (Smallbone and Welter, 2001). Consequently, European Union and most countries explicitly consider e-government as an instrument for cutting red tape. But e-government is more than the provision of public services in an electronic form – it also means the implementation of consequent process-oriented procedures, i.e. the design of e-governmental solutions should cope with the organisational structures of business and public administration and it should also map the organisational perspective into technical substructures (Reidolf and Prause, 2012). It is, therefore, important to understand the needs of the target groups of e-government services in order to create suitable e-service solutions. But studies show that there are already big differences in the e-governmental landscape in the countries around the Baltic Sea as well as in the needs of small and large companies (Lille and Prause, 2009).

This challenge also appears during the design of e-services for smart production and logistics, especially under the frame condition of internationally operating entrepreneurs and SMEs. Recently the whole production field is characterised by increased interest since after long time of decline, manufacturing and re-industrialization enjoy a renaissance on the Western economic agenda because politicians, business leaders and scientists recall the role of the industrial sector as a key driver of research, productivity, and job creation. Industry generates 80% of the EU's private innovations and 75% of its exports. Despite these facts a view into the statistical figures reveals that the global share of European manufacturing value added dropped from 36% in 1991 to 25% in 2012 (Veugelers, 2013; Heymann and Vetter, 2013; Dudzevičiūtė, 2013; Tvaronavičienė, 2014; Grubicka, Matuska, 2015).

Many manufacturing initiatives have been started in different parts of the world and a very promising approach seems to be the fusion of the virtual and the real world, i.e. the linkage between internet and manufacturing aiming to develop cyber-physical systems (CPS) and dynamic production networks in order to achieve flexible and open value chains in manufacturing of complex mass customization products in small series up to lot size 1 (Ramsauer, 2013). The German approach has been called “Industry 4.0” and aims also for energy and resource efficiency, increased productivity, shortening of innovation and time-to-market cycles together with a horizontal and vertical integration through value networks and an end-to-end digital integration of engineering across the entire value chain. Internet-linked production facilities and networked manufacturing systems open up a machine-to-machine-communication and interaction (Kagermann et al., 2013; Gerlitz, 2015). The successful realisation of Industry 4.0 requires R&D activities and progress in eight key areas comprising standardisation and open standards for a reference architecture, the management of complex systems, the delivering of a comprehensive broadband infrastructure for industry, safety and security issues, work organisation and work design in digital industrial age, specific training and continuing professional development, an appropriate regularity framework as well as resource efficiency. But the R&D needs for Industry 4.0 go far beyond sophisticated production expertise, what is also required is especially ICT related knowledge covering cyber security, e-commerce and e-government (Prause, 2015a; Štītīlis, Kliškauskas 2015.).

By scanning the European arena of e-services it turns out that the Republic of Estonia represents one of the leading e-governmental countries in Europe and it is the first country worldwide which offers a transnational digital identity called “e-Residency” (e-Estonia, 2015). “e-Residency” is a sophisticated form of e-business allowing an entrepreneur or SME employee to administer a location-independent business online, i.e. “e-Residency” and offers the opportunity to run a trusted company online. As Prause (2015b) pointed out the concept of e-residency is in line with ongoing approaches in the context of Industry 4.0 trying to realise the fusion of the virtual and the real world, i.e. the linkage between internet and manufacturing leading to concepts of smart supply chain management. Until now, only little research has been carried out

on the requirements of e-governmental services in the context of Industry 4.0. The literature review of existing e-governmental solutions focusing on Industry 4.0 especially for entrepreneurs and SME indicates a research gap in this specific field. For this reason, the paper addresses the research questions of how e-services for Industry 4.0 might look like and why the concepts of Industry 4.0 and e-residency might be complementary by taking into account the needs of internationally operating entrepreneurs and SMEs. The paper is subdivided into the following parts. First part provides the theoretical background for Industry 4.0 together with related e-governmental services with an emphasis on the needs of the SME sector. Afterwards, the research methodology for the empirical part is described. Subsequently, the empirical results of the conducted expert interviews, case studies and workshops are presented and discussed. Finally, the paper finishes with conclusions and implications.

2. Theoretical background

In order to spur manufacturing, re-industrialisation and industrial competitiveness in Western countries new concepts for smart production and logistics have been started. A promising approach seems to be the fusion of the virtual and the real world, i.e., the linkage between internet and manufacturing. In Germany, the most important industrial EU country, this approach has been called “Industry 4.0”. Industry 4.0 aims to develop cyber-physical systems and dynamic production networks in order to achieve flexible and open value chains in the manufacturing of complex mass customisation products in a small series up to lot size 1.

But Industry 4.0 has even higher ambitions, targeting energy and resource efficiency, the shortening of innovation and time-to-market cycles, as well as a rise in productivity. In this sense, Industry 4.0 represents nothing less than the fourth industrial revolution, comprising 3D printing, big data, Internet of Things and Internet of Services, i.e., all of the ingredients needed to facilitate smart manufacturing and logistics processes. Thus, Industry 4.0 shall bring the competitiveness in the manufacturing and high-tech sectors back to Western countries with particularly promising perspectives for the BSR due to their high innovation level, sophisticated ICT infrastructure, and highly qualified workforce (Kagermann et al., 2013). Industry 4.0 leads to new supply chain paradigms based on complex and intertwined manufacturing networks with changed roles of designers, physical product suppliers, clients and logistics service providers making it possible to identify and to trace single products during their entire life-cycle and even more because in industry 4.0 it becomes possible for products to organise and choose their own way through the production and related logistics processes (Bauer et al., 2014).

The fusion of cyber space and material world in Industry 4.0 leads to virtual structures in the value and supply chains, which require organisational and managerial tasks for related cross-company operations processes in networks touching manufacturing, logistics and distribution (Sydow and Möllering, 2009). These management tasks are realised and controlled by information flows within the Industry 4.0 networks and they are running parallel to the physical value and supply chain flow (Jacobs and Chase, 2014). Consequently, the physical value streams in Industry 4.0-related supply chains require an appropriate cyber-platform to be able to control the parallel information streams and to handle the related business administration tasks.

When it comes to the online administration of location-independent business the Republic of Estonia represents one leading actor in Europe offering to anyone who is interested in a transnational digital identity such internet-based business solutions. A very sophisticated form of e-business which Estonia offers as the first country worldwide is called “e-Residency” which comprises a government-issued digital identity enabling the user to run a trusted company online. One important target of Estonian e-residency is to unleash the world’s entrepreneurial potential but the e-residency concept is also compatible with ongoing approaches in the context of Industry 4.0 since it realises the fusion of the virtual and the real world in the context of smart supply chain management. It emphasizes and recognizes, furthermore, the needs of the SME sector which are crucial for the success of the Industry 4.0 approach since European manufacturing backbone is dominated by SMEs which combine highly developed ICT skills with high flexibility and innovation (Prause, 2015b). But offering only e-service solutions for SMEs are not sufficient to capitalize the opportunities and efficiencies of Industry 4.0, also new business models and structures are required (Prause, 2015b). Since Industry 4.0 aims to create a horizontal integration, the new

Industry 4.0–related value chains will be take place in complex and intertwined manufacturing networks, where the underlying supply chains can be characterized by a high degree of fragmentation (Dujin et al., 2014). This fragmentation leads to lower entry barriers for SMEs as well as to new R&D strategies in multinational value chains between advanced and emerging countries and these developments spur again creation of new business models (Belussi and Sedita, 2010).

The organisational aspects of this fragmentation were discussed by Olaniyi and Reidolf (2015) who showed the compatibility of fractal structures with Industry 4.0 by highlighting self-similarity, self-organization, self-optimization, goal-orientation, and dynamics as winning attributes of flexible and adaptable manufacturing organizations. The fractal approach also embraces intrapreneurship aspects, decentral and lean structures, dynamic and adaptable organisations and cooperation as well as the importance of high performing ICT systems for the linkage of the fractal units (Warnecke 1996). But the limitation on structural aspects for Industry 4.0 is too narrow to deploy the full potential of Industry 4.0; also new business models are necessary (Kagermann et al., 2013; Prause 2015b). Already control of information streams for cross-company value chains in the networks of cyber physical systems of Industry 4.0 require e-services for related business administrative processes which must be imbedded in a coherent way into the Industry 4.0 structures. When developing these e-services it must be kept in mind that especially for small firms the costs for implementation and updating of hard- and software and the transaction costs are often so important that benefits do not matter (Eierle, 2008). There exists also the threat of a digital divide between large and small firms (Lockett and Brown, 2006). A special problem field for small firms emerges when the legislation is changing quickly or is so complex that special experts like tax advisers or consultants should be hired and the costs are raising remarkably (Smallbone and Welter, 2001). ICT can help to reduce transaction and administrative costs and enhance productivity and efficiency of technologies. So policies should encourage SMEs to use ICT as studies show that ICT users are more likely to innovate (Higon, 2011). Research results show that those companies that make greater use of the Internet for their business processes are indeed those that have greater and sustained growth (Amoros et al, 2007).

3. Methodology

Until now, little research has been carried out on the requirements of business administration processes in the context of Industry 4.0 and corresponding e-services. For this reason, the paper addresses the research questions of how e-services for Industry 4.0 might look like and why the concepts of Industry 4.0 and e-residency might be complementary by taking into account the needs of internationally operating entrepreneurs and SMEs.

The results of the paper are based on a mix of empirical methods for data collection and data analysis and the underlying research design can be described as flexible according to Robson (1993) since the research uses mainly a qualitative approach. The present qualitative research uses desk research, in-depth interviews with entrepreneurs and e-government experts, which were conducted during two European projects. The first project was carried out within the FP7 programme between 2013 and 2016 and is called “Crossing Boundaries” aiming for the exploration of the processes, challenges and implications on innovation performance of knowledge and technology transfer across national boundaries (CB, 2016). The second project is called “EgoPrise” and it ran in the frame of the BSR Interreg programme between 2010 and 2012 with the aim to make public authority services more receptive to the needs of businesses, especially for the benefits of small and medium-sized enterprises in rural areas of the Baltic Sea region (Prause et al., 2012). Whereas the focus of the “Crossing Boundaries” project was more on transnational innovation processes, the main objective of the “EgoPrise” project was to understand the requirements and needs of e-government services from the perspective of entrepreneurs and SME from the countries around the Baltic Sea.

The qualitative research in the framework of this article included narrative research which comprises for both projects of expert interviews with SMEs, representatives of public administration on state or regional and local level, entrepreneurs, and with entrepreneurship umbrella organizations in Estonia, Finland, Germany, Latvia, Lithuania and Sweden. The

collected information has been restored and transformed into country-based narrative chronologies and finally summarized into a Baltic Sea collaborative narrative (Creswell 2003; Clandinin and Connelly, 2004). The final data analysis was made using thematic content analysis of the narrative following Anderson (2007). The expert interviews were completed on the bases of case studies mainly in Estonia. Since all the business sectors were represented in the EgoPrise project also the context of Industry 4.0 was investigated. The paper explores in depth through the case study the organisational and administrative structures and business processes of an Estonian high-tech company and the impact and potential of Estonian ICT and e-service infrastructure for the company's success. Complementary, a quantitative survey was conducted in the frame of the EgoPrise project between 2010 and 2013. The questionnaire consisted of closed and open questions which covered, besides the topics of access to e-government services and the assessment of efforts to follow information obligations, concrete questions concerning missing e-services and suggested improvements of existing e-government services from the perspective of SMEs. All together around 400 SMEs from different BSR countries with a focus on Estonian, German, Lithuanian and Swedish enterprises were randomly sampled from the entire population of SMEs and SME managers or entrepreneurs answered the questions in telephone interviews.

4. Business Administration for Industry 4.0

The fusion of cyber-world and material world in Industry 4.0 induces virtual structures in the value and supply chains which require organisational and managerial tasks for related cross-company operations processes in networks to control the related information and material flows (Sydow and Möllering, 2009; Jacobs and Chase, 2014). Consequently, the physical value streams in Industry 4.0-related supply chains require an appropriate cyber-platform to be able to control the parallel information streams and to handle the related business administration tasks. Compatible e-services have to fulfil the corresponding business administration tasks and they have to be developed and created according to the user needs.

An empiric survey was launched in the Baltic Sea region in the framework of the EgoPrise project and gave an inside view about the demands and needs concerning e-services for internationally operating entrepreneurs and SMEs (Prause et al., 2012). Firstly, the survey results confirmed the observation made by Lille and Prause (2011) that the needs and expectations towards e-services depend also on the company size and the business sector. Secondly, they revealed that there exists a huge difference among the countries investigated concerning the governmental online-ability. Furthermore, the results of the study showed that even in highly developed e-government countries the offered e-services are scattered between varieties of different web-sites so that they are not integrated and they do not reflect the business processes and needs of companies. Finally, an important point was related to safety issues since SMEs can be only encouraged to use new ICT services when trusted third parties are able to confirm the safety and usefulness of the system, which emphasises results from Lockett and Brown (2006). Especially internationally operating SMEs and entrepreneurs pointed out the need for standardized, secure, integrated and culturally independent e-services in order to facilitate transnational operations. Consequently, these results confirm the findings of Beckinsale et al (2011) who pointed out, based on studies of ethnic minorities, that to fight digital divide and to facilitate transnational and intercultural entrepreneurial activities standardized processes between countries would help enormously to support operations and to decrease administrative burdens.

By taking into account these considerations, the Estonian Government spurred investigation to improve and internationalise their in European context already highly developed e-governmental system. Recently, the Estonian ministry of Economic Affairs and Communication initiated a study for analysing the sore points for entrepreneurs and SME's participating in international supply and value chains (e-Estonia, 2015). The results of these investigations brought to light that the crucial business administration tasks for internationally operating SMEs and entrepreneurs are related to incorporation and

administration of legal entities, contracting with clients, suppliers and other companies, access to banks and payments, invoicing as well as exchange with legal and public authorities including taxation (e-Estonia, 2015). These business administration tasks are exactly those which are necessary to control the information streams which are related to material value added streams of transnational supply chains in the context of Industry 4.0 (Figure 1; e-Estonia 2015).

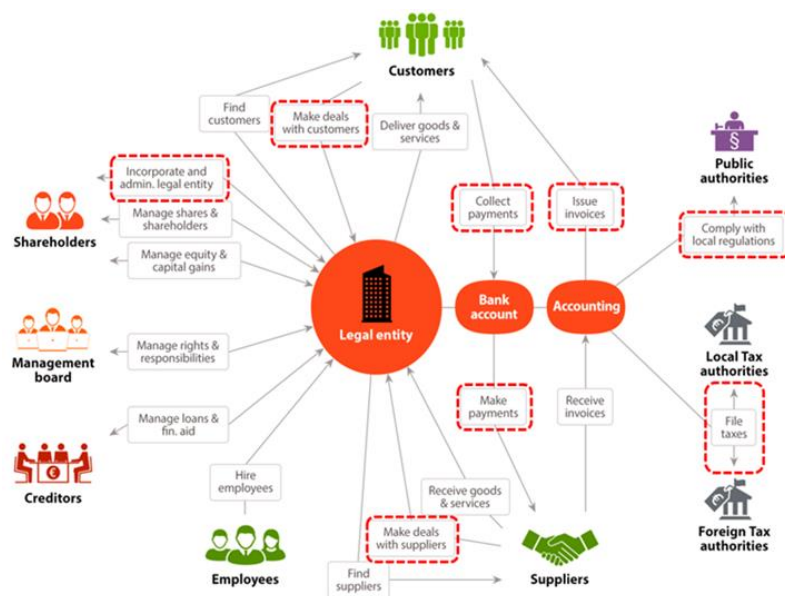


Figure1. Crucial business administration tasks of supply chains for entrepreneurs

Source: e-Estonia (2015)

An additional aspect of the survey of the Estonian ministry of Economic Affairs and Communication is depicted in figure 1 highlighting that all stakeholders of a company and its full supply chain are considered in the business administration approach comprising of customers, employees, shareholders, creditors, suppliers, company management and public authorities.

In this sense a transnational business administration platform for Industry 4.0 should consist of a concept that represents the fusion of the cyber and business administration world and which possess the potential to spur the evolvement of further international business models in the context of Industry 4.0, especially for internationally operating entrepreneurs and SME's. In accordance with these reflexions the Estonian e-residency offers a transnational digital identity to internationally operating SMEs and entrepreneurs which is equipped with a portfolio of integrated, standardised, secure and multi-lingual (Estonian, English and Russian) e-services.

The attributed digital services of e-residency are enabling a secure and convenient way to sign and verify the authenticity of digitally signed documents and contracts, to encrypt and transmit documents securely, to establish an Estonian company online and to administer the company from anywhere in the world. Linked to e-residency is the possibility to conduct e-banking and remote money transfers, which represent the payment opportunity of European banking and access to Single European Payment Area (SEPA) system as well as to EU legal space including the advantage of quick and cheap financial transactions inside EU, contracting and enforcing in a reliable Estonian law system as well as the possibility of a remote foundation of an Estonian holding company.

Additionally, the e-resident is able to participate in the highly developed Estonian e-government system comprising the declaration of Estonian taxes online as well as all other efficient and easy-to-use e-services (e-Estonia, 2015).

But Kaspar Korjus (2015) continues that e-residency services will not only be limited to services offered by the Estonian state so that e-residency gets an international and non-public dimension: “On the contrary, it is our wish and expectation that the private sector will start to develop new services. We can create great conditions for it”. In the meantime private players like LHV, Stripe and PayPal enter the game. An important question in academic literature is how to encourage entrepreneurs to use e-government services. Usually dissemination and learning process should be started with promotional campaigns and success stories to build experience of using e-government services and to improve social characteristics and knowledge of the end users in order to widen the number of users (Warkentin et al, 2002; Mahadeo 2009). In the case of Estonian e-residency program the development was different since director Kaspar Korjus (2015) states that “What we aim to do is to create a worldwide virtual business environment, where people from both the developed and developing countries can easily become entrepreneurs and start doing business anywhere in the world. Physical national borders and restrictions will no longer present an obstacle. You can start a business, open bank accounts, make transactions, sign contracts and even declare taxes, all on your computer”. And it seems that there is a huge demand for those e-services from entrepreneurial side because Korjus (2015) continues that “When we went live with the e-estonia.com/e-residents page some months ago, we received over 4,000 applications in 24 hours from people who wished to be kept informed about the e-residency launch. Those contacts came from 140 different countries”.

Considering this the approach of the e-residency can be considered to be a fusion of the cyber and business administration world, which might play the role of international business administration platform for Industry 4.0 and possess the potential to spur the evolvement of further international business models in the context of Industry 4.0, especially for internationally operating entrepreneurs and SME’s. The “remote” option of e-residents enables entrepreneurs everywhere in the world to use via Estonia a platform for transnational business operations. As a long term advantage entrepreneurs are able to receive an EU-residency after having bought real estate in Estonia. The special advantages for the Estonian side are to develop Estonia via the e-residency to an international business hub with growing service offers for foreign entrepreneurs and investors in the fields of finance, consultancy, accountancy and law services (Prause, 2015c).

4. An Estonian case study

How e-services may contribute to internationally operating SME shall be demonstrated by a case study which is dedicated to a very successful Estonian production company Meritex OÜ (the authors changed the company name for publication). The company produces maritime functional wear and has its management headquarters in a rural area in Western Estonia whereas it operates on highly developed foreign markets like Germany, Sweden and UK. In this sense the case study also highlights the impact of the specific Estonian ICT infrastructure together with its cyber system for rural development as well as how the Estonian e-residency concept spurs the evolution of successful international operations of this SME. Meritex has been a research object in “Crossing Boundaries” project where it was studied how the company became a European market leader in functional maritime wear and how strongly the company’s success was linked to innovation and to well-developed internet access of large parts of the Estonian rural areas (Olaniyi and Reidolf 2015; Prause 2015b). A sophisticated internal company ICT together with well-developed Estonian ICT infrastructure facilitates the high innovation performance, which is necessary to keep the market leader position of Meritex and which stresses again the observations of Higon (2011).

Meritex OÜ started in 1993 and is currently employing a staff of more than one hundred people in four production locations in Estonia. The business operations are distributed all over the world comprising global sourcing of smart materials from China, USA, Sweden, South Korea and Taiwan, R&D activities in Germany and Estonia, cutting and production of

components in Estonia, sewing in Estonia and Ukraine, and the final assembly in Estonia. Nearly all sales activities are located outside Estonia. The fragmentation of the value and supply chains which are characteristic for Industry 4.0 can be observed also in the case of Meritex touching the purchasing and sourcing processes, R&D activities, integration of “remote” expertise via telework places as well as the manufacturing value chain of the company. The production processes between the company locations in Estonia and Ukraine are interrelated and synchronised by an integrated company-wide goal system and standardized trans-location processes, which are fixed and illustrated by multi-media process documentation including e-learning tools. These activities are related to sewing work which is done in Narva (Estonia) and Ukraine. The core competence and related technologies however are guarded and kept in the Estonian locations comprising the main warehouse, ICT, as well as other complicated and technical processes like cutting, prototypes and high-end products. For example all the parts are cut in Estonia, shipped to Ukraine and other places for sewing and then shipped back to Estonia for final assembling. Even by taking into account the costs for outsourcing to Ukraine including logistics it turned out that these costs are only half as high when compared to a complete production in Estonia. But the well-developed Estonian ICT and internet infrastructure played also a crucial role for the company’s success within Estonia and the synchronization of the work in the different Estonian company facilities which are also linked via cyber services.

The Estonian e-governmental services make it possible to run the company operations from the countryside and to manage nearly all business–government tasks related to taxation issues, permits and other applications online in a very efficient 24/7 mode. Beyond that the e-services of e-Estonia are additionally facilitating and visualizing internal company processes like travel statements, holiday declarations, overtime accounting, settlement and exchange of contracts as well as payments since all these organizational tasks can be handled, signed and exchanged electronically between employees and company administration. Consequently, big parts of internal business administration tasks including human resource management issues, financial topics and contracting can be organised online. By using these e-services the company was able to mitigate the lack of high-qualified workforce in the rural areas by integrating needed know-how of Estonian experts and specialists into the Meritex organisation via telework and remote work places in the cities of Tallinn and Tartu. In parallel, the company deployed over the years intensive training and educational activities at their locations which generated a large number of highly-qualified and sustainable workplaces in their rural areas over the last 20 years.

Meanwhile Meritex developed its markets and exports all over Europe with high market shares in Denmark, Finland, France, Germany, UK and Sweden as well as in Australia, whereas the main competitors from other EU countries export only up to five countries. The success story is closely linked to concepts combining smart production and supply chain management on the bases of the smart Estonian cyber and e-service infrastructure which is available even in rural areas. This cyber infrastructure enables Meritex to run distributed multi-national operations and to implement business administration concepts for online management including the marketing activities of European sales which was organised via sales agents representing their national markets. By doing so Meritex demonstrated that even in rural areas high–tech entrepreneurship can be successfully implemented and rural shortcomings like brain drain, elderly population, lack of highly qualified workforce and deficits in mobility can be mitigated. The presented success story of Meritex was based until now largely on the fruitful symbiosis of technology, smart production, innovation and supporting e-services for related business administration processes. Unfortunately these e-services were restricted till 2015 to Estonian citizens and the related business operations were restricted to Europe. With the introduction of e-residency for all citizens of the world this success story has the chance to get globalized.

5. Implications and Discussions

Already the original e-governmental services of Estonia besides the digital identity enjoyed a lot of features which followed the recommendations of Beckinsale et al (2011) including integration, standardisation and multi-lingual e-services in Estonian, English and Russian language enabling entrepreneurs and SMEs the online administering of location-independent

business. The restriction to Estonia and Europe has been removed with the introduction of the e-residency concept which opened up from 2015 the opportunities of the service portfolio of e-Estonia to all global citizens.

In the case of Meritex the availability of e-residency for partners and suppliers outside Europe has the possibility to facilitate the full global Meritex supply chain and accelerate the business operations beyond European Union. The related efficiency gains can be capitalized in contracting, purchasing, marketing, financial management via SEPA procedures between European banks as well as in the settlement of legal issues between business partners of Meritex by using Estonia as a business and legal platform. E-residency allows to handle and to manage all these tasks fully online under the precondition that the business partners of Meritex apply for Estonian e-residency and they open EU bank accounts. By doing so all business partners who are involved in the international Meritex supply chain are enabled to run via e-residency all related business administration tasks online including the Meritex sales representatives in Australia as well as all its suppliers in Asia, China and the USA, i.e. the use of e-residency services touches the full supply chain from marketing to contracting, payment, logistics up to delivery for low costs.

Additionally, e-residency enables the Meritex partners to handle online efficiently and quickly all governmental tasks related to Estonia. Further advantages are related to intra- and extra-company online processes in personnel management, financial transactions and exchange of information and material flows. This also applies to teleworkers inside and outside Estonia under the precondition of being an e-resident since all documents can be signed, transmitted and handled fully electronically so that the Meritex supply chain-related information and business administration tasks can be treated virtually, i.e. e-residency integrates and brings efficiency and business benefits to all stakeholders in the value chain. But the apparent fragmentation of the value and supply chains require more workflow-oriented solutions which integrate cross-company use of the e-residency services which are just starting to evolve. Here more R&D activities would be preferable.

In this sense e-residency might be considered as a concept for the management of information streams and business administration issues within supply chains in the context of Industry 4.0, focussing on the needs of internationally operating entrepreneurs and SME's and joining cyber – physical aspects in business administration (Prause, 2015a). Nevertheless this represents only a starting point for the final "Business Administration 4.0" concept since a recent survey from BITKOM et al. (2013) about the "prospects for Industry 4.0" revealed that standardisation, new business models, a regulatory framework and new concepts for process and work organisation were mentioned among the most important challenges of Industry 4.0, i.e. the Estonian first steps have to be continued within Europe as well as in other parts of the world because smart production and logistics together with their international supply chains is a global business (Kargermann et al. 2013).

As Dujin et al. (2014) pointed out Estonia enjoys already now a favourable position concerning Industry 4.0 readiness among the EU15 countries which is significantly strengthened after the launch of e-residency since it facilitates related business administration processes. But by following Prause (2015b) it can be stated that the opportunities of e-residency concept are also supporting new business models in the context of Industry 4.0 which are more geared towards individual, last-minute customer requirements, providing new solutions for dynamic pricing by taking into account the customers' and competitors' situations and by embracing openness and more networking and cooperation aspects between partners in the supply chain compared to now.

Conclusions

The Estonian e-residency concept represents a first step towards the fusion of the cyber and business administration world taking into account all stakeholders of a company and its full supply chain. The concept is open for international business models in the context of Industry 4.0 and due to its focus on internationally operating entrepreneurs and SME's it enables online business via Estonia. Special features of e-residency are access to the EU-banking system (SEPA) including the

advantage of quick and cheap financial transactions inside EU, contracting and enforcement in a reliable Estonian law system as well as the possibility of a remote foundation of an Estonian holding company including the favourable Estonian taxation system. Industry 4.0 aims to create a horizontal integration through value networks embracing open, cooperative and secure business models integrating all stakeholders of international supply chains, comprising of customers, employees, shareholders, creditors, suppliers, company management and public authorities, without neglecting the needs of entrepreneurs and SME.

The case study of an Estonian SME with intensive international business operations revealed the potential and the impact of the Estonian portfolio of e-services and pointed out that e-residency might play the role of international business administration platform for Industry 4.0. The case study together with the further discussions highlighted additional efficiency gains by using e-residency for non-European stakeholders in the international company supply chain. In this sense e-residency possesses important characteristics of a transnational business administration platform for Industry 4.0 extending the concept of fusion of the cyber and physical world to business administration processes. The case study also pointed out that this extension bears the potential to spur the evolvement of new business models in the context of Industry 4.0.

By summing up the Estonian e-residency offers a transnational digital identity to internationally operating SMEs and entrepreneurs which is equipped with a portfolio of integrated, standardised, secure and multi lingual e-services which enable the online administering of location-independent business. E-residency facilitates international business operations in the context of Industry 4.0 for entrepreneurs and SMEs and offers a portfolio of e-services which might play the role of suitable platform for the business administration processes of Industry 4.0. Further research is required to specify new e-services according to the needs of Industry 4.0

References

- Amoros JE, Planellas M and Batista-Foguet JM (2007) Does Internet Technology Improve Performance in Small and Medium Enterprises? Evidence from Selected Mexican Firms. *Akademia. Revista Latinoamericana de Administracion*, 039: 71-91.
- Anderson R (2007) Thematic content analysis (TCA): descriptive presentation of qualitative data. Available from Internet: <http://www.wellknowingconsulting.org/publications/pdfs/The-maticContent-Analysis.pdf>.
- Bauer, W.; Schlund, S.; Marrenbach, D.; Ganschar, O. (2014). Industry 4.0 – Volkswirtschaftliches Potenzial für Deutschland, BITKOM, Berlin.
- Beckinsale M, Ram M and Theodorakopoulos N (2011) ICT adoption and e-business development: Understanding ICT adoption amongst ethnic minority businesses. *International Small Business Journal*, 29: 193-219
- BITKOM; VDMA; ZVEI (2013). Survey “prospects for Industrie 4.0”, Frankfurt.
- CB (2016). <http://www.crossingboundaries.eu/>, access: 28.01.2016
- Clandinin, D. J.; Connelly, F. M. (2004). *Narrative Inquiry: Experience and Story in Qualitative Research*. 1st edition, Jossey-Bass.
- Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. SAGE Publications.

- Dudzevičiūtė, G. (2013). Lithuanian manufacturing trends in the context of developed and developing countries, *Entrepreneurship and Sustainability Issues* 1(1): 55-66 [http://dx.doi.org/10.9770/jesi.2013.1.1\(6\)](http://dx.doi.org/10.9770/jesi.2013.1.1(6))
- Dujin, A.; Geissler, C.; Horstkötter, D. (2014). INDUSTRY 4.0: The new industrial revolution, Roland Berger Strategy Consultants, Munich.
- e-Estonia (2015). <https://www.e-estonia.com> .
- Eierle B (2008) Filing Practice of Small and Medium-sized Companies: Empirical Findings from Austria. *International Small Business Journal* 26: 491-528.
- Gerlitz, L. 2015. Design for product and service innovation in industry 4.0 in emerging smart society, *Journal of Security and Sustainability Issues* 5(2): 181–198. DOI: [http://dx.doi.org/10.9770/jssi.2015.5.2\(5\)](http://dx.doi.org/10.9770/jssi.2015.5.2(5))
- Grubicka, J.; Matuska, E. (2015). Sustainable entrepreneurship in conditions of UN (Safety) and technological convergence, *Entrepreneurship and Sustainability Issues* 2(4):188–197. DOI: [http://dx.doi.org/10.9770/jesi.2015.2.4\(2\)](http://dx.doi.org/10.9770/jesi.2015.2.4(2))
- Heymann, E.; Vetter, S. (2013). Europe's re-industrialisation, DB Research, Frankfurt
- Higon, D.A. (2011) The impact of ICT on innovation activities: Evidence for UK SMEs. *International Small Business Journal*, March 14, 2011 0266242610374484 [Accessed 14 October 2011].
- Jacobs, R.; Chase, R. (2014). *Operations and Supply Chain Management*, 14th edition, McGraw Hill, 762p.
- Kagermann, H.; Wahlster, W.; Helbig, J. (2013). Recommendations for implementing the strategic initiative INDUSTRY 4.0, National Academy of Science and Engineering, Berlin/Frankfurt.
- Korjus, K. (2015). Estonia's e-residency goes global, *Estonian World* from 14. May 2015, Tallinn
- Lille, M.; Prause, G. (2009). *E-Governmental Services in the Baltic Sea Region*. Wismar: Wismar University
- Locket N and Brown DH (2006) Aggregation and the Role of trusted Third Parties on SME E-Business Engagement. A Regional Policy Issue. *International Small Business Journal* 24: 379-404.
- Mahadeo JD (2009) Towards an Understanding of the Factors Influencing the Acceptance and Diffusion of e-Government Services. *Electronic Journal of e-Government [e-journal]* 7(4), Available through: Routledge database.
- Olaniyi E. O; Reidolf, M (2015). Organisational Innovation Strategies in the Context of Smart Specialization. *Journal of Security and Sustainability Issues*, 5 (2), 213–227, 10.9770/jssi.2015.5.2(7).
- Prause, G. (2015a). Industry 4.0: New Perspectives for Smart Production and Logistics in the Baltic Sea Region, *Baltic Rim Economies*, 2015(4), p. 41.
- Prause, G. (2015b). Sustainable business models and structures for industry 4.0. *Journal of Security and Sustainability Issues*, 5 (2), 159–169, 10.9770/jssi.2015.5.2(3).
- Prause, G.; Hunke, K.; Thessel, F. (2012). *Transnational Aspects of End-user Oriented E-services in the Baltic Sea Region*. Berlin: Berliner Wissenschafts-Verlag.
- Ramsauer, C. (2013). Industry 4.0 – Die Produktion der Zukunft, *WINGbusiness* 3/2013, 6 – 12.
- Reidolf, M.; Prause, G. (2012). EGOPRISE Project: Results and Outlooks. In: Prause, G.; Hunke, K.; Thessel, F. (Ed.). *Transnational Aspects of End-user Oriented E-services in the Baltic Sea Region* (172–183). Berlin: Berliner Wissenschafts-Verlag.
- Robson, C. (1993). *Real-world research: A resource for social scientists and practitioner – researchers*. Malden: Blackwell Publishing.
- Shatreovich, V.; Strautmane, V. (2015). Industrialisation factors in post-industrial society, *Entrepreneurship and Sustainability Issues* 3(2): 157-172. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(4\)](http://dx.doi.org/10.9770/jesi.2015.3.2(4))

Smallbone, D.; Welter, F. (2001). The Role of Government in SME Development in Transition Economies. *International Small Business Journal*, 19(4): 63-77.

Štitilis, D.; Kliškauskas, V. (2015) *Journal of Security and Sustainability Issues* 5(1):45–57.

Sydow, J.; Möllering, G. (2009): *Produktion in Netzwerken: Make, Buy & Cooperate*. 2. Aufl. Vahlen. München.

Tvaronavičienė, M. (2014). If industrial sector development is sustainable: Lithuania compared to the EU, *Entrepreneurship and Sustainability Issues* 1(3):134–142. DOI: [http://dx.doi.org/10.9770/jesi.2014.1.3\(2\)](http://dx.doi.org/10.9770/jesi.2014.1.3(2))

Veugelers, R. (2013). *Manufacturing Europe's future*, BRUEGEL BLUEPRINT SERIES Volume XXI, Brussels, ISBN: 978-90-78910-32-9.

Warkentin, M.; Gefen, D.; Pavlou, P.A.; Rose, G.M. (2002). Encouraging Citizen Adoption of e-Government by Building Trust. *Electronic Markets [e-journal]* 12(3), Available through: In-formaworld database.

Warnecke, H. (1996). *The Fractal Company: A Revolution in Corporate Culture*, English Version in 1997, Springer, Berlin.

Gunnar PRAUSE is Professor for International Business in Tallinn School of Economics and Business Administration (TSEBA) of Tallinn University of Technology. Research interests: International Business, Entrepreneurship & SME – Management, Logistics, Innovation. He is Board Member of the Centre for Business Research and Development at the Department of Business Administration of TSEBA, Board Member of the Institute of Cooperative Studies at Humboldt University Berlin, Board Member of Baltic China Science Park Network. He is author of more than 100 scientific articles.

This is an open access journal and all published articles are licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/)

Copyright of Journal “Entrepreneurship and Sustainability Issues” © Entrepreneurship and Sustainability Center, All Rights Reserved

Publisher



The International Journal

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

ISSN 2345-0282 (online) <http://jssidoi.org/jesi/aims-and-scope-of-research/>

2016 Volume 3 Number 3 (March)

REGIONAL AIRPORTS' POTENTIAL AS A DRIVING FORCE FOR ECONOMIC AND ENTREPRENEURSHIP DEVELOPMENT – CASE STUDY FROM BALTIC SEA REGION

Anatoli Beifert^{1,2}

¹Tallinn University of Technology
Ehitajate tee 5, 19086 Tallinn, Estonia
and

²Wismar University of Applied Sciences
Philipp-Müller Str 14, 23966 Wismar, Germany

E-mail: anatoli.beifert@hs-wismar.de

Received 15 October 2015; accepted 10 December 2015

Abstract. Meanwhile it is generally acknowledged that accessibility belongs to major factors of economic attractiveness of metropolitan areas, other territories and peripheral regions. The aviation industry in general and airports' activities in particular contribute considerably to the improvement of regional accessibility. For some remote regions the airports are the only gateway to bigger hubs. However, due to the increasing competition in the aviation sector the airports and especially regional airports in Europe face structural and operational challenges nowadays. According to the report of the EU Commission: "The Future of the Transport Industry" the number of loss making small and regional airports in Europe is constantly growing. On the other hand the regional airports might crucial role in boosting economic development and entrepreneurship growth in regions. In this context, it is very urgent for regional airports themselves, as well as for regional policy makers, business and other relevant stakeholders to recognize the role of regional airports on the economic growth in their regions. As a response, this paper addresses to the evaluation and assessment of potential effects of regional airports on economic and entrepreneurship growth in their regions.

Keywords: regional airports, regional economic and entrepreneurship development

Reference to this paper should be made as follows: Beifert, A. 2016. Regional airports' potential as a driving force for economic and entrepreneurship development – case study from Baltic Sea region, *Entrepreneurship and Sustainability Issues* 3(3): 228-243.

DOI: [http://dx.doi.org/10.9770/jesi.2016.3.3\(2\)](http://dx.doi.org/10.9770/jesi.2016.3.3(2))

JEL Classifications: O34

1. Introduction

The transport sector, in direct and indirect meaning, is one of the main driving forces of European and global economies (EC, 2015a). The White Paper on Transport that is the main policy document on transport policy in the EU states: "Transport is fundamental to our economy and society. Mobility is vital for the internal market (...) enables economic growth and job

creation". In the overall transport sector, the air transport is considered to be one of the dominant modes for the passenger traffic over long and middle distances in Europe and worldwide. Air transport is playing also a vital role for the air cargo transport with a high value added or time sensitive goods (EC, 2014). European airports are responsible for employment over a million people, working directly or indirectly in aviation business, employed by airlines or by airports' operational environment, i.e. technical aircrafts' maintenance, logistics or catering services, retailing and or traffic control, etc. The aviation business in total contributes more than 140 billion euro to the European GDP (EC, 2015a, 2015b). Air transport is also considered as one of the main driving forces for the trade of innovative manufactures worldwide (IATA, 2015) and as an enhancer of the economic potential of a region (Goetz, 1992; Alkaabi & Debbage 2007; Debbage & Delk 2001). However, the number of loss making European airports (especially small and regional airports) is constantly growing (EC, 2014). In spite of growing losses, in order to secure accessibility to remote or peripheral regions, the regional or national public authorities keep on supporting the regional airports (Breidenbach, 2015). European regional policy makers have invested millions of euros in airports' infrastructure development, however today almost all regional airports depend on public subsidies. However, the new state aid rules for a competitive aviation industry, issued by EU Commission in February 2014, order the substantial cut of financial public subsidies of any art on the EU national or regional level for regional airports (EC, 2014). The main objective here is not to "recycle" the regional airports, but to stimulate them to operate on cost efficient, and profitable basis. On the other hand a number of experts argue that it is rather a false approach to focus on the monetary losses of the regional airports only, without recognising their importance for regional development and emphasize positive effects for the development of the regional industry (especially service and high-tech industry) benefit from airport's operation (cf. Sheard, 2014; Brueckner, 2003; Button & Taylor, 2000; Beifert, 2015, Rezk, et al. 2015). Bråthen (2003) merely economic point of view in terms of airports closure is not enough; he stressed the importance of regional development issues while conducting such an analysis. However, the provision and growth of transport services alone would not automatically lead to economic and regional development (Green 2007). In fact, it is economic and regional development that might lead to the growing demand for transportation services, and although the direct linkage between air transportation and economic growth does really exist, the causation is not completely clear (Button et al. 2010). Halpern & Bråthen (2011) pointed also that on the one hand the airports might act as primary facilitators for the economic and regional growth, providing accessibility and improving supply side components; on the other hand, it might be economic development (here: demand side) that determines demand and growth of transport services. Halpern & Bråthen further argue that the question if the demand or the supply in this context have the stronger effect.

In the framework of the EU funded project "Baltic.AirCargo.Net" (BACN, 2014) a number of regional airports in the Baltic Sea Region (BSR) have been analysed aiming, among other things, at assessing potential of regional airports and their role in the regional economic environment. The main findings of the BACN project demonstrated playing an essential role in improving regional accessibility and being an indispensable part of the European aviation system, especially regional airports face growing challenges; their relevance for regional development is being questioned now. This paper explores the potential of regional airports as economic and entrepreneurship driving forces for their regions. This paper is organised as follows: the theoretical framework showcases theoretical approaches to regional development, regional airports and their possible interdependencies. The following sections present, methodology, main findings of the case studies investigated in the framework of the BACN project and conceptual implications of regional airports that might improve their efficient participation in the regional economic growth, thus making the airports and their regions more profitable and attractive to invest in.

2. Theory and concepts

The roots of the location and regional theories related to transportation may be traced back to the works of Weber (1929), where he primarily focused on transportation costs, arguing that companies, while delivering raw materials and goods to the market, are trying to minimize the transportation costs (cf. Dawkins, 2003). The works of Hoover (1937) discussing

advantages from local agglomeration, such as large-scale economies, localization economies (i.e. businesses of the same industry collocate and cooperate in the same area) urbanization economies (i.e. colocation of companies from different industries), gave further impulses to the development of regional cluster theories (Porter, 1985). The works of Greenhut (1956) and Isard (1956) although focusing mainly on mathematical optimisation modelling of industry given the costs for transporting raw materials and final goods, argued that the business companies tend to locate near primary input sources, whereas the monetary weight of raw materials can be larger compared to the weight of the final goods.

The dedicated research studies focusing on the relation between air transport services and regional development may be traced to Ndoh and Caves (1995), investigating the influence of supply side of air transport on demand, arguing that the attractive accessibility may directly influence location decision-making and stimulate further economic activity. Percoco (2010) considers the role of infrastructure and especially of airports as one of the crucial factors of regional growth due to the increasing importance of air transport in connecting territories. The linkage between airports and regional development as well as the impact of accessibility on regional economic development by means of air transport has been also investigated in a number of other studies (Graham, 1995; Rietveld & Bruinsma, 1998; Shin and Timberlake, 2000; Horst, 2006; Hakfoort et al., 2001; Niemeier, 2001; Cherry, 2014). The scientific studies of Bogai and Wesling (2010), Baum et al. (2005), Hujer et al. (2008), Brueckner (2003) note the considerable effects of airports on regional employment structure, regional labour market and general regional economic growth. Boon et al. (2008), Hart and Mccann (2000) in their works also underline the economic effects and benefits from airports' operation on the regional development.

According to the supply-side theory, the availability of adequate transport infrastructure and provision of transport services will lead to economic development, and therefore the airports may be seen as catalysts for regional economic development, on the other hand according to demand-side theory, economic growth will increase the demand for the transportation services (cf. Rodrigue & Notteboom, 2013). While the relationship and interdependence between airports and regional economic development is considered to be very strong, the availability of supply side or providing air transportation would not automatically lead to regional economic development (Halpern & Bråthen, 2011). However, the causality discussion still remains open, i.e. is it an airport that stimulates the growth and economic development or it is economic development in a region that may boost the demand for air transportation services (Ndoh and Caves 1995; Green 2007; Button et al., 2010). Mukkala and Tervo (2013) also stressed the existing causality of airports to regional development in peripheral regions, pointing also out that in core regions this causality is less clear, however they clearly underlined that air transportation is a very significant factor for boosting economic development in remote regions.

Generally, the researcher in the framework analysis of the airports' impact on regional development differentiate between following impact factors: direct, indirect, induced, purchasing power effects of an airport's activities on the regional economic growth (cf. Malina et al., 2007 and 2008) and so-called catalytic impacts relating to the wider role of the airport on regional development (cf. York Aviation, 2004). According to Malina et al., (1) direct impact relates to the operation of the airport itself, direct economic activities of firms located in the airport' operational environment, employment and investments; (2) indirect effects arise from value chain of suppliers of goods and services related to the airport and airport's region; (3) induced effects are caused by the consumption demand of direct and indirect airport employees; and (4) purchasing power effects arise due to an inflow or outflow of demand for goods by the passenger flows. Baum et al. (2004) explained direct, indirect, and induced effects of air transport on a region in economic metric terms, such as employment or production value. Beyond this, the airports have a so-called (5) catalytic or multiplier impact by improving location attractiveness for businesses and tourism.

Although a number of studies focus on the first four types of airports' impact factors, since they are relatively easy to measure (cf. Hakfoort et al., 2001), Halpern & Brathen (2011) argue that catalytic impacts are the most essential function of an airport and regional development (cf. York Aviation, 2004). The catalytic impact of airports and air transport sector on regional development has been studied by several researchers (Robertson, 1995; Cezanne & Mayer, 2003; Cooper and Smith, 2005; Gloersen, 2005; Bandstein et al., 2009). The previous studies basically note that due to the fact that it not easy to differentiate catalytic impacts of an airport from other factors and due to their complex character, the identification and measurement of catalytic effects is seen as rather problematic. Halpern & Brathen (2011) identify two main types of catalytic impact of airports on regional growth: (1) catalytic impacts that relate to regional economic competitiveness, resulting from airports' export activities, business operations and productivity; (2) catalytic impacts that relate to regional accessibility and social development, arising from airports' potential to improve regional accessibility. Braun et al. (2010) differentiate catalytic impacts of airports on a region between (1) consumer surplus; (2) environmental social effects; and (3) economic spin-offs, whereas positive economic spin-offs may stimulate inbound investments, inbound leisure or business tourism and improved productivity; negative spin-offs relate to outbound tourism, outbound investment. Wittmer et al. (2009) noted also the importance of intangible economic catalytic effects of regional airports on economic growth, such as network capacity, skills and competences, structural and image effect, etc. Although the intangible impacts cannot be clearly measured, they also have a strategic economic and social effect on the regional development (Wittmer et al., 2009).

Technically, it is not an airport, but rather airlines or logistic services providers that execute passenger or airfreight services. An airport provides the required hard (e.g. runways, terminals, warehouses, catering, etc.) and soft (e.g. security regulations, air cargo screening, sky-guiding, etc.) infrastructure. In this perspective an airport might be also seen as a logistics cluster (Juchelka & Brenienek, 2016). The concept of industrial clusters is well recognized in academic research (Marshall, 1890; Porter, 2000). "A Cluster is a proximate group of inter-connected companies and associated institutions in a particular field, linked by commonalities and complementarities." (Porter, 2000, p. 254). The definition of logistics clusters however, is still disputable due to differences of spatial and economic approaches (Elsner et al. 2005). The researches generally identify global, national or regional logistics clusters (Rivera & Sheffi 2012). Wang (2015) views logistics clusters as "geographically concentrated sets of logistics-related business activities, which have already become one of the most important regional development strategies." Along with the classical advantages of the logistics cluster such as: know-how and expertise sharing, service and costs benefits, etc., the logistics cluster participants might utilise or develop common approaches in terms of (a) provision of the systematic services and acquire adequate benefits from other (regional, inter-regional, international) markets; (b) benefiting from positive feedback circle through cluster cooperation; (c) enhancing core regional and firms' competences; (d) acquiring sustainable driving forces for companies' competitive advantages (cf. Wang, 2015).

Furthermore, regional airports shall not be seen as simple locations that provide air transport services, but rather as an essential subject of regional development activities and regional planning policies, whereas their operational success might be one of the most important influencing factors (cf. Feldhoff, 2012; Beifert, 2013 and 2015). A number of researches argued a firm's (here: an airport's) impact on the regional development lies also on the strategic and operational success that mainly derives from the following three elements: diversity, differentiation and innovation of airport business (Prahalad & Hamel, 1990). In this context, the following theoretical concepts pinpointing diversification, differentiation and innovation potential internally (i.e. regional airport) and externally (market) for regional airports: Resource-Based View (RBV) (Wernerfelt 1984; Barney, 1991), competitive advantage and cluster theory by Porter (2000) including innovation management process are of a special importance. The resource-based view approach examines the competitive environment from "inside-out" aspect, dealing with the internal environment of a company (Prahalad & Hamel, 1990). In order to increase

an impact on the regional development, the regional airports need to optimise their performance strategy internally (organisation-based) and externally (market-driven), thus enhancing also their diversification and differentiation potential. As one of the bottlenecks for economic prosperity of an airport is often not accessibility, but rather the deficit of qualified manpower or resources in the airport's operational environment (EC, 2014), the airports shall not be reliant on a single or traditional revenue source, but rather on wider airports' potential and performance depending on efficient utilisation of the available resources in form of human or financial capital, intangible valuable or unique assets (Barney, 1991). In the framework of the opportunity-based entrepreneurship theory Drucker (1985) argues that entrepreneurs do not cause change, but use the opportunities that changes bring: "the entrepreneur always searches for change, responds to it, and exploits it as an opportunity". Stevenson (1990) further extends Drucker's opportunity-based model by including so called resourcefulness that identifies generally that the hub of entrepreneurial management means the "pursuit of opportunity without regard to resources currently controlled" (Stevenson, 1990, p 2). The entrepreneurship resource-based theory states that access to resources is an essential factor for the entrepreneurship growth (Alvarez & Busenitz, 2001). This theory underlines the important role of social, human and financial, resources; arguing that the access to resources stimulates the entrepreneurial ability to utilise discovered opportunities more efficiently (Davidson & Honing, 2003). Financial, social and human capital represents three classes of theories under the resource – based entrepreneurship theories. However, some regional airports often view new market opportunities as not promising or underestimate their strategic value due to their disruptive innovations character in the aviation and airport business (Beifert, 2015). But if those innovative concepts (e.g. Logistics Bonded Park or Airport Industrial Zone) are already utilised or offered by the nearest regional competitors, it might be often inefficient just to reduplicate them (Downes & Nunes, 2013). Osterwalder & Pigneur (2010) developed a comprehensive business model that includes nine elements: customer segments, value propositions, channels, customer relationships, revenue sources, key resources, key activities, key partnerships and cost structure, that might be considered as a basement assessment tool for a successful business operation. In this context it might be recommended that regional airports shall learn to identify these market opportunities and deploy them considering innovation business models and better bargaining potential of entrepreneurs, e.g. by utilizing of so called "air trucking services" (Beifert, 2013).

3. Methodology

Although a number of scientific research studies and empirical evidences are available nowadays that relate to such subjects as: logistics' clusters (e.g., Rivera & Sheffi 2012; Wang, 2015; Juchelka & Brenienek, 2016), airport's operational environment and their impact on the regional development (e.g. Malina et al., 2007, Braun et al., 2010; Halpern & Brathen, 2011), however it might be stated that much less attention has been paid to regional airports so far and the earlier studies have been focusing mostly on airport-hubs or metropolitan areas, whereas the perspective of regional airports and their potential impact on their region in terms of economic and entrepreneurship development has been studied less thoroughly (Mukkala & Tervo, 2012). Halpern and Bråthen (2011) also noted that catalytic impact of regional airports on regional development calls for deeper and wider research. Based on the above-mentioned theoretical concepts and earlier empirical evidences and it might be assumed that regional airports might have a strong potential to enhance economic growth and entrepreneurship activities in their regions. In the framework of this study the following research questions are investigated:

Question 1: What are the possible conceptual approaches to optimise or to enhance regional airports' impact on economic growth and entrepreneurship development in their region?

Question 2: What is the appropriate approach to evaluate potential of regional airports to boost economic growth and entrepreneurship development in their regions?

With regard to the above-presented concepts, it is argued here that regional airports acting as a gravity force for logistics cluster-building in a region and multi-layer business systems may be analysed by applying various assessment criteria found in the theoretical framework discussed above. The following presented assessment matrix is based on theoretical concepts

of direct, indirect or induced effects of airports on regional economic development (Malina et. al., 2008; Baum et al., 2004), catalytic impact (Bandstein et al., 2009; Halpern & Brathen, 2011), airports' clustering effect (Rivera & Sheffi, 2012; Wang, 2015), airports' internal success factors, i.e. RBV of Prahalad & Hamel (1990) as well as innovation and entrepreneurship growth of Osterwalder & Pigneur (2010).

As it has been mentioned before, due to the fact that the causality discussion of the impact relationship between airports' operation and regional growth still remains open, the author identifies here two main groups of the growth enhancers: (1) perspective of regional development (here: demand-side), by which regional airports may be considered as an object of regional economic growth where economic development in a region will boost the demand for the air transportation services and stimulate an airport's growth; and (2) regional airport's perspective (here: supply-side), whereby regional airports act as a subject of regional development, e.g. airport's activities may stimulate economic and entrepreneurship growth in its region. As a response to the first research question, the following assessment matrix evaluating regional airport's potential to influence economic and entrepreneurship growth might be suggested (Table 1).

Table 1. Regional airports' impact assessment and sustainable business model development

Perspective	Assessment criteria indicator
Regional Development Perspective (demand-side enhancers for airport's growth, i.e. regional airport as an object of regional development)	Regional accessibility
	Regional economic competitiveness
	Regional business concentration
	Regional density of high-growth and innovative enterprises
	Regional level of entrepreneurial and innovation activities
	Regional density of population
	Regional labour market
	Regional prosperity and purchasing power
	Regional level of skills and competences
	Regional network capacity, governance and coordination level
	Linkages of airports with other public & private R&D
	Linkage of airports with innovation policies
	Regional marketing activities
	Regional awareness of airport's capacities and value proposition
Regional Airport's Perspective (supply-side enhancers for economic and entrepreneurship growth, i.e. regional airport as a subject of regional development)	Airport's infrastructure
	Airport's extension potential for future clustering activities
	Level of direct airports' employment
	Level of indirect employment
	Level of value proposition
	Level of clustering activities, e.g. creating network of logistic service provider, building up logistical service centres, etc.
	Level of customer experience creation (e.g. airport marketing, corporate identity and branding activities)
	Value chain of suppliers of goods and services related to the airport and airport's region
	Level of competing sophistication (operational effectiveness and quality of micro-economic business environment)
	Level of entrepreneurship environment in airport's premises

Source: Author (based on airports' impact factors of Malina; catalytic impacts of Halpern and Brathen; RBV by Prahalad and Hamel; Innovation Business Canvas of Osterwalder and airports' clustering effects of Wang)

The author of this paper argues that the above-presented assessment matrix for the regional airports' assessment based on the consolidated theoretical frameworks based on airports' impact factors of Malina; catalytic impacts of Halpern and

Brathen; RBV by Prahalad and Hamel; Innovation Business Canvas of Osterwalder and airports' clustering effects of Wang enables comprehensive assessment of regional airports' potential on the economic and entrepreneurship growth.

The following assessment results and main findings presented in this paper have been based on secondary and primary data, including qualitative expert interviews and surveys that have been collected and produced in the framework of the EU funded research project Baltic.AirCargo.Net (BACN, 2014), financed by the EU Programme "INTERREG IVB, Baltic Sea Region", ERDF Funds. The empirical data was collected from diverse sources of evidence during the project life 2011-2014, i.e. primary empirical data sources in form of quantitative and qualitative observations of the involved project experts, researchers and relevant stakeholders. The evaluations, project documentation and observations gathered from respective project activities such as workshops, conferences as well as from the field notes from project meetings. Following target groups and relevant stakeholders participated in the surveys and expert interviews a) representatives from Transport Ministries and Airport Management; b) representatives from Transport and Logistics companies from participating regions; c) representatives from the academic side, c) expert from aviation sector, air cargo security and air cargo freight sector. In terms of the presented investigated case studies, 67 qualitative interviews were conducted and evaluated. The above-presented assessment matrix for regional airports' potential on regional development (cf. Table 2) has been chosen as a basement to present compliant evaluation analysis of the selected airport.

In the framework of the BACN project, in total nine regional airports from eight BSR countries have been analysed and evaluated. Parchim Airport (Germany) has been selected here as a demonstration case using an evidence-based method in order to assess the airports' potential as a driver for economic and entrepreneurship development in Mecklenburg-Vorpommern region (Germany). A case study approach shall generally draw an essential attention on contemporary study issues by addressing strategic question "know-why?" (Yin, 2009). Although the applied qualitative methods here may make it difficult to validate the presented events, it will enable to highlight the particularity and complexity of the single case evidences (Stake, 1995).

4. Main findings and implications

Parchim Airport is located in the county Ludwigslust-Parchim (area: ca. 4.752 square kilometre; population density ca. 45 per one square kilometre) near regional town Parchim in the State of Mecklenburg-Vorpommern, Germany. There are two main cities in the catchment area of Parchim airport, i.e.: Schwerin – ca. 44 km or 40 minutes by road, which is the capital city of Mecklenburg-Vorpommern region with ca. 91 thousand people and; and Rostock - ca. 111 km or 1,5 hours by road. The geographical transport and time distance by road from Parchim to the nearest airport-hubs are: to Berlin Tegel: 172 km, ca. 2 hours; to Hamburg: 131 km, ca. 1,5 hours. The geographical transport and time distance from Parchim to other operating regional airport, i.e. Airport Rostock-Laage is ca. 70 km or ca. 1 hour by road. The airport has been used for more than 70 years exclusively for the military purposes. In 2007 the airport was sold to a private investor LinkGlobal International Logistics Group Ltd. – a Chinese company that is the current owner of the airport. The airport has a direct connection to the highway A24, linking Hamburg and Berlin and beyond to the German and European long-distance transport network. Rail connections are limited to regional traffic, since no direct access to long distance train lines in Parchim traffic exists. No regular flights are offered in Parchim Airport at the moment. The new owners have planned the internationalization business model for the Parchim airport. The objective was to extend the site to an air cargo hub for transportation between Europe, Africa and Asia. Three flights a week were planned with an option for extension up to 30 flights a day. Furthermore, a sufficient logistics infrastructure was intended. These investments should be made in cooperation with Goodman Group. In 2007 two airfreight connections have been established, one to Zhengzhou (CGO) in the province of Henan and another to Urumqi (URC), the capital of the Xinjiang Uyghur Autonomous Region of China. The targeted frequency of service on these flight connections has not been achieved so far. In 2010 only 8000 tons of air cargo were handled, a volume that has to be considered as completely insufficient to guarantee a cost-effective operation.

For this reason more and more capacity utilization problems arise due to the fact that only a low activity rate can be achieved for the personnel and also the technical equipment (aircraft tugs, fire-fighting vehicles, etc.) needed for airport operations as well as for the offered logistic services. The current as well as the to-be expected volumes in air cargo transport are insufficient to generate the necessary revenues for maintaining operations at the airport. Relevant revenues coming from other business areas cannot compensate operational costs of Parchim Airport at the moment

Regional Development Perspective Evaluation of Parchim Airport

In the framework of the regional development perspective or evaluation demand-side enhancers for the airport's growth evaluation, the following assessment scale of the given criteria was applied (very good developed / provided: 5; adequate developed / provided: 4; average developed / provided: 3; insufficient developed / provided: 2; very poor developed / provided: 1). In the framework of BACN project, external experts (i.e. representatives from regional relevant business and policy structures, entrepreneurs and academic field) participated in the analysis of the Parchim Airport. The assessment of Parchim Airport's growth potential from the point of view of demand side perspective has shown the following results. The applied weighting scale of the assessment criteria has been based on the overall compilation of the experts' evaluations and the results of the experts' interviews fulfilled in the framework of the BACN project. The experts of the BACN project also pointed out that although this weighting scale might be very subjective, however it needs to be integrated in this or another form in the evaluation process, since the assessment criteria are not equal.

Table 2. Assessment of the demand side enhancer for the airport's growth

Assessment criteria (demand-side enhancers for airport's growth)	Weight scale	Criteria mean score	Total mean value
Regional accessibility	10%	3	0,30
Regional economic competitiveness	10%	3	0,30
Regional business concentration	10%	2	0,20
Regional density of high-growth and innovative enterprises	10%	2	0,20
Regional level of entrepreneurial and innovation activities	10%	3	0,30
Regional density of population	10%	2	0,20
Regional labour market	5%	3	0,15
Regional prosperity and purchasing power	6%	4	0,24
Regional level of skills and competences	10%	4	0,40
Regional network capacity, governance and coordination level	5%	3	0,15
Linkages of airports with other public & private R&D	2%	2	0,04
Linkage of airports with regional innovation policies	2%	1	0,02
Regional marketing activities	5%	4	0,20
Regional awareness of airport's capacities and value proposition	5%	1	0,05
TOTAL	100%		2,75

None of the given criteria has been evaluated as "very good developed / provided". The overall mean value of the evaluation of the demand-side enhancers on the airports' operation is slightly below average value. Only three criteria (i.e. regional prosperity and purchasing power, regional level of skills and competences and regional marketing activities) were evaluated as "good developed or provided" in the region. Two criteria indicators have been evaluated as "adequate developed / provided", i.e. linkage of airports with regional innovation policies and regional awareness of airport's capacities and value proposition. Although the criteria: "network capacity, governance and coordination level" in general has been evaluated as "average", a number of BACN experts saw here a big potential for improvements. In fact, the BACN experts mentioned that certain gaps in networking and communication from the side of the Chinese owner and relevant regional stakeholders such as public admiration of County of Ludwigslust-Parchim (co-owners of the Parchim Airport), German Customs Authorities, Ministry of Transport of Mecklenburg-Vorpommern do really exist.

Regional Airport's Perspective Evaluation

In the framework of the regional airports perspective or evaluation supply-side enhancers for the economic and entrepreneurship growth in the region, the same assessment scale of the given criteria were applied as by the demand-side enhancers (cf. Regional Development Perspective Evaluation of Parchim Airport). The assessment of Parchim Airport's potential impact on economic and entrepreneurial growth in the region, i.e. from the point of view of supply-side perspective has shown the following results.

Table 3. Assessment of the airport's impact on regional development

Assessment criteria (supply-side enhancers for regional development)	Weight scale	Criteria mean score	Total mean value
Airport's infrastructure, incl. tangible and intangible resources	10%	4	0,40
Airport's extension potential for future clustering activities	10%	4	0,40
Level of direct airports' employment	5%	1	0,05
Level of indirect employment	5%	1	0,05
Level of value proposition	15%	4	0,60
Level of clustering activities, e.g. creating network of logistic service provider, building up logistical service centres, etc.	15%	1	0,15
Level of customer experience creation (e.g. airport marketing, corporate identity and branding activities)	10%	2	0,20
Value chain of suppliers of goods and services related to the airport and airport's region	10%	2	0,20
Level of competing sophistication (operational effectiveness and quality of micro-economic business environment)	10%	2	0,20
Level of entrepreneurship environment in airport's premises	10%	2	0,20
TOTAL	1		2,45

None of the given criteria has been evaluated as “very good developed / provided”. Three criteria indicators (i.e. airport's infrastructure, incl. tangible and intangible resources, airport's extension potential for future clustering activities and level of value proposition) have been evaluated as “adequate developed / provided”. In fact, the airport's infrastructure belongs to one of the main tangible resources of Parchim airport: the new tower was built in May 2015, the length of the runway is 3000 meter, the airport has appropriate passengers and cargo terminals, including required security screening technologies. The following attributes have been mentioned by the experts as the airport's distinctive intangible resources:

- low costs operation airport;
- 24/7 operation, i.e. aircrafts are allowed to land and departure 24 hours daily and 7 days a week; no restriction to night flight operations;
- all types of aircrafts (incl. AN124 and A380) can be accommodated and handled at the airport, over-size cargo operations are possible;
- efficient customs services, that makes Parchim Airport's cargo terminal to dry a port.

So called “24/7” operation was mentioned as valuable or non-substitutable intangible resource of Parchim Airport. Comparing to other German airports, nowadays a number of official and civil discussion have been started to introduce a night ban for the state owned airports. Since Parchim Airport is in the private hands, the owners and the airport management claim that in the mid-term and in the long-term perspective, the 24/7 operation will be still valid for Parchim Airport and might not be questioned. Although considering expanding of the passenger traffic, Parchim Airport is clearly positioning itself as an international gateway to China with a strong focus on the air cargo. According to the current development plan,

the airport will be upgraded to ICAO 4F class airport. The experts evaluated the level of value proposition as “adequate” considering the air-cargo development model and cost-performance ratio.

It has to be mentioned that a number of various value added services does already exists or is being developed and implemented in Parchim Airport:

- Bond Logistics Park (partly realized)- a customs free zone, where cargo may be stored in the Customs Bond Warehouse, there is no time limitation and is treated as outside the boundary of EU or Germany, tax or duties will not be applied if cargo is purposed to be transit to other countries or Bond Zones, air cargo transit to other countries or Bond Zones via the Customs Bond Warehouse may be exempted for import procedures
- Customs Bonded Industrial Park (in planning) - the commodities could be assembled by various value added model under Customs bond. The commodities could be considered as “Assembled in Germany” or “Made in Germany” with value-added determination in the Bond Zone by EU regulations and policies. The goods from the EU countries’ “preferential origins” can enjoy reduced or zero tariffs in some countries (mutual agreements
- Bond Trade & Procurement Centre (in planning) - the commodities can be exhibited for trading or auction purpose. Import procedures will be required and tax & duty will apply only when cargo need to enter into EU markets. Cargo transit to other countries or Bond Zones via the Customs Bond Warehouse in Parchim International Airport is exempted for import procedures

However, in spite of above mentioned plans and already realized activities, the level of clustering activities in Parchim Airport has been ranked as “poor”. The experts underline the deficit of attracting factors for potential investors that might be connected also to a lack of targeted or direct communication as well as rather weak regional economic structure and the absence of the critical mass of local industries and companies. It has been further noticed to improve the level of operational effectiveness and quality of micro-economic business environment. In spite of the appropriate infrastructure, like runway and the newly built tower, the institutional and infrastructure framework in which the airport operates has been considered as “poor”. Furthermore, it has been stated that the current competitive advantage of Parchim Airport is based nowadays mostly on low costs model than on unique/innovative products and services.

5. Discussion

Due to growing social and political responsibility in terms of environmental issues, such aspects or impact analysis of an airport’s operation on environment might be also discussed. There are already a number of EU funded project that have started to examine airports as so-called environmental sensors. The possible implications of an airport in this direction might be mitigation of environmental impacts and risks, implementation of strategic plans to minimize noise and air pollution effects on the environment. At the moment some relevant regulations and standards imposed by EU and national current legislations shall motivate airports to pay more attention, in other words to invest in innovative and “green” technologies, e.g. technologies for the production of renewable energy on an airport’s territory, producing so-called ecological corridors that reconnect parts of the territory through environmental linear infrastructure, etc. This entire legislative framework, acting as demand-side enhancer may stimulate new entrepreneurship and innovation business activities within the nearest airports’ operational environment.

Furthermore, in according to the guidelines of the European infrastructure development plan for 2014-2020, the airport connectivity (especially in some remote regions) will be improved aiming at improving territorial synergy or networking between nearby airports as well as better integration of smaller and regional airports in common the organizational logistical network though extensive airports’ integration with local transport systems, e.g. railways and local buses. All these initiatives may also give an impulse for an airport’s growth, thus increasing complementarities, improving value proposition, diversification and specialisation of airports.

The BACN experts underlined also the importance for every region to be accessible. In our innovation-driven economies regional accessibility is very important both for people (both: tourists and businessmen) and companies. The regional airports might positively contribute to improving their regional accessibility and herewith economic and entrepreneurship growth in a region. The BACN experts mentioned that it might be also achieved through improved horizontal or networking cooperation between regional airports in the Baltic Sea Region. The distribution of the “weight” between the assessment criteria in the presented assessment model may represent a subject of future disputes and discussions. The experts of the BACN underlined that although this weighting scale might be very subjective, however the it needs to be integrated in this or another form in the evaluation process, since the assessment criteria are not equal. It has been further noted by BACN experts that this weighting scale is not a “universal” for every regional airport, but on the contrary the evaluation approach and the correspondingly applied weighting scale must be very individual, respecting the regional peculiarities, economic perspectives and regional stakeholders’ interests.

Specifically for Parchim airport it might be mentioned that one of the basic prerequisites for the successful realization of the current strategies is the assumption that innovative Chinese companies and entrepreneurs will start to settle in the airport area and build up a critical mass of interconnected companies, thus creating a cluster. However, the creation of such extraterritorial low-wage areas will be hardly possible today to enforce on a political level, as by adopting such a procedure fundamental structures of the German labour and social law would be questioned. The second problem is the use of the established brand Made in Germany which image would be permanently damaged and will cause severe and long-lasting loss of image to the German industrial reputation going far beyond the Parchim location if the quality standards are not properly met. Whether and to what extent the presented concepts can be realized, remains open. A key issue is the question for which companies the Parchim International Airport can be an attractive alternative to other airport locations in the Northern and Central German region. The visions with respect to the possible development of the site that have been propagated for a number of years will be presented in the next paragraph.

LinkGlobal presents visions of the future of a Parchim Bond Business Park with the aim to find users for the airport and the local logistics facilities. Advantages of this location are the favourable geographic situation in Europe, the technical equipment for all aircraft types, the cost effective structures with an operating time of 24 hours as well as the status of a customs free zone. The Bond Logistics Park, the Bond Industrial Park and the Bond Trade & Procurement Center essentially constitute the fundamentals of the Parchim Bond Business Park serving as its economic core. The Parchim Business Park will be complemented with an Asia Center as well as with a Business Cooperation Zone. With the help of these two the attractiveness of the Parchim location is to be increased.

Conclusions

Although the role of the European airports for socio-economic development can be hardly overestimated today, the number of loss making small and regional airports in Europe is growing. The regional airports face structural and economic challenges. Since the causality discussion about interdependent relationship between airports and regional economic growth still remains open, the author argues that the approach in evaluating of an airport’s potential influence on economic and entrepreneurial activities in a region shall be balanced, i.e. assessment of both perspectives might be necessary. The regional airports shall not be viewed as a transport infrastructure that provides air transport services, but rather as an essential subject and an object of regional development activities and regional planning policies, whereby an airport’s operational success might be one of the most important influencing factors on regional economic and entrepreneurship growth.

The main findings indicate that regional accessibility is very important nowadays, whereas normally it is not the absence or inadequate airport's infrastructure or an airport's extension capacities (e.g. for industrial bonded parks, warehouses, etc.) that make an airports' impact on regional development insignificant, but rather soft factors that might be improved, such as level of level of customer experience creation, level of value chain of suppliers of goods and services related to the airport and airport's region or level of competing sophistication (operational effectiveness and quality of micro-economic business environment. A special attention shall be paid to enhancing of clustering activities, e.g. though structuring and combining regional logistics services, creating efficient network of regional and inter-regional logistic service providers, coordinating airport's own service structure with relevant regional political and business stakeholders, etc.

The above-presented results demonstrated that the regional airports should better recognize their important role for the economic and entrepreneurship growth in their regions as well as accept their own dependence on regional prosperity, as well as improve their operational activities through better coordination with relevant stakeholders of their region.

References

- Alkaabi, K.A., Debbage, K.G. (2007). Air passenger demand and skilled labor markets by US metropolitan area. *Journal of Airport Management* 13, pp. 121-130
- Alvarez, S., Busenitz, L. (2001), "The entrepreneurship of resource based theory", *Journal of Management*, 27, pp. 755-775
- Bandstein, S., Stenérus, A.-S., Espinoza, N. (2009). A Social Analysis of Stockholm-Arlanda Airport: Impact of the Airport on Sweden and the Stockholm Region. FOI Swedish Defense Research Agency, Stockholm
- Baum, H., Schneider, J., Esser, K., Kurte, J. (2004). Standortfaktor Flughafen Frankfurt Main – Bedeutung für die Struktur, Entwicklung und Wettbewerbsfähigkeit der Wirtschaft der Region Frankfurt/Rhein-Main. Köln
- Barney, J. B. (1991). Firm Resources and Sustained Competitive Advantage, *Journal of Management* 17(1): pp. 99-120
- Beifert, A. (2015). Business Development Models For Regional Airports - Case Studies From The Baltic Sea Region. *Journal of Security and Sustainability Issues*, Vol. 5, pp. 199–212
- Beifert, A.; Maknyte, L.; Prause, G. (2013). SMEs Behaviour in the Air Cargo Supply Chain: Engagement, Performance and Strategy. A Regional Approach on SMEs Practices and Future Directions in Mecklenburg-Vorpommern. In: *Social Sustainability and Economic Security, Proceedings of the International Entrepreneurship Forum*
- Bråthen, S. (2003). The viability of regional airports in Norway – are the regional development issues adequately addressed? The Regional Science Association conference: reinventing regions in a global economy, Pisa, Italy, pp. 12–15
- Bråthen, S., Eriksen, K.S., Hjelle, H.M., Johansen, S., Lillebakk, L.M., Lyche, L., Sandvik, E.T., Strand, S., 2006. Social Impact of Aviation, Part 2: Case Studies, Report 0606b. Møreforsking Molde, Molde
- Braun, T., Klophaus, R., Lueg-Arndt, A. (2010). Wider economic benefits of air transport: estimating consumer surplus for Germany. *Proceedings of 12th World Conference of Transport Research*, pp. 11-15
- Breidenbach, P., (2015). Ready for Take-off? The Economic Effects of Regional Airport Expansion. *Ruhr Economic Papers*, Ruhr-Universität Bochum (RUB), Bochum, p. 4
- Bogai, D., Wesling, M. (2010). Großflughafen Berlin Brandenburg: Analyse Airport Beschäftigungspotenziale in Berlin und Brandenburg. IAB-Regional, Berichte und Analysen aus dem regionalen Forschungsnetz, IAB-Regional Berlin-Brandenburg 02/2010, Berlin-Brandenburg

- Boon, B., Davidson, M., Faber, J., Nelisson, D., van de Vreede, G. (2008). The economics of Heathrow expansion. Final report. CE Delft, Delft
- Brueckner, J. (2003). Airline traffic and urban economic development. *Urban Studies*, Vol. 40(8), pp. 1455–1469
- Button, K., Doh, S., Yuan, J. (2010). The role of small airports in economic development. *Airport Management*, 4(2), pp. 125-136
- Cantos, P., Gumbau, M., Maudos, J. (2005). Transport infrastructures, spillover effects and regional growth: evidence of the Spanish case. *Transport Reviews* 25, pp. 25–50
- Cezanne, W., Mayer, A. (2003). Flugplatz als Wirtschaftsfaktor Möglichkeiten und Formen der Landeplätze als Wirtschaftsfaktor, Analyse der im Land vorhandenen Situation, Ministerium für Stadtentwicklung des Landes Brandenburg, Cottbus
- Cherry, J. (2014). The Economic importance of airports; ICAO. Aeroports de Montreal
- Cooper, A., Smith, P. (2005). The Economic Catalytic Effects of Air Transport in Europe, Report EEC/SEE/2005/004. Eurocontrol, Brussels.
- Davidson, P., & Honing, B. (2003), “The role of social and human capital among nascent entrepreneurs”, *Journal of Business Venturing*, pp. 20,121
- Dawkins, C.J. (2003). Regional Development Theory: Conceptual Foundations, Classic Works, and Recent Developments. *Journal of Planning Literature*, Vol. 18,No.2(November2003), p. 136
- Debbage, K.G., Delk, D. (2001). The geography of air passenger volume and local employment patterns by US metropolitan core area: 1973-1996. *Journal of Air Transport Management* 7, pp. 159-167
- Downes, L., Nunes, P. (2013). Big Bang Disruption: Why classic business rules don’t apply, *Harvard Business Review*.
- Drucker, P.F. (1985). *Innovation and Entrepreneurship*. New York: Harper & Row Publishers
- Elsner, W., Hübscher, JA., Zachial, M. (2005). Regionale Logistik-Cluster. Statistische Erfassung, Stärken und Schwächen, Handlungspotentiale. Frankfurt am Main
- Feldhoff, T. (2012). Japan’s regional airports: conflicting national, regional and local interests. *Journal of Transport Geography* 10 (2002), pp. 165–175
- Gloersen, E. (2005). The importance of airports in securing accessibility and the role of demographics. In: Cranfield University, 4th Forum on Air Transport in Remoter Regions, Stockholm, Sweden, May 2005. pp. 24–26
- Goetz, A.R. (1992). Air passenger transportation and growth in the U.S. urban System, 1950-1987. *Growth and Change* 23, pp. 218-242
- Graham, B. (1995). *Geography and Air Transport*. Wiley, Chichester
- Greenhut, M.L. (1956). *Plant location in theory and in practice*. Chapel Hill: University of North Carolina Press
- Green, R.K. (2007). Airports and economic development. *Real Estate Economics*, Vol. 35(1), pp. 91-112.
- Isard, W. (1960). *Methods of regional analysis: An introduction to regional science*. Cambridge, MA: MIT Press.
- Juchelka, R., Brenienek, J. (2016). Evaluation of Impacts of Logistics Clusters in the Corridor Rotterdam–Genoa. *Integrated Spatial and Transport Infrastructure Development, Contributions to Economics*. Springer International Publishing Switzerland 2016, pp. 172-173
- Hakfoort, J., Poot, T., Rietveld, P. (2001). The regional economic impact of an airport: the case of Amsterdam Schiphol Airport. *Regional Studies* 35 (7), pp. 595–604
- Halpern, N., Bråthen, S. (2011). Impact of airports on regional accessibility and social development. *Journal of Transport Geography* 19 (2011),pp. 1145–1154

- Hart, D.A. & Mccann, P. (2000). The continuing growth of London Stansted airport: Regional economic impacts and potential. *Regional Studies*, Vol. 34(9), pp. 875-882
- Hoover, E.M. (1937). *Location theory and the shoe and leather industry*. Cambridge, MA: Harvard University Press.
- Horst, M. (2006). *The Role of German Regional Airports in Logistics Networks*, Westminster
- Hujer, J. (2008). *Regionalökonomische Effekte von Flughäfen*. Peter Lang, *Sozialökonomische Schriften* Vol. (31), Frankfurt am Main
- Kanafani, A., Abbas, M.S. (1987). Local air service and economic impact of small airports. *Journal of Transportation Engineering*, Vol. (113), pp. 42-55
- Kasarda, J.D., Lindsay, G. (2011). *Aerotropolis: the way we'll live next*, 1st edn. Farrar, Straus and Giroux, New York
- Kupfer, F., Lagneaux, F. (2009). *Economic Importance of Air Transport and Airport Activities in Belgium*, Report 158. National Bank of Belgium, Brussels.
- Lian, J.I., Gjerdåker, A., Rønnevik, J., Jean-Hansen, V., Rypdal, K., Skeie, R.B., Berntsen, T., Fuglestad, J., Torvanger, A., Alfsen, K., Thune-Larsen, H. (2007). *The Economic and Environmental Impact of Air Transport*, Report 921/2007. Transport Economics Institute, Oslo
- Malina, R., Wollersheim, C., Peltzer, S. (2007). *Die regionalwirtschaftliche Bedeutung des Dortmund Airport*. Industrie- und Handelskammer zu Dortmund, Dortmund
- Malina, R.; Luttmann, J., Wollersheim, C. (2008). *Prognose der regionalwirtschaftlichen Effekte des Dortmund Airport für das Jahr 2020*. Münster
- Marshall, A. (1890) *Principles of Economics*, vol. I. Macmillan, London
- Mukkala, K., Tervo, H. (2012). "Regional airports and regional growth: which way does the causality run?". *ERSA conference papers ersa12*, European Regional Science Association, p. 642
- Niemeier, H.M. (2001). On the use and abuse of impact analysis for airports: A critical view from the perspective of regional policy. In: Pfähler, Wilhelm (ed.) (2001): *Regional Input-Output Analysis. Conceptual issues, airport case studies and extensions*. Nomos, Baden-Baden
- Ndoh, N.N., Caves, R.E. (1995). Investigating the impact of air-service supply on local demand a causal analysis, *Environment and Planning A* 27(3), pp. 489 – 503
- Orlikowski, W. (2002). Knowing in Practice: Enacting a Collective Capability in Distributed Organising, *Organisation Science*, 13, pp. 249-273
- Osterwalder, A., Pigneur, Y. (2010). *Business model generation. A handbook for visionaries, game changers, and challengers*. Frankfurt a. M.: Campus
- Percoco, M. (2010). Airport Activity and Local Development: Evidence from Italy, *Urban Studies*, Vol. 47(11), pp. 427-443
- Porter, ME. (2000). Location, competition, and economic development: local clusters in a global economy. *Econ Dev Q* 12:15–42
- Prahalad, C.K., Hamel, G. (1990). The core competence of the organization, *Harvard Business Review*, 68(3), pp. 79-91
- Rezk, M. R. A.; Ibrahim, H., H.; Tvaronavičienė, M.; Sakr, M. M.; Piccinetti, L. (2015) .Measuring innovations in Egypt: case of industry, *Entrepreneurship and Sustainability Issues* 3(1), pp. 47-55. DOI:[http://dx.doi.org/10.9770/jesi.2015.3.1\(4\)](http://dx.doi.org/10.9770/jesi.2015.3.1(4))
- Rietveld, P., Bruinsma, F. (1998). *Is Transport Infrastructure Effective? Transport Infrastructure and Accessibility: Impacts on the Space Economy*. Springer, Berlin
- Rivera, L., Sheffi, Y. (2012). *Logistics clusters in the US: an empirical study*. MIT CTL Research Paper CTL/1-A-12, Vol. January

- Robertson, J.A.W. (1995). Airports and economic regeneration. *Journal of Air Transport Management* 2 (2), pp. 81–88
- Rodrigue, J-P., Notteboom, T. (2013). *The Geography of Transport Systems*. Hofstra University, New York
- Sellner, R., Nagl, P. (2010) Air accessibility and growth: The economic effects of a capacity expansion at Vienna International Airport. *The Journal of Air Transport Management*, 16 (6). pp. 325-329.
- Sheard, N. (2014). Airports and urban sectoral employment. *Journal of Urban Economics*, Vol. (80), pp. 133-152.
- Shin, K.H., Timberlake, M. (2000). World cities in Asia: cliques, centrality and connectedness. *Urban Studies* 37 (12), pp. 2257–2285.
- Stake, R.E. (1995). *The Art of Case Study Research*, Sage Publications, Thousand Oaks: California.
- Stevenson, H., Harmeling, S. (1990). “Entrepreneurial Management’s Need for a More "Chaotic" Theory”, *Journal of Business Venturing*, 5, pp. 1-14
- Wang, S. (2015). Study of Core Competence of Logistics Cluster: The Integration and the Extension of Value Chain. *American Journal of Industrial and Business Management*, 5, pp. 20-26
- Weber, A. (1929). *Theory of the location of industries*. Chicago: University of Chicago Press
- Wernerfelt, B. (1984). A Resource-Based View of the Firm’, *Strategic Management Journal* 5, pp. 171-180
- Wittmer, A., Weinert, R., Romer, D., Scherer, R., Strauf, S., Walser, M. (2009). *Regionalflugplätze und deren Wirkung auf das Luftfahrtssystem der Schweiz - Analyse der intangiblen regionalwirtschaftlichen Effekte*, CFAC-HSG, St. Gallen
- Yin, R.K. (2009). *Case Study Research: Design and Methods*, Sage Publications: London 2009
- Policy papers and other web sources:
- Baltic.AirCargo.Net (2014). INTERREG IVB Programme, Baltic Sea Region 2007-2013, ERDF Funds (BACN, 2014): <http://www.balticaircargo.net> (access: January 2016)
- EU Commission (2015a). JRS Technical Reports: The Future of the Transport Industry, EU Commission, JRC93544, Brussels.
- EU Commission (2015b). Annual Analyses of the EU Air Transport Market 2013, Brussels.
http://ec.europa.eu/transport/modes/air/internal_market/observatory_market/doc/annual-2013.pdf
(access: January 2016)
- EU Commission (2014). European Court of Auditors: EU Funded Airport Infrastructures: poor value for money.
http://www.eca.europa.eu/Lists/ECADocuments/SR14_21/QJAB14021ENC.pdf
(access: January 2016)
- EU Commission (2013). ADES report: Airports as Drivers of Economic Success in Peripheral Regions. Targeted Analysis 2013/2/17, ESPON 2013
http://www.espon.eu/export/sites/default/Documents/Projects/TargetedAnalyses/ADES/DFR/01_ADES_DFR.pdf (access: January 2016)
- IATA (2015). Economic Performance of the Airline Industry, 2015-end-year Report, www.iata.org/economics (access: January 2016)
- York Aviation, (2004). *The Social and Economic Impact of Airports*. ACI-Europe, Geneva

Anatoli BEIFERT is a PhD Student at Tallinn University of Technology (Estonia) and Wismar University of Applied Sciences (Germany). He is Head of EU Project Center at Wismar University of Applied Sciences. Major assignments: Research, teaching, consulting and training activities in fields of: Strategic and Operational Management in Shipbuilding, Maritime Economics and Port Operations, Controlling in Maritime Industry, coordination of the EU funded research projects.

This is an open access journal and all published articles are licensed under a
[Creative Commons Attribution 4.0 International License](#)

Copyright of Journal “Entrepreneurship and Sustainability Issues” © Entrepreneurship and Sustainability Center, All Rights Reserved

ublisher



The International Journal

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

ISSN 2345-0282 (online) <http://jssidoi.org/jesi/aims-and-scope-of-research/>

2016 Volume 3 Number 3 (March)



„The paper was published with support from the Baltic-German University Liaison Office from funds of the German Academic Exchange Service (DAAD)”

DESIGN MANAGEMENT AS A DOMAIN OF SMART AND SUSTAINABLE ENTERPRISE: BUSINESS MODELLING FOR INNOVATION AND SMART GROWTH IN INDUSTRY 4.0

Laima Gerlitz

*Wismar University of Applied Sciences: Technology, Business and Design
Philipp-Müller-Str. 14, 23966 Wismar, Germany*

E-Mail: laima.gerlitz@hs-wismar.de

Received 15 October 2015; accepted 10 December 2015

Abstract. The prior research has scrutinised the extent and scope of design integration for smart production and services innovation and value generation for smart society including enterprises, customers and end-users in the context of Industry 4.0. A conceptual approach has been proposed for practical business applications in developing and exploiting new innovative products or services. The present paper underpins the earlier research in methodological terms and is an affiliated research endeavour. The research traces successful performance of small and medium-sized enterprises (SMEs) within the context of Industry 4.0 in correlation with design as a source, resource and strategic tool for value generation and its capitalisation on the market. Building upon the integrated design as a tool and process for innovation capacity in the current industrial development paradigm, the present paper contributes to the previously anticipated research objective to reveal how design integration and design management manifest within small business practices and to what extent creates value. The key research focus is placed here on the strategic business orientation – business modelling and value creation for SMEs driven by impact factors from design, innovation management and strategic management field in the context of entrepreneurship. The present research is a result of qualitative research activity based on the case study methodological approach. Empirical data suggest how small enterprises within the Industry 4.0 domain can accelerate their growth targets and become more innovative, innovation being the move towards sustainable competitiveness and smart growth.

Keywords: design-driven business model, design value, design impact, design measuring, industry 4.0, small and medium-sized enterprises

Reference to this paper should be made as follows: Gerlitz, L. 2016. Design management as a domain of smart and sustainable enterprise: business modelling for innovation and smart growth in Industry 4.0, *Entrepreneurship and Sustainability Issues* 3(3): 244-268.
DOI: [http://dx.doi.org/10.9770/jesi.2016.3.3\(3\)](http://dx.doi.org/10.9770/jesi.2016.3.3(3))

1. Introduction

In the Communication of the European Commission COM (2012) “Entrepreneurship 2020 Action Plan – Reigniting the Entrepreneurial Spirit in Europe”, it is stated that future growth and competitiveness needs to be smart, sustainable and inclusive addressing our principal societal challenges. Europe is depending on entrepreneurs in order to bring Europe back to growth and higher levels of employment (COM(2010) 2020 final; COM/2014/014 final; SWD(2014) 14 final). In the landscape of industrial (r)evolution (‘Industry 4.0’ or ‘Internet of Things’), entrepreneurship is particularly important to accelerate development of the six emerging industrial and social growth sectors according to the Communication from the Commission (COM(2012) 582 final, p. 4). Smart and sustainable growth for 2014-2020 milestone necessitates innovation and research, digital agenda, support for and SMEs and low-carbon economy (SWD (2014) 120 final, p. 7). All of the four focus fields already reveal the linkage with Industry 4.0.

Linking up with the prior research, the author believes that what is highly missing in the context of Industry 4.0 and smart entrepreneurship growth is not a business model based digital and information technologies, strategic management and firm research solely (Inglewood & Youngs, 2014; Burmeister *et al.*, 2015; Westerlund *et al.*, 2014; Blythe, 2014; Fleisch *et al.*, 2014; Dujin *et al.*, 2014; Kagermann, 2015), but rather one evolving from design integration into business for innovations supported by strategic orientation. It is about thinking and acting in a smart way and becoming a part of smart society (SWD(2013) 380 final; SEC(2009) 501 final). Impact and value of design for innovations – competitiveness and smart growth – should not be marginalised any longer also in this field, as it happened with other business domains, where design has been acknowledged as a source, resource, tool or approach within the strategic management, product development and innovation management arrays (McNabola, 2013; UK Design Council, 2013; Micheli, 2013, 2015; Mortati, 2015; Borja de Mozota, 1998, 2003; Kortesoja, 2013; Maroni *et al.*, 2013; Gerlitz, 2015).

Design integration must go beyond design thinking approach emerged as a new business model within the design management evolutionary paradigm (Boland and Colopy, 2004; Borja de Mozota & Kim, 2009; Brown, 2008; Brown & Whyte, 2010; Martin, 2009; Meinel & Leifer, 2011; Plattner *et al.*, 2011). In this industrial era, design should become the core of design-driven business model for SMEs, and design management – take a step forward – leaving aside obsolete tenets and taking the move towards smart tool, process and approach for innovations, competitiveness and growth of SMEs in this high-tech and digitised industrial paradigm. Indeed, Industry 4.0 related research have already emphasised the need to rethink existing business models as a result of pervasiveness of digital and new information technologies, increasing virtual communication and open communities (Turber *et al.*, 2014; Burmeister *et al.*, 2014). Thus, this research reconsiders the time as being appropriate one not to miss design integration into business in Industry 4.0 and avoid any possible challenges in entrepreneurship, which, as the real business practices show, can be solved by bringing in design in operational, strategic or social-environmental business dimension to create value. As a result, the research endeavour complements the prior research from the Industry 4.0 perspective and, structured in a similar way, advocates design integration in SMEs practices using a case study approach.

2. Literature review

In the strategy management, organisation and innovation related literature, smart, sustainable and inclusive growth has been often linked with Industry 4.0 and discussed through the business modelling and information technology perspective (Sun *et al.*, 2012; Eckert, 2014; Brettel & Uckelmann 2014; Rivard *et al.*, 2006; Kemp, 2014), competitive advantage or business

strategy perspective (Bucherer *et al.*, 2012; Porter & Heppelmann, 2014; Veit *et al.*, 2014). A series of responses has been proposed in order to integrate industry 4.0 tenets within industrial and entrepreneurial practices to advance business performance and growth. As a result, numerical research outputs forecasting the future potential of Industry 4.0 have entered academic and practice-oriented landscape, e.g. proposing business models for Industry 4.0 and within it (Fan & Zhou, 2011; Leminen *et al.*, 2012; Ueckelmann *et al.*, 2014; Hui, 2014; Chan, 2015). A new rethought business model adapted to digital technologies and digitisation, advanced manufacturing technologies, merging virtual and real worlds, increasing automation and intensifying information flows, which enable to acquire competitive advantage (Porter & Miller, 1985; Porter, 1996; Moody & Walsh, 1999; Porter & Kramer, 2006; Porter, 2008; Li *et al.*, 2012; Tvaronavičienė, Černevičiūtė, 2015), including openness and open innovation sources as well as Internet importance among socio-economic stakeholders (industries, businesses, costumers and user communities) and emerging role of communities (Jawecki *et al.*, 2011; Füller & Matzler, 2007; Füller *et al.*, 2011, 2012; Gault, 2012; Dell’Era & Landoni, 2014; Baldwin & von Hippel, 2009; von Hippel *et al.*, 2011, 2012) has been put on the demand list of scholars and researchers.

From the conceptual point of view, the adopted concepts and design can be linked via their objective boundaries and content meanings, as they are likely to share similar common content threads. Industry 4.0 aims at assuring high-tech manufacturing location, jobs and welfare to people in a certain region to generate the competitive advantage (Ramsauer, 2013, p. 6; Avigdor *et al.*, 2014, p. 2; Krückhans and Meier, 2013, p. 31) and concerns design, manufacture, operation and service dimension of the manufacturing industry, thus including product, services and enterprise dimension as well as operational, strategic and environmental level. Smart specialisation is linked with competitive advantage and strategy, since it is a strategic approach aiming at developing a vision and identifying a competitive advantage setting strategic proprieties and making use of smart policies to maximise the knowledge-based development potential (David *et al.*, 2009, p. 1; SWD (2014) 120 final, p. 17). It also sets out to generate knowledge about the future economic value of a possible structural change and to discover the best suitable domains of specialisation by entrepreneurs (Foray *et al.*, 2011, p. 8). Innovation dimension can be added as additional needed capacity to smart specialisation and thus smart growth. It finds the roots in the innovation systems literature, the entrepreneurship and growth (OECD, 2013). As a result, three key tenets are associated with the concept: it recognises economic potential and growth via entrepreneurial search processes during which (1) distribution of potential opportunities for technological improvements in a specific sector, activity or profession is identified; (2) exploitation of the innovation results is ensured and (3) learning from outcomes regarding opportunities and scope of innovations is applied (McCann and Ortega-Argiles, 2015, pp. 1292-1293; Foray and Goenega, 2013, p. 1). In fact, smart specialisation strategies forge competitive advantage by obtaining the most efficient innovation results by means of effective prioritising scarce resources or concentrating resources on certain domains of expertise, e.g. industry, education and innovation (Ortega-Argiles, 2012, p. 2). Adding to this resource-efficient, greener thinking and competitive acting, Europe might arrive and not only smart, but also sustainable growth by 2020 (COM (2010) 2020 final, p. 5).

Sustainable growth, the same as smart growth, is dependent on entrepreneurship growth (Voss, 1998; Vossen, 1999; Delgado *et al.*, 2014; Mettler & Williams, 2011, Ayyagari *et al.*, 2011; Fraser, 2010; O’Gordman, 2001). Sustainable entrepreneurship is subject to efficiency and effectiveness, sufficiency and consistence (Young & Tilley, 2006, p. 402, Gerlach, 2003, p. 101), it aims to deliver profit and improve environmental sustainability and social conditions, i.e. setting long-term economic and business outputs deriving from entrepreneurial opportunities (Cohen & Winn, 2007, p. 35). In entrepreneurship, it requires a more specific focus by SMEs on social responsibility, environmental awareness, i.e. intertwining of all three dimensions of sustainability, i.e. economic, environmental and social ones (Cliberti *et al.*, 2008, p. 1580). Sustainability issues encompass such indicators as product-based green supply, environmentally friendly decision-making, cost reducing. In fact, sustainability might refer to issues, whether environmental, ethical or social ones (Seuring and Müller, 2008, p. 456).

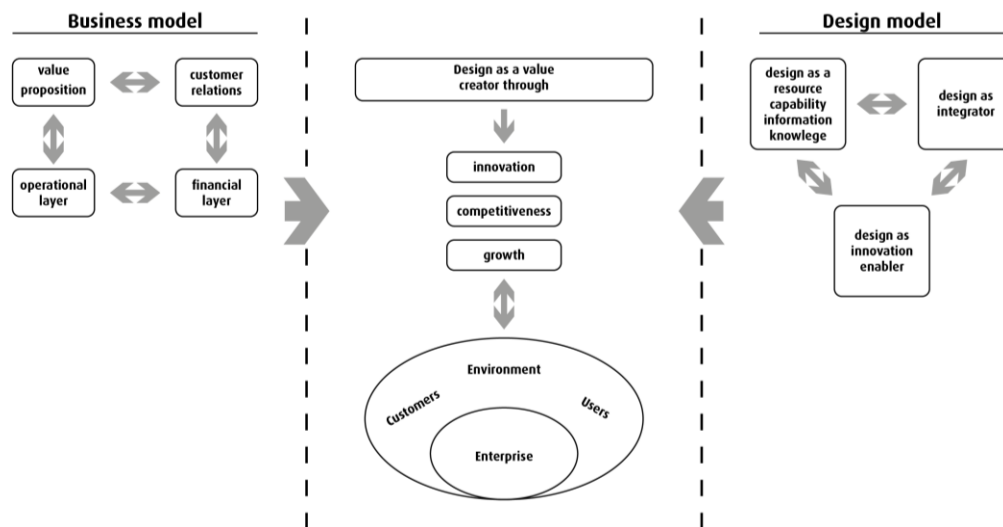
3. Framework for analysis and measurement

Being important vehicle of regional and national economy, SMEs have become a topical issue. Innovation, competitiveness and growth are key business success variables articulated by science and practice. According to the EU Policy Paper “Regional Policy for Smart Growth of SMEs”, the key aim is therefore to increase the strategic focus of SMEs by making them more innovative, thus contributing to competitiveness and growth, as innovation is the key to both (p. 1). To envisage such a business success – smart and sustainable growth, business and design domains have been leveraged and merged as a result of sharing common grounds for creating and exploiting value for SMEs:

- (1) Design domain integrating tenets of value creation and exploitation – design for innovation, competitiveness and growth.
- (2) Business domain embracing value creation and capturing residing in strategy and competition, innovation and business modelling.

The stated below underpins the conceptual inter-linkage of perception of innovations, competitiveness and growth from cross-disciplinary perspective. As a result, the author hypothesises that existing similarities support design integration in business interactions and proposition of design-driven model application for enterprises, contributing towards the anticipated key success factors, a business model, which answers essential questions of archetypal business model who, what, how and why (Gassmann *et al.*, 2014, p. 90ff).

Fig. 1. Merging Design and Business Domains in Industry 4.0



Source: compiled by the author

3.1. Design domain to innovation

Strategic role of design and inter-linkage of design and innovation is used to be the research objective in the context of service design. Strategic role of design has been also frequently revealed through the lens of the ‘customer value’ (Schmiedgen, 2011, p. 1; Wetter Edman 2011, p. 41; Chiva & Alegre, 2009; Meier-Kortwig, 1997; Brown, 2008). Design innovation modelling and thus business modelling has been linked through service design approaches (mostly, design

thinking). Nevertheless, the role of other driving parameters and factors for business model and strategy from the design management related literature seem to be underestimated (Borja de Mozota, 2013, p. 296). In fact, it is important to link all the actors in the innovation process, both inside and outside of the firm and to establish and maintain the role of designer as a 'gatekeeper' facilitating such linkages (Walsh, 2000, p. 88).

Starting from 1990s, there can be observed a trend of 'advocacy' of design in the management field and demystification of design among managers (Gorb and Dumas, 1987; Oakley, 1990; Walker, 1990). Design management should be employed within management in form of design resources available to an organisation aiming to achieve its corporate objectives. The issue of design leadership and its role for corporate identity get at increasing attention among scholars and practitioners, e.g. Koppelman, 1993; Blaich and Blaich, 1993; Davies, 1993; Gorb, 1990; Topalian, 2002; Turner, 2013, etc. from 1990 onwards. Placement of design within an organisation, identification of design resources and related issues for solving key management issues and trainings of managers to effectively use design (Gorb, 1990, p. 2). Similarly, however, with a stronger view on long-term corporate mission and vision, Blaich and Blaich (1993) conceive design management as a programme of corporation activity focused on communication of design relevance to achieve long-term goals of an organisation and coordinate design resources on all applicable organisational activity levels, thus enabling to achieve corporate objectives (pp. 13-15). Similarly, Turner (2013) links design management with corporate strategy and vision. It is as a tool enabling to achieve this, and design leadership – a means to define the future, i.e. vision. Both are critical sources to value achievement and its maximisation. Fundamentally, Turner conceives design management and its role in delivering successful design solutions in an efficient and cost effective way (ibid., 72). In this, it can be stressed, here, the focus clearly shifts from design management as being solely employed on functional and operational levels towards its embeddedness within the corporate strategic level.

Today, strategic design management research frequently addresses design as a resource, core competency, capability and capital. Its role moved from just fitting to the industry towards becoming heart of the business model and value creation (Borja de Mozota, 1998, p. 26; Borja de Mozota & Kim, 2009, p. 67). It is a competitive advantage and strategy. It is a process and styling leading towards strategic competitive advantage (Borja de Mozota, 2006, p. 45ff). Design has increasingly become perceived as a strategic tool, whereby information and knowledge about a product from which it can be materialised and positioned on the market, thus creating and capturing value (Kotler and Rath, 1984; p. 16; Er, 1997, p. 293). As a result, design integrates all the strategically essential methods, tools, capabilities and resources accumulated and deployed from the three domains: design, business and technology (Prause *et al.*, 2012, p. 441; Hack *et al.*, 2012, pp. 140-141). Design became differentiator (1), integrator (2), transformer (3) and a good business (4) (Borja de Mozota, 2006, p. 45). Design may influence products offered by a firm giving them sense. Being design as a source of making sense of things, design implies messages to the user, within the styling (e.g. form), functionality of a product, service or process, emotional and symbolic value, i.e. meaning. Meaning proposes to users a system of values by using a specific language, e.g. signs, symbols and icons that deliver the message (Verganti, 2008, p. 440). As a result, design can be used as a resource in several ways: as a strategy, as a method, as a styling, as internal enterprise resource, as valuable knowledge and as a process applied in enterprises.

3.2. Business approach to innovation

Value creation has been heart of business modelling, innovation, business strategy and organisation discourses (Hui, 2014, p. 2; Magretta, 2002, p. 87, etc.). Already Porter & Miller (1985) by proposing the value chain highlighted the importance of information for competition as well as that of information technology. Value emerges along the entire value chain and is

at the end confirmed by the customer via mutual transactions (usage of product or service) (p. 154). Later, big data and data management were considered as changing value proposition and value chain (Nagle & Sammon, 2014, p. 397). Similarly, change in service logic implied value creation with goods as value supporting resources and services as value supporting processes (Grönroos, 2006, p. 325) or change in producer-customer paradigm, where value embedded in an physical artefact is exchanged with customer and customers are part of a service seen as a resource or integrating resources (Lusch *et al.*, 2008, p. 10; Vargo *et al.*, 2008, p. 145; Prahalad & Ramaswamay, 2004, p. 5).

Beyond the 'classical' manufacturing enterprise's and supply and value chain perspective on value creation (Porter & Miller, 1985; Porter, 1995; 1996) and perception of value creation through the lens of 'service logic' (Lusch *et al.*, 2004; Vargo & Lusch, 2004, 2008), recently research community has started to focus on value from the angle of strategy as basis for value creation (Osterwalder & Pigneur, 2010; George & Bock, 2011; Zott *et al.*, 2011; Osterwalder *et al.*, 2014; Gassmann *et al.*, 2014) or innovation (business innovation model) (Chesbrough & Rosenbloom, 2002; Chesbrough, 2010; Teece, 2010; Bucherer *et al.*, 2012; Amit & Zott, 2012; Andries & Debackere, 2013; Foss & Saebi, 2015; Ignatavičius *et al.* 2015). In fact, a business model finding its roots in 1957 (Bellmann *et al.*) should allow a holistic view on an enterprise by combining factors located inside and outside the firm (Turber & Smiela, 2014, p. 4). This is a clear link towards the two sides of the coin, i.e. internal and external organisational perspective – external environment approaches as shaped by Porter fitting strategy to the external environment, and internal scrutinising enterprise, deconstructing the competitiveness and innovation within the domain of key resources, capabilities, competencies (Wernerfelt, 1984; Barney, 1991; Amit & Shoemaker, 1993; Peteraf, 1993; Prahalad & Hamel, 1990; Hoopes *et al.*, 2003; Helfat & Peteraf, 2003; Crook *et al.*, 2008; Foss, 2011, etc.; Rezk *et al.*, 2015).

Enterprise and innovation as intertwined construct have been perceived already by Drucker (1985), Zhao (2005) and frequently discussed within business model innovation discourses (e.g. Amit & Zott, 2012; Teece, 2010, etc.). Here, again, the heart of the business innovation model is innovation process and the ability to identify a good idea including capacity transforming such idea into a business model that adds value and generates revenue (Andries & Debackere, 2003, p. 337). There is a need to integrate all interdependencies and to combine them into one consolidated approach, an integrated structure of products, services and information flows including the involved actors and roles as well as the potential value created for all participants and the source of revenue (Sun *et al.* 2012, p. 3). It is business pattern of components, linkages between them and dynamics. It is a systematic approach implying construction of certain 'success elements'. There are nine elements comprising four building blocks within business models: value proposition, operational and financial model and customer relations (Osterwalder & Pigneur, 2010, p. 252; Chesbrough & Rosenbloom, 2002, p. 551; Kindström, 2012, p. 483; Zott *et al.*, 2011, p. 1020ff; Tikkanen *et al.*, 2005, p. 790). These building blocks are also referred to as balanced systemic approach consisting of financial, internal business process, customer and learning and growth (innovation) dimensions, which make up a balanced system towards strategy – balanced scorecard (Kaplan & Norton, 1996, p. 56; Kaplan & Norton, 2005, p. 5), as strategy maps (2006, p. 105) or even activity system maps enabling to achieve competitive positioning and implement strategy (Porter, 1996, p. 60ff). As frequently emphasised, value proposition of a business innovation model is heavily subject to products and services offered by an enterprise and its operational model, and therefore products and services innovation can lead to business model innovations. Nevertheless, the innovation is not limited to dominant product or service process innovations (Bucherer *et al.*, 2012, p. 184). In fact, a broad variety of 'ingredients' are needed to achieve value.

4. Methodology

The present research applied a hybrid research approach (Fereday & Muir-Cochrane, 2006, p. 80) combining inductive and deductive perspectives, analysing and interpreting raw data and identifying key tenets that enable to capture the key phenomenon – design integration and its value for SMEs. Starting from thematic analysis, locating the applicable thematic

research streams, developing a framework for analysis and measurement, the research aims at answering two fundamental research questions:

- (1) How can design be integrated within entrepreneurial strategic orientation and accelerate business model?
- (2) To what extent can design integration and design value be traced within SMEs in Industry 4.0 context?

A following research path characterises the methodological research approach. First, the paper builds upon design perception as integrated design management approach for innovations (using deductive reasoning) and traces smart ideation and exploitation patterns in a given enterprise (case study) on operational, strategic and social-environmental dimension based on the accumulated evidence gathered. Subsequently, potential business model integrating design, innovation and firm management perspective is developed and validated by manifold field research activities (inductive reasoning) proposing how value can be generated and exploited for smart entrepreneurial growth (inductive). As emphasised by Kelley (1998), within design related discourses, an inductive approach to innovation is dominating (p. 32). Although the research combines the mix of deductive and inductive intentions, when using a qualitative case study to build the design-driven business model for Industry 4.0, it relies, however, on integration of theoretical reflections (the framework). It serves as a foundation and common ground for the analysis and results' synthesis, although the theoretical reflections usually are not employed within the analysis phase. Here, using a specific structured approach by means of the developed outline (Fereday & Muir-Cochrane, 2006, p. 80; Crabtree and Miller, 1992, pp. 93-109), the research adopts a framework for analysis and measurement as a certain template with specific applying indicators (Fig. 1) and uses it for the phenomenon observation purposes and data validation. In fact, employment of the framework underpins credibility of the research by providing a specific approach towards dealing with evidence and facilitates transparency. Consequently, observations made allow articulating a new conceptual perspective on design integration and its role within Industry 4.0 discourses – a model, which can be employed within SMEs businesses.

The choice and adaptation of qualitative research approach has been justified taking into account applicable research streams (Neergaard & Ulhøi, 2007, p. 1; Fossey *et al.*, 2002, p. 717), where qualitative research approach has been dominating. In the last decades, increasing role has been ascribed to the case study as being very crucial in making conceptual models (Eisenhardt, 1989; Miles and Huberman, 1994, p. 101; Stake, 1995, pp. 4-6; Yin, 2009, p. 2; 2012, p. 3). Further, as has been observed, whereas surveys were usually employed in the context measuring the business performance in a particular industry SMEs, case studies dominated research focusing on linkage of design and innovation, new product development as well as in research contributions related to the strategic management and the business strategy, i.e. emerging, developing and growing SMEs, e.g. Borja de Mozota, 1998, 2002.

The research process implies the following steps of the qualitative study, such as case selection, data collection, data preparation, data analysis, data interpretation and validation as well as data utilisation for theoretical and managerial contributions. The qualitative research applies such research methods as case study method (Yin, 2009, 2013), thematic analysis method (Braun & Clarke, 2006), interviews with enterprise representatives, field notes, diagrams and memos as well as social network analysis. They are recognised as being appropriate for examining design management practices and their role for small businesses and design management networks, as they enable to trace the links and to investigate relationships of interacting structures and units, in this particular case of that within a given enterprise (Wassermann & Faust, 1994, p. 8; Scott, 2003, p. 38ff; Corbin & Strauss, 2008, p. 123ff). In fact, the case study enables to catch the particularity and complexity of a single case (Stake, 1995, p. xi). The research type is therefore exploratory, interpretative, integrative and practice-oriented. It is also reflective showing how the research was produced, described and justified. The research scale is rather small, as it involves a single case study – a perception of design integration within strategic orientation and business modelling in one given enterprise. Nevertheless, the conceptual implications imply generalisation potential, i.e. a piloted design-driven model, which can be tested within an increased number of further observations of this phenomenon.

5. Case of Merging Design and Business Domains: A Design-Driven Smart and Sustainable Enterprise

Building upon the previous topical research within Industry 4.0 context, this research attempt showcases design performance, i.e. its integration and implication patterns on the enterprise level. Design is likely to be the driving force on operational, strategic, and socio-environmental level of the enterprise (its external performance on the market and linkage with customers). It implies a common thread embedded in all enterprise interactions, from the manufactured goods, over service proposition and customer management related to produced goods or services towards self-supporting value networks. Within Industry 4.0, design is a networked activity, source, resource, competency and capability. It enables and facilitates connectivity of an enterprise from internal and external perception. A new network is emerging that supports value creation for enterprise (revenue generation) and value proposition for its customers and end-users.

The case company is the small enterprise from Berlin, Germany. The SME offers planning, production and implementation of ideas – products and services. Through the three key business areas – product development, related knowledge accumulation and transfer and working drawing including workshop, the enterprise has established strong horizontal links with potential customers and users from different sectorial affiliations – science, research, business, service providers, network users, etc. Value creation occurs simultaneously, is manifold source-driven and connected with design being at the heart of the enterprise. For confidential purpose, the name of the enterprise is not disclosed, especially taking into account its size and therefore potential negative exposure on its growth. This, however, does not affect the reliability and validity of the research results.

The justification of this case study builds upon self-supporting evidence. First, the motivation to canvas the design impact for entrepreneurial practices, especially of those being very small or start-ups is clearly supported by the research evidence. There is to less attention have been paid towards revealing design impact, design practices and implications within smaller SMEs (Gemser and Lenders, 2001; Hertenstein *et al.*, 2005; Moultrie *et al.*, 2007; Fernandez-Mesa *et al.*, 2013; Erichsen, 2014; Kortesoja, 2013; Maroni *et al.*, 2015). As a result, there is an increasing research impetus to provide smaller enterprises with potential guides on how to harvest design for operational efficiency and effectiveness, strategic orientation and acknowledgement by customers and users. Second, the case study suits well the given landscape. Instead of selling products or services solely on the market through design-driven innovation, where innovation is usually associated with the operational readiness needed for products and services development and implementation on the market, the given enterprise adopts a different view. It sells a mixed commodity, a value proposition for different customers groups, varying from those of using products to those using a particular service attached to this enterprise. It proposes therefore a value, which does not solely belong to the upstream (production) or downstream (activities). By contrast, it encompasses the entire enterprise and its ecosystem (Leminen *et al.*, 2012). Third, the selected case shows the context proximity, i.e. the enterprise has been chosen from Germany as being birthplace of Industry 4.0 trend (Gerlitz, 2015). By contrast to the ample cases on Industry 4.0 and business models, this research scrutinise how Industry 4.0 is perceived and employed within small business practices in relation to design. Fifth, the research claims that design integration supports not only smart, but also sustainable performance of enterprise on operational, strategic, social and environmental (external) level. Indeed, the enterprise was chosen for the case study, as it envisages the vision of sustainable development and proposition of sustainable solutions to its customers. Particularly, the SME adopted within its business practices the environmental tenets calling for the sustainable development owing to the proceedings of the UN Environment Conference and World Summits on Sustainable Development. As a result, the SME contends developing smart, ecologically and environmentally friendly solutions intertwining ecology, economy and social dimension into one ecosystem.

In what sense is then this enterprise being smart and sustainable in the context of Industry 4.0? Along the three key aspects delimited in the framework, the integration of design is scrutinised from the value creation perspective being the heart of the business model. Accumulated identified patterns of design ‘performance’ along the entrepreneurial practices are presented, which are needed to match them to the construct of design-driven strategic orientation of SME and therefore integrate into the research setting. Subsequently, the author shortly elaborates on findings, articulates analytical statements

and illustrates them by using the examples and data from the case. The succeeding research will require for generalisation of the ‘distilled’ patterns of design integration and its value creation potential.

Design as A Domain for Innovation

As the empirical data from the case study demonstrate, design is a core activity and stepping stone within certain projects. In a given enterprise, designer is at the core of the firm. Design enables to deliver innovations through the incremental process, from the idea to the developed product or service. As contended within personal interviews and observations, design ranks the highest position when it comes to its perception as a source of innovation. Design, the same applies for innovation, introduces a new meaning and value for its consumers, i.e. a new or significantly improved good or service, process or new marketing method, new organisational methods in business practice, workplace organisation or external relations (OECD/ EC, 2005, p. 46). As contended by the CEO and top managers of the enterprise, design enables to ‘design’, i.e. develop solutions, which match the needs and demand of the society – customers and end-users. The developed solutions, however, showcase clear linkage of functional, aesthetical, meaning and visual match expressed through a form (product) or solution (service or process). In fact, the developed solutions must clearly underpin functional dimension. Furthermore, for this specific enterprise, design enables product development from the idea towards the maturity phase. Particularly, different number of developed solutions and prototypes in the field of sustainable design enables diversification – application of solutions to a range of options, thus enabling quantification of design-driven innovation solutions. Innovation implies a process during which all the necessary activities such as problem resolving and /or idea generation, development, manufacturing and marketing of a new construct (would it be product, service, or process itself) are effectively and efficiently managed and commercially and practically exploited to the market (Trott, 2012, pp. 12-15). Innovation is to be viewed as a process of turning opportunity into new ideas, ensuring its practical application in the reality (Tidd & Bessant, 2013, pp. 18-22) and bringing value through its availability and access to it for its users via the market and/or other channels or distributed peer-to-peer and / or by the market (Gault, 2012, p. 122). Design is a tangible outcome, i.e. end product of the process or intangible, e.g. service or process, solution, etc. (von Stamm, 2004, p. 11).

Thus, design being key innovation source and designer as key enabler to innovate allows developing smart and sustainable products. As the case data show, design stands for a basic requirement for all sustainable and smart solutions’ development. In Industry 4.0 context, such innovative solutions can be developed faster, particularly using prototyping devices – software such as computer-aided design (CAD), 3D printer or other rapid prototyping methods. It is interestingly, however, that everybody, who has infrastructural, financial and internal capabilities and capacities to develop solutions, can use today such tools and methods. Indeed, technological advancement, increasing interconnectedness of machines and people, better possibilities to respond to customers needs and recognition by end-users facilitates faster innovation potential. However, the research results imply that technological and managerial capabilities are not enough. It contends that design and related capabilities residing in design, when combined with technology and business dimension, can lead towards mature innovations – smart and sustainable ones. Particularly, design-driven innovation is underpinned, it is argued here, through internal design capabilities and competencies, i.e. designer being at the heart of the enterprise or designers, who are working within the enterprise. It is far less evident that smart and sustainable solutions emerge when outsourcing design related services. In fact, design needs to meet enterprise culture, shared values, thinking and acting expressed through operational and strategic setting. According to the data, enterprise perception of design impact on innovation is the following. Using the seven-point scaling, the author has measured the potential of design for innovation in the enterprise. For this, the researcher has constructed three impact layers, which showcase the magnitude of the particular parameter for innovations: essential (+++), average (++) and marginal to absent (+ / 0) and clearly underpin the analytical statements above.

Table 1. Design Domain and Innovation

Design is a source of innovation within the enterprise	+++
Design implies important development process of SME	+++
Design improves production and / or service provision development and provision processes	+++
Design improves products, services and process in SME	+++
Design enables achievement of the required product, service or process quality	++
Design supports development of new technologies, methods and tools in SME	+++
Design Domain's Magnitude	Essential

Source: compiled by the author

Design as A Domain for Competitiveness

Innovation is key towards business success, processes, products, services and other internal and external optimisation patterns. Innovation might be regarded as a key for SMEs to develop, grow and mature on the market. Becoming innovative forges also the level of competitiveness and affects the pace of growth. Taking into account the evidence from the given enterprise, it can be argued that the competitive edge derives from smart combination of resources, capabilities and competencies. It is also based upon external perception and customer relationships. The principal competitiveness might lay in the fact that the enterprise, also being very small, builds upon the tenet of providing a complete solution package, including both product and service attached to this product. Further, a certain perception towards social and environmental setting outside the company can be considered also as a potential source of competitiveness. The enterprise claims on complying with environmental friendly principles, emphasises the coexistence with and recognition of resources scarcity. Developed solutions do not stand just for a specific artefact. By contrast, it can be asserted that they implicate a combined approach in a smart way proposing a commodity integrating creative, managerial and social perspectives. Finding customers, which do acknowledge such solutions calling for a more sustainable thinking and acting complements the competitiveness. The enterprise has specialised in terms of offering sustainable solutions, which save energy, reduced maintenance and waste generation and enables cost saving in terms of operational, social and environmental parameters. Key customers are being integrated into the product or service delivering process at an early stage. Designer acts as service provider showing the benefits of the final commodity – functional excellence, positive ecological footprint and social recognition. It is move towards sense making for customers and end-users. Indeed, design is a powerful source of the enterprise competitiveness that, however, needs to be generated, smartly intertwined and exploited. The enterprise's top management perception towards potential of design to facilitate enterprise competitiveness in the parameters below (i.e. correlation between design capability to support and thus strengthen the competitiveness) are displayed as follows:

The empirical evidence showcase that design as a source alone cannot provide enterprise with differentiation strength yet, thus being able as enterprise to differentiate itself from the competitors. Design facilitates improvement of external performance of the enterprise on the market through, e.g. marketing activities or supports enterprise corporate identity and positive image building. This means that despite the fact that design role for competitiveness is evident and moving towards increasing one, design cannot be treated alone as a source of competitiveness. As it is apparent, it requires a combination of certain parameters and criteria. However, especially from the external perspective, where relationships with customers, network engagement and management of customers come into play, design impact on them is less traceable than that on internal product, service or process peculiarities and related activities, such as development and exploitation (innovation).

Table 2. Design Domain and Competitiveness

Uniqueness of your product	+++
Production / servicing process in SME	++
Marketing activities and outputs	++
Branding activities and brand	+++
Design is treated as important source for competitiveness of SME	+++
Innovation process	+++
Capacity for innovation	+++
Cooperation and links with customers / clients	++
Links with supplies	+
Networking and internationalisation	++
Design Domain's Magnitude	Average moving towards Essential

Source: compiled by the author

Design as A Domain for Smart and Sustainable Growth

It is clear that design role as enabler for innovation, competitiveness can be underpinned on entrepreneurial level, where design is driving force for all applicable interactions and transactions. The author argues that smart and sustainable growth can evolve and be sustained when assuring balanced product, service or process development process. Being competitive does not automatically implies being smart and growing in a sustainable way. Sustainability is a very broad concept that can be delineated through intertwining economic, environmental and social layers of performance (Cliberti *et al.*, 2008, p. 1580; Seuring and Müller, 2008, p. 456). Sustainable enterprise, as the case enterprise from Germany shows, should comply with tenets, such as social responsibility, environmental awareness, etc. The aspects of sustainability are gaining more attention as a response to the current economic challenges, increasing negative footprint on environment and social setting, globalisation and demographic trends, etc. In fact, sustainability evolves through value creation and ensuring consistent value chain performance, i.e. value proposition for all involved actors. In addition, sustainability embraces aspects of labour, environmental standards, etc. In this regard, values are affected in terms of social, environmental or labour-related settings and through two key functions within the value chain, i.e. rule making and rule keeping.

Sustainable thinking and acting, however, are not ultimate preconditions for smart growth. The researcher claims that sustainable and smart growth emerges from smart combination. As the enterprise evidence suggest, design can influence sustainable enterprise growth, however, to a different extent. In the particular case study, design role is likely to vary when all the key parameters are measured in the same paradigm – impact of design for the enterprise, as the Table 3 below reveals.

Table 3. Design Domain and Smart and Sustainable Growth

Business performance	+
Integration of internal organisational resources and capabilities and their use	++
SME's competitiveness	+++
Level of innovativeness and innovation generation	+++
SME's business growth	+
Design Domain's Magnitude	Average moving towards Essential

Source: compiled by the author

With regard to the data displayed it may be argued that understanding design role for SMEs growth is not well revealed yet both on the research and practice level in the context of Industry 4.0. Paradoxically, although the enterprises highly recognises the role of design for innovation, which is seen the heart for competitiveness and growth, the impact of design

for growth remains underestimated. The reasoning behind this might also lay in the fact that small enterprises have not clearly linked innovation to competitive business strategy yet or do not possess necessary command how to do this. The decisions are taken less deliberate, it might be argued. Another reason refers to the bare fact that small enterprises are just developing and might have not established business growth perspective yet. Business performance indicator can be interpreted in a similar way, which principally yields internal and external business performance expressed through the costs and revenue structures, all enterprise building blocks, such as operational, financial model, customer and process perspective.

Taking the future perspective of the given enterprise into account, the evaluation pattern looks similar. Design enjoys the highest rank in terms of its potential for future enterprise business within the parameters of innovation and competitiveness. Essentially important in the context of Industry 4.0 becomes efficient resource employment and their utilisation, which share the same position for the given enterprise with the prior ones. For the given enterprise, design will also be crucially important in the future in the array of employees, industrial manufacturing and servicing, whereas economic competitiveness and business growth will be placed far down the business agenda and strategic enterprise orientation modelling.

6. Discussion

Industry 4.0 related discourses are saturated with ‘smartness’, which should help in achieving this goal, particularly, boosting productivity and value added of industries and stimulating economic growth, for instance, through smart products and services (Schmidt *et al.*, 2015; Porter & Heppelmann; 2014), smart objects (Atzori *et al.*, 2014), smart machines and factories (Kagermann *et al.*, 2013), smart manufacturing and industry (Dais, 2014; Davis *et al.*, 2012), smart spaces (Leminen *et al.*, 2012) or smart cities (Letaifa, 2015). It is a smart way of thinking and acting that can be expressed in the ecosystem via smart economy, smart people, smart governance, smart mobility, smart environment and smart living (Giffinger *et al.*, 2007; Mačiulis, Tvaronavičienė 2013). Further six principles can be applied to implement ‘smartness’: interoperability, virtualization, decentralization, real-time capability, service orientation and modularity (Hermann *et al.*, 2015, p. 3). Smart growth implies creation of internal, aligned, self-reinforcement system, which integrates effective leaders, engaged employees, continuous-improvement enterprise culture, experimental learning process including measurement systems and reward policies that drive growth (Downs, 2005; p. 368; Hess, 2010, p. 75).

The principal value of Industry 4.0 lies in providing industries and thus enterprises with specific value implying innovation, competitiveness and growth within the entire ecosystem – operational, strategic and socio-environmental (external) dimension, e.g. through increased flexibility, mass customisation, speed in product / service design and manufacturing, improved product quality, increased productivity, integrated customers and higher customer satisfaction or proximity of location to customers (Davies, 2015, p. 2ff; Mejtoft, 2011, p. 672). This, in turn, facilitates not only smart, but also sustainable thinking and acting. In sum, all these principles are encompassed within a business model providing a smart value, where industry and enterprises gain competitive advantage and are able to grow based on their innovativeness, capabilities for product, services or process designs that meet customers’ needs and assure quality and satisfaction thereof.

In Industry 4.0, there is a shift in the paradigm of value creation and value capturing. It is not anymore enough to create value by identifying customer needs and producing state-of-the-art products. It is usually a web-based services that users access through a product (Ferber, 2013, p. 2) and generate income (Carruthers, 2014, p. 5). Instead, the focus shifts towards value creation based on customer experiences and value capturing, i.e. monetisation of customer value in the digitised connected spaces, including value-added services. Indeed, there is a growing concern that the classical generating strategy model as developed by Porter building upon differentiation, cost leadership and focus is not sufficient any longer, as these

indicators can be supplement, but not solely used as exclusive ones. It is more that they can reinforce value creation and capturing (Hui, 2014, pp. 4-5; Porter, 1985, pp.12ff). However, the combination of both is needed – strengthening products, their differentiation, supply chains, human resources, brands as well as related services. As a result, value creation and capturing should be scrutinised from both manufacturer and customer / consumer perspective. Indeed, this is a special endeavour to be kept in mind when dealing with Industry 4.0, highly digitalised world and intensive interactions inside and outside the enterprise.

Table 4. Design as a Strategic Domain for Value Creation

Design integration through strategic value proposition		
Σ Design as an integrator and innovation enabler	Design deployed and exploited on corporate operational and strategic level	
Form of design integration	Operational indicators	Strategic indicators
DESIGN AS: Resource Knowledge Information Meaning Source of competitive advantage Competence Resourcing, organisational coordinative, protective and innovative capability Coordinative capability Networking capability	⊕ Aesthetic appearance (form)	⊕ Differentiation
	⊕ Functionality in the value chain (e.g. manufacturing specific product/service) to be validated (e.g. through technology, cost, etc.)	⊕ Productivity ⊕ Strategic flexibility
	⊕ Manufacturability (product/service as a result of design /creativity process from problem/idea to commercialisation on the market)	⊕ Positioning ⊕ Resource efficiency ⊕ Efficient productivity
	⊕ Integrity (using design to intertwine aesthetic, technological, business, social, environmental resources and capabilities)	⊕ Differentiation ⊕ Strategic flexibility ⊕ Customer/user satisfaction
	⊕ Durability (product/service effectively and efficiently used over longer time)	⊕ Positioning ⊕ Customer/user satisfaction ⊕ Differentiation
	⊕ Quality (product/service excellence in use and recognition by customers/users)	⊕ Positioning ⊕ Differentiation ⊕ Customer/user satisfaction
	⊕ Sustainability (product/service functionally reusable, recyclable, material-saving, ecological, clean)	⊕ Resource-efficiency ⊕ Differentiation ⊕ Positioning ⊕ Strategic flexibility ⊕ Societal critical mass
	⊕ Usability (user-friendly, safe, reliable, individually customised, etc. product/service)	⊕ Customer/user loyalty and satisfaction ⊕ Positioning ⊕ Differentiation

Source: compiled by the author

Design can create extensive value – would it be smart manufacturing, smart products and services or other smart solutions for customers and consumers. Impact of design within industry 4.0 practices can be clearly linked through perceiving design as a source of competitive advantage, knowledge, information, resource, capability and innovative and creative process. As a common thread serves value proposition, activities of value creation and processes of value capturing and exploitation. Indeed, the value creation includes resources, dynamic capabilities and processes required to deliver the offering – starting from partner/supplier relationships to sales channels. Value capture comprises the underlying cost structure and revenue formula, which decide about profitability and economical sustainability (Burmeister *et al.*, 2015, p. 5). Design, which has been perceived as knowledge, can be strategically deployed and exploited for product/service innovation. Strategic acting of design within the business array can be delineated as a critical dynamic collaboration across operational and management practices of organisations or companies successfully utilising design capabilities. For this, design integration for innovations resulting in value proposition on corporate level might be showcased as in Table 4.

Table 5. Design as A Strategic Domain for Value Creation in Industry 4.0

Design integration in industry 4.0					
Integration domains industry 4.0	Manifestation / dimension	Performance impact	Operational indicators	Strategic indicators	Enabling, creating and implementing technologies
Industrial manufacturing Healthcare Sustainable mobility and transport Energy efficiency Clean technologies Service sector Customer/user engagement	Industrial design (product) Service design (services) Design as a innovation process Design as an integrated creative process	Operational efficiency Economic efficiency Environmental efficiency –e.g. travel/carbon footprint / source / energy reduction Social efficiency – individual customisation, user acceptance, liberalisation / democratisation	Aesthetic appearance Functionality Manufacturability Integrity Durability Quality Sustainability Usability Reliability	Differentiation Positioning Strategic flexibility Resource efficiency Customer/user satisfaction Value creation Competitive advantage Predictability	ICT – computers, servers, software, Internet, WiFi, EDI, etc. IvT – modelling, simulation, visualisation, rapid prototyping, 3D printing OMT – design and production & coordination and networking technologies (e.g. computer-aided design tools, CNC, MRP, etc.

Source: compiled by the author

In the context of industry 4.0, such strategic indicators of design enable clear strategic opportunities advocated by scholars and practitioners: competitive strength, flexible manufacturing, individual customised products and services, innovative business models, new working and collaboration ways, resource-efficiency (production on demand), production at a place of use or in the market and user engineering through his integration in development process (Bartevyan, 2015, p. 2). Indeed, innovation, and thus design, as showcased above, can beat on the market with same value enablers (Francis and Bessant, 2005, p. 172ff). When it comes to design integration areas in the course of Industry 4.0, there exist different classifications and specifications of key technologies and domains of their application (Dujin *et al.*, 2014; Bechtold *et al.*, 2014; Blythe, 2014; etc.). Areas of application can be distinguished based on such criteria as networked systems; intelligent products/services; smart solutions, users; key enabling technologies; key economy sectors (transport/logistics, energy, mobility, maritime, environment, healthcare, business, insurance and finances, creative industries); industrial applications (e.g. advanced manufacturing); social and virtual networks and culture and social interactions.

Yet, within industry 4.0, design integration and exploitation for value creation is considered impossible without key enabling technologies. These are likely to be essential for innovation, and thus for design integration creating strategic value. Key enabling technologies allows design integration and exploitation within product/service innovation processes through integrating all key stakeholders – companies, suppliers/partners, customers, users and policy decision makers (Whyte *et al.*, 2015, p. 13). Within innovation processes, such technologies play crucial role for innovations, as they make innovation and thus design process more accurate, efficient, provides more activity/action room, time saving and cost efficiency, result-orientation (product/service innovation), resource efficiency, experimentation and sophistication (Dodgson *et al.*, 2008; p. 5; Thomke, 2001, Schrage, 2013; p. 211ff; Debackere and Looy, 2003). They also make sharing between and coordination of stakeholders and coordination of actors in innovation process simpler. Such design enabling technologies are used both internally and externally – corporate and market (community) level as well as in the economic and social context, characterised by shift away from manufacturing industries to services in developed economies. This, in turn, is stimulating innovations leading towards improved value, quality and experience in consumption. Economically, it is also increasing productivity and profitability in their supply (Dodgson *et al.*, 2008; pp. 5-6).

Fig. 1. Business Modelling for Design Integration within Industry 4.0 Landscape

Learning & Growth perspective	Target: increasing number of innovations driven by design Measure: number of innovations and design integration	Target: cost efficiency in the long-term Measure: numerical data of achieved cost efficiency through design-driven innovation processes	Target: Smart & sustainable organisation readiness; new product, service or process portfolio integrated with technology; producer-customer paradigm Measure: design integration within internal business practices, vision and strategy; new growth prospects and new customers	Target: customer retention through design and sense making Measure: customer loyalty; exploitation of innovation products, services or process on the market; sustained co-creation; service proposition for customers attached to the product or process
	Target: innovation process efficiency & effectiveness Measure: Parameters of efficiency & effectiveness proving process simplification, streamlining and acknowledgement internally, innovation creating, enabling and implementing technologies	Target: cost efficiency providing competitive advantage for enterprise Measure: number of key indicators achieved in terms of costs reduction, resource efficiency	Target: design-driven competitive advantage sustained Measure: number of indicators proving competitive advantage for enterprise by design; improved technological base enabling innovations and user interactions	Target: social responsibility and environmental awareness assured by design integration Measure: number of indicators achieved on sustainability level, including customer experience on design integration
	Target: integrated design process Measure: integrated design process within product, services, process development; supply & value chains	Target: cost efficiency; cost reduction on operational and strategic level Measure: reduced costs through structured innovation process adopted driven by design	Target: launch of product, service or process innovations Measure: number of product, service or process innovations developed and launched	Target: product, service or process innovations exploited on the market Measure: customers / end-users engaged into innovation service co-development and evaluation; number of customers / end-users platforms related to launched service / product
Operational / process level Financial level Strategic level Socio-environmental level				

Source: compiled by the author

Conclusions

Design integration and tracing its potential for value creation needs cross-cutting perspective. Establishing cross-linkage between design and business domain to innovation in Industry 4.0 landscape allows forging design-driven strategic orientation of enterprise as well as proposes background to generate business models for enterprises aiming to catch up with Industry 4.0 and to comply with its tenets – operational efficiency, competitive excellence, smart and sustainable growth. This research contribution yields that design is a sound source of value creation through innovation, competitiveness and growth. Creating value through design integration can become heart of businesses that set out not to be innovative, competitive and growing, but using design to move towards uniqueness and smart and sustainable competitive strength. Design as a driving force for value creation makes it hard for competitors to imitate business model and strategy. Design integration as key ‘ingredient’ in business model within Industry 4.0 comes up with new perspective crossing boundaries of business and technological array. The conceptual common thread needs to agglomerate concepts supporting this smart and sustainable growth. The author argues that interlinking profound concepts from the strategy, management and firm-based literature with that of the strategic design related concepts in the paradigm of European economic development could support business excellence in European SMEs. In fact, the present research, which is complementary to the first attempt to perceive and track design integration for innovations within Industry 4.0, reveals the positive link and provides a potential model for small enterprises to proceed.

Deepened observations of entrepreneurship practices within Industry 4.0 domain support the scholarly justification of positive design impact for innovations and extend the perspective. If design integration yields the power to develop and exploit innovations being a driver for competitiveness and growth, it is rather also the case that design will result in value creation. Achieving innovation, competitiveness and growth is smart strategic orientation of an enterprise. Design integration and design management practices might affect not only the innovation dimension of entrepreneurship but also the entire enterprise ecosystem and value creation emanating from design integration within business practices. It is not enough to rely on service design as a business model. There is needed integrated perspective on design perception within Industry 4.0 and smart enterprise in order to remain sustainable, resource-efficient and smart. Internal and external perspectives need to be combined, as the proposed business model implies. The empirical data justify this need and showcase the importance of design integration for enterprise innovation capacity, competitiveness and smart growth.

Nevertheless, the research results recognise affordance to quantify the positive design impact within the business model application in the subsequent research step. Particularly, this is evident in the case of design integration and its potential for small enterprise within the parameter of smart growth. The future research impetus is therefore driven by the fact to generalise the positive research implications with empirical observations. A number of enterprises should be analysed in this context from being very small to bigger ones. Further, empirical data need to showcase perspectives of different enterprises performance across the networks, particularly, focusing on the increased connectivity, intensified interactions and stronger focus on customer and end-user logic.

References

- Amit, R.; Schoemaker, P. J. H. 1993. Strategic Assets and Organisational Rent, *Strategic Management Journal* 14(19=): 33–46.
- Amit, R.; Zott, C. 2012. Creating Value Through Business Model Innovation, *MIT Sloan Management Review* 53(3): 41–49.
- Andries, P.; Debackere, K. 2013. Business Model Innovation: Propositions on the Appropriateness of Different Learning Approaches, *Creativity and Innovation Management* 22(4): 337–358.

- Atzori, L.; Iera, A.; Morabito, G. 2014. From “smart objects” to “social objects”: The next evolutionary step of the internet of things, *Communications Magazine*, IEEE 52(1): 97–105.
- Avigdor, G.; Gauders, N.; Hollanders, H.; Lucas, R.; Mielech N.; Wintjes, R. 2014. *Trend report Smart factories, clean tech and customer experience; how to scale-up the success of learning with users? Business Innovation Observatory Contract No 190/PP/ENT/CIP/12/C/N03C01*, European Union, Directorate–General for Enterprise and Industry, Directorate B “Sustainable Growth and EU 2020”, Unit B3 “Innovation Policy for Growth”.
- Ayyagari, M.; Demirgüç-Kunt, A.; Maksimovic, V. 2011. *Small vs. Young Firms Across The World – Contribution to Employment, Job Creation, and Growth*, World Bank Policy Research Working Paper No. 5631.
- Baldwin, C.; Hippel, E. von. 2009. *Modelling a Paradigm Shift: From Producer Innovation to User and Open Collaborative Innovation*, Working Paper 10–038, 1–34.
- Barney, J. B. 1991. Firm Resources and Sustained Competitive Advantage, *Journal of Management* 17(1): 99–120.
- Bartevyan, L. 2015. *Industry 4.0 – Summary report*, DLG-Expert report 5/2015, 1–8.
- Bellman, R.; Clark, C. E.; Malcolm, D. G.; Craft, C. J.; Ricciardi, F. M. 1957. On the construction of a multi-stage, multi-person business game, *Operations Research* 5(4): 469–503.
- Blaich, R.; Blaich, J. 1993. *Product Design and Corporate Strategy: Managing the Connection for Competitive Advantage*, New York: McGraw–Hill.
- Blythe, C. 2014. Business Models for value generation in the Internet of Things, in *Data- and Value-Driven Software Engineering with Deep Customer Insight*, Proceedings of the Seminar no. 58314308, 8–15.
- Boland JR. J.; Collopy, F. 2004. Design Matters for Management, in Boland, J. JR.; Collopy, F. (Eds.) *Managing as Designing*, California: Stanford Business Books, 3–18.
- Borja de Mozota, B. 1998. Structuring Strategic Design Management: Michael Porter’s Value Chain, *Design Management Journal*, Spring 9(2): 26–31.
- Borja de Mozota, B. 2003. Design and competitive edge: A model for design management excellence in European SMEs, *Design Management Journal Academic Review* 2: 88–103.
- Borja de Mozota, B. 2003. *Design Management. Using Design to Build Brand Value and Corporate Innovation*, New York. Allworth Press.
- Borja de Mozota, B. 2006. The Four Powers of Design: A Value Model in Design Management, *Design Management Review* 17(2): 44–53.
- Borja de Mozota, B. 2013. Design strategic value revisited: a dynamic theory for design as organisational function, in Cooper, R.; Junginger, S.; Lockwood, T. (Eds.) *The Handbook of Design Management*, Bloomsbury Academic, 295–310.
- Borja de Mozota, B.; Kim, B. Y. 2009. Managing Design as a Core Competence: Lessons from Korea, *Design Management Review* 20(2): 67–76.
- Braun, V.; Clarke, V. 2006. Using thematic analysis in psychology, *Qualitative research in psychology* 3(2): 77–101.
- Brettel, M.; Friederichsen, N.; Keller, M.; Rosenberg, M. 2014. How Virtualization, Decentralization and Network Building Change the Manufacturing Landscape: An Industry 4.0 Perspective, *International Journal of Mechanical, Aerospace, Industrial and Mechatronics Engineering* 8(1): 37–44.
- Brown, T. 2008. Design Thinking, *Harvard Business Review*, June, 1–10.
- Brown, T.; Wyatt, J. 2010. Design Thinking for Social Innovation, *Stanford Social Innovation Review*, Winter 2010, 31–35.
- Bucherer, E.; Eisert, U.; Gassmann, O. 2012. Towards Systematic Business Model Innovation: Lessons from Product Innovation Management, *Creativity and Innovation Management* 21: 183–198.

- Bucherer, E.; Uckelmann, D. 2011. Business Models for the Internet of Things, in Uckelmann, D.; Harrison, M.; Michahelles, F. (Eds.) *An architectural approach towards the future internet of things*, Berlin Heidelberg: Springer, 253–277.
- Burmeister, C.; Lüttgens, D.; Piller, F. T. 2015. *Business Model Innovation for Industrie 4.0: Why the "Industrial Internet" Mandates a New Perspective on Innovation*, Aachen: RWTH Aachen University, Technology and Innovation Management (TIM).
- Carruthers, K. 2014. How the Internet of Things Changes Everything, *Australian Journal of Telecommunications and the Digital Economy* 2(4), Article 69.
- Chan, H. C. Y. 2015. Internet of Things Business Models, *Journal of Service Science and Management* 8: 552–568.
- Chesbrough, H. 2010. Business model innovation: opportunities and barriers, *Long range planning* 43(2): 354–363.
- Chesbrough, H.; Rosenbloom, R. S. 2002. The role of the business model in capturing value from innovation: evidence from Xerox Corporation's technology spin-off companies, *Industrial and corporate change* 11(3): 529–555.
- Chiva, R.; Alegre, J. 2007. Linking design management skills and design function organisation: An empirical study of Spanish and Italian ceramic tile producers, *Technovation* 27: 616–627.
- Cliberti, F.; Pontrandolfo, P.; Scozzi, B. 2008. Investigating corporate social responsibility in supply chains: a SME perspective, *Journal of Cleaner Production* 16: 1579–1588.
- Cohen, B.; Winn, M. I. 2007. Market imperfections, opportunity, and sustainable entrepreneurship, *Journal of Business Venturing* 22(1): 29–49.
- Corbin, J.; Strauss, A. 2008. *Basics of qualitative research – techniques and procedures for developing grounded theory*, SAGE Publications, USA: Thousand Oaks.
- Crabtree, B. F. and Miller, W. 1992. *Doing Qualitative Research*, Sage: Newbury Park, CA.
- Crook, T. R.; Ketchen Jr., D. J.; Combs, J. G.; Todd, S. Y. 2008. Strategic Resources and Performance: A meta-analysis, *Strategic Management Journal* 29: 1141–1154.
- Dais, S. 2014. Industrie 4.0 – Anstoß, Vision, Vorgehen, in Bauernhansl, T.; Hompel, M. ten; Vogel-Heuser, B. (Eds.) *Industrie 4.0 in Produktion, Automatisierung und Logistik, Anwendung, Technologien und Migration*, Wiesbaden: Springer Verlag.
- David, P.; Foray, D.; Hall, B. 2009. *Measuring Smart Specialisation: The concept and the need for indicators*, Knowledge for Growth Expert Group, 1–7.
- Davies, H. 1993. The impact of competitive structure and technological environment on design management: a case study of the UK touring caravan industry, *Design Studies* 14(4): 365–378.
- Davies, R. 2015. *Industry 4.0: Digitalisation for productivity and growth*, EPRS, European Parliamentary Research Service.
- Davis, J., Edgar, T.; Porter, J.; Bernaden, J.; Sarli, M. 2012: Smart manufacturing, manufacturing intelligence and demand-dynamic performance, Smart manufacturing, manufacturing intelligence and demand-dynamic performance, *Computers & Chemical Engineering*, 47: 145_156.
- Debackere, K.; Looy, B. van. 2003. Managing integrated design capabilities in new product design & development, *Innovation in the Knowledge Economy*, London: Imperial College Press, 213–234.
- Delgado, M.; Porter, M. E.; Stern, S. 2014. Clusters, convergence, and economic performance, *Research Policy*, 43(10): 1785–1799.
- Dell'Era, C.; Landoni, P. 2014. Living Lab: A Methodology between User-Centred Design and Participatory Design, *Creativity and Innovation Management* 23(2): 137–154.
- Design Council– 2013. *Leading Business by Design: Automotive sector*. London: Design Council.
- Dodgson, M.; Gann, D.; Cooptmans, C. 2008. Playful Technologies: Creativity, Innovation and Organisation, in *DRUID's 25th Anniversary Conference on Entrepreneurship and Innovation – Organisations, Institutions, Systems and Regions*, Copenhagen, 1–20.

- Downs, A. 2005. Smart growth: why we discuss it more than we do it, *Journal of the American Planning Association* 71(4): 367–378.
- Drucker, F. 1985. *Innovation and entrepreneurship: Practice and Principles*, Oxford.
- Dujin, A., Geissler, C. and Horstkötter, D. 2014. *Think Act Industry 4.0. The new industrial revolution: How Europe will succeed*, Munich: Ronald Berger Strategy Consultants GmbH.
- Eckert, R. 2014. *Business Model Prototyping: Geschäftsmodellentwicklung im Hyperwettbewerb. Strategische Überlegenheit als Ziel*, Berlin: Springer.
- Eisenhardt, K. M. 1989. Building Theories from Case Study Research, *The Academy of Management Review* (14)4: 532–550.
- Er, H. A. 1997. Development Patterns of Industrial Design in the Third World: A Conceptual Model for Newly Industrialised Countries, *Journal of Design History* 10(3): 293–307.
- Erichsen, P. G. 2014. *Design Integration – a theoretical and empirical study of design integration in small and medium sized Danish companies*, Syddansk Universitetsforlag.
- European Commission. 2009. *Design as a Driver of User-Centred Innovation*, Commission Staff Working Document, SEC(2009) 501 final. Brussels.
- European Commission. 2010. *Europe 2020: A strategy for smart, sustainable and inclusive growth*, COM(2010) 2020 final. Brussels.
- European Commission. 2012. *A Stronger European Industry for Growth and Economic Recovery Industrial Policy Communication Update*, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2012) 582 final. Brussels.
- European Commission. 2012. *Entrepreneurship 2020 Action Plan – Reigniting the Entrepreneurial Spirit in Europe*, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2012) 795 final. Brussels.
- European Commission. 2012. *Regional Policy for Smart Growth of SMEs: Guide for Managing Authorities and bodies in charge of the development and implementation of Research and Innovation Strategies for Smart Specialisation*. Publications Office of the European Union: Luxembourg.
- European Commission. 2013. *Implementing an Action Plan for Design-Driven Innovation*, Commission Staff Working Document. SWD(2013) 380 final. Brussels.
- European Commission. 2014. *Advancing Manufacturing – Advancing Europe: Report of the Task Force on Advanced Manufacturing for Clean Production*, Commission Staff Working Document, SWD(2014) 120 final. Brussels.
- European Commission. 2014. *For a European Industrial Renaissance*, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2014) 14 final. Brussels.
- Fan, P. F.; Zhou, G. Z. 2011. *Analysis of the business model innovation of the technology of internet of things in postal logistics*, *Industrial Engineering and Engineering Management (IE&EM)* 2011, IEEE 18Th International Conference, 3–5 September 2011, 532–536.
- Ferber, S. 2013. How the Internet of things changes everything, *HBR Blog Network*, 7 May 2013.
- Fereday, J.; Muir-Cochrane, E. 2006. Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development, *International journal of qualitative methods* 5(1): 80–92.
- Fernández-Mesa, A.; Alegre-Vidal, J.; Chiva-Gómez, R.; Gutiérrez-Gracia, A. 2013. Design management capability and product innovation in SMEs, *Management Decision* 51(3): 547–565.

- Fleisch, E.; Weinberger, M.; Wortmann, F. 2015. Business models and the Internet of Things: International Workshop, FP7 OpenIoT Project, Held in Conjunction with SoftCOM 2014, Split, Croatia, September 18, 2014, in Podnar Zarko, I.; Kresimir, P.; Serrano, M. (Eds.) *Interoperability and Open-Source Solutions for the Internet of Things*, Springer International Publishing, 6–10.
- Foray D.; Goenega X. 2013. The goals of smart specialisation, *S3 Policy Brief Series No. 01/2013, JRC Scientific and Policy Report*, Publications Office of the European Union: Luxembourg.
- Foray, D.; David, P. A.; Hall, B. H. 2011. *Smart Specialisation: From academic idea to political instrument, the surprising career of a concept and the difficulties involved in its implementation*, MTEI Working Paper, Lausanne, pp. 1–16.
- Foss, N. J. 2011. *Entrepreneurship in the Context of the Resource-Based View of The Firm*, Palgrave.
- Foss, N. J.; Saebi, T. 2015 (Eds.). *Business Model Innovation: The Organisational Dimension*, OUP Oxford.
- Fossey, E.; Harvey, C.; McDermott, F.; Davidson, L. 2002. Understanding and evaluating qualitative research, *Australian and New Zealand journal of psychiatry* 36(6): 717–732.
- Francis, D.; Bessant, J. 2005. Targeting innovation and implications for capability development, *Technovation* 25(3): 171–183.
- Fraser, S. 2010. *The Effect of the UK Crisis on UK SME Finance*, Economic and Social Research Council: Swindon.
- Füller J.; Matzler K. 2007. Virtual product experience and customer participation – A chance for customer-centred, really new products, *Technovation* (27): 378–387.
- Füller, J.; Huttner, K.; Faullant, R. 2011. Why co-creation experience matters? Creative experience and its impact on the quantity and quality of creative contributions, *R&D Management* (41)3: 259–273.
- Füller, J.; Matzler K.; Hutter, K.; Hautz, J. 2012. Consumers' Creative Talent: Which Characteristics Qualify Consumers for Open Innovation Projects? An Exploration of Asymmetrical Effects, *Creativity and Innovation Management* (21)3: 247–262.
- Gassmann, O.; Frankenberger, K.; Csik, M. 2014. Revolutionising the Business Model, in Gassmann, O.; Schweitzer, F. (Eds.) *Management of the Fuzzy Front End of Innovation*, New York: Springer, 89–98.
- Gault, F. 2012. User innovation and the market, *Science and Public Policy* 39(1): 118–128.
- Gemser, G.; Leenders, M. A. 2001. How integrating industrial design in the product development process impacts on company performance, *Journal of Product Innovation Management* 18: 28–38.
- George, G.; Bock, A. J. 2011. The business model in practice and its implications for entrepreneurship research, *Entrepreneurship theory and practice* 35(1): 83–111.
- Gerlach, A. 2003. *Sustainable entrepreneurship and innovation*, in University of Leeds, The 2003 Corporate Social Responsibility and Environmental Management Conference, 30th June – 1st July 2003, Leeds: UK, 101–110.
- Gerlitz, L. 2015. Design for product and service innovation in industry 4.0 in emerging smart society, *Journal of Security and Sustainability Issues*, 5(2): 181–198.
- Giffinger, R.; Fertner, C.; Kramar, H.; Kalasek, R.; Pichler-Milanovic, N.; Meijers, E. 2007. *Smart cities: Ranking of European medium-sized cities*, Centre of Regional Science, Viena: Vienna University of Technology.
- Gorb, P. 1990. *Design Management: Papers from the London Business School*, London: Architecture Design and Technology Press.
- Gorb, P.; Dumas, A. 1987. Silent design, *Design Studies* 8(3): 150–156.
- Grönroos, C. 2006. Adopting a service logic for marketing, *Marketing Theory* 6(3): 317–333.
- Hack, A., Prause, G.; Maknyte (Gerlitz), L. 2012. Design Management and Branding for SMEs: Experiences from the DesignSHIP, in Muravska, T.; Prause, G. (Eds.) *European Integration and Baltic Sea Region Studies: University-Business Partnership through the Triple Helix Approach*, Berlin: Berliner Wissenschafts-Verlag, 129–148.

- Helfat, C. E.; Peteraf, M. A. 2003. The Dynamic Resource–Based View: Capability Lifecycles, *Strategic Management Journal* 24(10): 997–1010.
- Hermann, M.; Pentek, T.; Otto, B. 2015. *Design principles for Industrie 4.0 scenarios: A literature review*, Dortmund. Technische Universität Dortmund.
- Hertenstein, J. H.; Platt, M. B. 1997. Developing a Strategic Design Culture, *Design Management Journal* 8(2): 10–19.
- Hess, E. D. 2010. Smart Growth – Creating Real Long-term Value, *Journal of Applied Corporate Finance* 22(2): 74–82.
- Hippel, E. von; Jong, J. P. J. de; Flowrers, S. 2012. Comparing Business and Household Sector Innovation in Consumer Products: Findings from a Representative Study in the United Kingdom, *Management Science* 58.9 (2012): 1669–1681.
- Hippel, E. von; Ogawa, S.; Jong, J. P. J. de. 2011. The Age of the Consumer–Innovator, *MIT Sloan Management Review* 53(1): 27–35.
- Hoopes, D. G.; Madsen, T. L.; Walker, G. 2003. Guest Editors’ Introduction To the Special Issue: Why is There A Resource–Based View? Toward A Theory of Competitive Heterogeneity, *Strategic Management Journal* 24: 889–902.
- Hui, G. 2014. How the internet of things changes business models, *Harvard Business Review*, 1–5.
- Ignatavičius, R.; Tvaronavičienė, M.; Piccinetti, L. 2015. Sustainable development through technology transfer networks: case of Lithuania, *Journal of Security and Sustainability Issues* 4(3): 261–267. DOI: [http://dx.doi.org/10.9770/jssi.2015.4.3\(6\)](http://dx.doi.org/10.9770/jssi.2015.4.3(6))
- Inglewood, R.; Youngs, G. 2014. *Designing the Digital Economy – Embedding Growth through Design, Innovation and Technology*, California: Design Commission.
- Jawecki, G.; Füller, J.; Genauer, J. 2011. A Comparison of Creative Behaviours in Online Communities across Culture, *Creativity and Innovation Management* (20)3: 144–156.
- Kagermann, H., Wahlster, W.; Helbig, J. 2013. *Securing the future of German manufacturing industry: Recommendations for implementing the strategic initiative INDUSTRIE 4.0*, Final report of the Industrie 4.0 Working Group, acatech – National Academy of Science and Engineering.
- Kagermann, H.; Wahlster, W.; Helbig, J. (Eds.). 2013. *Recommendations for implementing the strategic initiative Industrie 4.0: Securing the Future of German Manufacturing Industry*, Final Report of the Industrie 4.0 Working Group, Forschungsunion.
- Kaplan, R. S.; Norton, D. P. 1996. Linking the balanced scorecard to strategy, *California management review* 39(1): 53–79.
- Kaplan, R. S.; Norton, D. P. 2005. The balanced scorecard: measures that drive performance, *Harvard business review* 83(7): 1–11.
- Kaplan, R. S.; Norton, D. P. 2006. How to implement a new strategy without disrupting your organisation, *Harvard business review* 84(3): 1–10.
- Kelley, T. 1999. Designing for Business, Consulting for Innovation, *Design Management Journal (Former Series)* 10(3): 30–34.
- Kemp, D. 2014. Vorwort, in BITKOM (Ed.) *Industrie 4.0 – Volkswirtschaftliches Potenzial für Deutschland*, Berlin: BITKOM.
- Kindström, D. 2010. Towards a service–based business model–Key aspects for future competitive advantage, *European Management Journal* 28(6): 479–490.
- Koppelman, U.; Spies, H. 1993. *Integriertes Design Management*, Cologne: Fördergesellschaft Produktmarketing.
- Kortesoja, J. 2013. *Design management in a startup: A multiple case study on managing the visual product identity in 13 startup companies*, Aalto University.
- Kotler, P.; Rath, G. A. 1984. Design: A powerful but neglected strategic tool, *Journal of Business Strategy* 5(2): 16–21.
- Krückhans, B.; Meier, H. 2013. Industrie 4.0 – Handlungsfelder der Digitalen Fabrik zur Optimierung der Ressourceneffizienz in der Produktion, in Dangelmaier, W.; Laroque, C.; Klaas, A. (Eds.) *Simulation in Produktion und Logistik Entscheidungsunterstützung von der Planung bis zur Steuerung*, Paderborn: HNI–Verlagsschriftenreihe, 31–40.

- Leminen, S.; Westerlund, M.; Rajahonka, M.; Siuruainen, R. 2012. Towards IOT Ecosystems and Business Models, in Adreev, S.; Balandin, S.; Koucheryavy, Y. (Eds.) *Internet of Things, Smart Spaces, and Next Generation Networking*, Berlin Heidelberg: Springer, 15–26.
- Letaifa, S. B. 2015. How to strategise smart cities: Revealing the SMART model, *Journal of Business Research* 68(7): 1414–1419.
- Li, Y.; Hou, M.; Liu, H.; Liu, Y. 2012. Towards a theoretical framework of strategic decision, supporting capability and information sharing under the context of Internet of Things, *Information Technology and Management* 13(4): 205–216.
- Lusch, R.; Vargo, S.; Wessels, G. 2008. Toward a conceptual foundation for service science: Contributions from service–dominant logic, *IBM Systems Journal* 47(1): 5–14.
- Mačiulis, A.; Tvaronavičienė, M. 2013. Secure and sustainable development: Lithuania’s new role in taking the Presidency of the EU, *Journal of Security and Sustainability Issues* 3(2):5–13. DOI; [http://dx.doi.org/10.9770/jssi.2013.3.2\(1\)](http://dx.doi.org/10.9770/jssi.2013.3.2(1))
- Magretta, J. 2002. Why Business Models Matter, *Harvard Business Review* 80: 86–92.
- Maroni, I.; Arruda, A.; Araujo, K. 2015. The Design and technological innovation: how to understand the growth of start–ups companies in competitive business environment, *Procedia Manufacturing* 2: 2199–2204.
- Martin, R. 2009. *The Design of Business: Why Design Thinking is the Next Competitive Advantage*, Harvard Business Press: Boston.
- McCann, P.; Ortega–Argilés, R. 2015. Smart Specialisation, Regional Growth and Applications to European Union Cohesion Policy, *Regional Studies* 49(8): 1291–1302.
- McNabola, A. 2013. The UK Design Council: Putting a Value on Design, *Design Management Review* 24(4): 22–23.
- Meier–Kortwig, H. J. 1997. *Design Management als Beratungsangebot*, Cologne: German Design Council.
- Meinel, C.; Leifer, L. 2011. Design Thinking Research, in Plattner, H; Meinel, C.; Leifer, L. (Eds.) *Design Thinking: Understand, Improve, Apply*, Berlin Heidelberg: Springer, xiii–xxi.
- Mejtoft, T. 2011. Internet of Things and Co-creation of Value, in *Internet of Things (iThings/CPSCoM), 2011 International Conference on & 4th International Conference on Cyber, Physical and Social Computing, Dalian, China, 19-22 October 2011*, 672–677.
- Mettler, A.; Williams, A. D. 2011. The Rise of the Micro–Multinational: How Freelancers and Technology–Savvy Start–Ups Are Driving Growth, Jobs and Innovation, Lisbon Council Policy Brief 5(3): 1–30.
- Micheli, P. 2013. *Leading business by design: Why and how business leaders invest in design*. London: Design Council.
- Micheli, P. 2015. *Leading Business by Design: High Value Manufacturing*. London: Design Council.
- Miles, M. B.; Huberman, A. M. 1994. *Qualitative data analysis: an expanded sourcebook*, Sage Publications.
- Moody, D. L.; Walsh, P. 1999. *Measuring the Value Of Information – An Asset Valuation Approach*, *Seventh European Conference on Information Systems (ECIS’99)*, Copenhagen Business School, Frederiksberg, Denmark, 23–25 June 1999, 496–512.
- Mortati, M. 2015. A Framework for Design Innovation: Present and Future Discussions, *Design Issues* 31(4): 4–16.
- Moultrie, J.; Clarkson, P. J.; Probert, D. 2007. Development of a Design Audit Tool for SMEs, *Journal of Product Innovation Management* 24: 335–368.
- Nagle, T.; Sammon, D. 2014. Big Data: A Framework for Research, in Phillips–Wren, G., Carlsson, A.; Respicio, A. (Eds.) *DSS 2.0 – Supporting Decision Making With New Technologies*, Amsterdam: IOS Press, 395–400.
- Neergaard, H.; Ulhøi, J. P. (Eds.) 2007. *Handbook of qualitative research methods in entrepreneurship*, Edward Elgar Publishing.
- O’Gordman, C. 2001. The sustainability of growth in small and medium-sized enterprises, *International Journal of Entrepreneurial Behaviour & Research* 7(2): 60–75.

- Oakley, M. 1990. Design and design management, in Oakley, M.; Borja de Mozota, B.; Clipson, C. (Eds.) *Design management*, Cambridge: MA: Basil Blackwell, Inc., 3–14.
- Oakley, M. 1990. *Design Management: A Handbook of Issues and Methods*, Oxford: Basil Blackwell.
- OECD / European Communities. 2005. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*.
- OECD. 2013. *Draft Synthesis Report on Innovation Driven–Growth in Regions: The Role of Smart Specialisation*, Organisation for Economic Cooperation and Development, Paris.
- Ortega–Argilés, R. 2012. *Economic Transformation Strategies: Smart Specialisation Case Studies*. S3 Smart Specialisation Platform, 1–102.
- Osterwalder, A.; Pigneur, Y. 2010. *Business model generation: A handbook for visionaries, game changers, and challengers*, Frankfurt a. M.: Campus.
- Osterwalder, A.; Pigneur, Y.; Bernarda, G.; Smith, A.; Papadakos, T. 2014. *Value Proposition Design: How to Create Products and Services Customers Want (Strategyzer)*, Hoboken, New Jersey, USA: John Wiley & Sons.
- Peteraf, M. A. 1993. The Cornerstones of Competitive Advantage: A Resource–Base View, *Strategic Management Journal* 14(3): 179–191.
- Plattner, H.; Meinel, C.; Leifer, L. 2011. *Design Thinking*. Berlin: Springer.
- Porter, M. E. 1985. *Competitive Advantage: Creating and Sustaining Superior Performance*, New York: Free Press.
- Porter, M. E. 1995. The competitive advantage of the inner city, *Harvard Business Review* 73(3): 55–71.
- Porter, M. E. 1996. What is Strategy?, *Harvard Business Review* 6: 61–78.
- Porter, M. E. 2008. The Five Competitive Forces That Shape Strategy, *Harvard Business Review* 86(1): 78–93.
- Porter, M. E. and Heppelmann, J. E. 2014. How Smart, Connected Products are Transforming Competition, *Harvard Business Review* 11: 1–23.
- Porter, M. E.; Kramer, M. R. 2006. Strategy & Society: The Link Between Competitive Advantage and Corporate Social Responsibility, *Harvard Business Review* 84(12): 78–92.
- Porter, M. E.; Millar, V. E. 1985. How information gives you competitive advantage, *Harvard Business Review* (63)4: 149–160.
- Prahalad, C. K.; Hamel, G. 1990. The Core Competence of the Corporation, *Harvard Business Review*, May–June, 1–15.
- Prahalad, C. K.; Ramaswamy, V. 2004. Co–creating unique value with customers, *Strategy & leadership* 32(3): 4–9.
- Prause, G., Hack, A.; Maknyte (Gerlitz), L. 2012. *How to integrate design management concepts into SME? Experiences from the South Baltic Sea Region*, Conference Proceedings of the International Entrepreneurship Forum Entrepreneurship and Sustainability: From Lifestyles to Innovative Enterprises in Creative and Sustainable Environments, Kuala Lumpur (KL) Malaysia, 3–6 September 2012, Vol. 2, Essex, UK, 429–457.
- Rezk, M. R. A.; Ibrahim, H., H.; Tvaronavičienė, M.; Sakr, M. M.; Piccinetti, L. 2015. Measuring innovations in Egypt: case of industry, *Entrepreneurship and Sustainability Issues* 3(1): 47–55. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.1\(4\)](http://dx.doi.org/10.9770/jesi.2015.3.1(4))
- Ramsauer, C. 2013. Industrie 4.0 – Die Produktion der Zukunft, in *WINGbusiness*, No. 3, 6–12.
- Rivard, S.; Raymond, L.; Verreault, D. 2006. Resource–based view and competitive strategy: An integrated model of the contribution of information technology to firm performance, *The Journal of Strategic Information Systems* 15(1): 29–50.
- Schmidt, R.; Möhring, M.; Härting, R. C.; Reichstein, C.; Neumaier, P.; Jozinović, P. 2015. Industry 4.0 – Potentials for Creating Smart Products: Empirical Research Results, in Abramowicz, W. (Ed.) *Business Information Systems, 18th International Conference, BIS 2015, Poznan, Poland, June 24–26, 2015*, Proceedings, Springer International Publishing, 16–27.

- Schmiedgen, J. 2011. *Innovating User Value: The Interrelations of Business Model Innovation, Design (Thinking) and the Production of Meaning – A Status-quo of the Current State of Research*, Doctoral dissertation, University of Potsdam.
- Scott, J. 2003. *Social network analysis – A handbook*, UK: SAGE Publications.
- Seuring, S.; Müller, M. 2008. Core Issues in Sustainable Supply Chain Management – a Delphi Study, *Business Strategy and the Environment* 17: 455–466.
- Stake, R. E. 1995. *The Art of Case Study Research*, Sage Publications, California: Thousand Oaks.
- Stamm, B. von. 2004. Innovation – What's Design Go to Do with It?, *Design Management Review* (15)1: 10–19.
- Sun, Y.; Yan, H.; Lu, C.; Bie, R.; Thomas, P. 2012. A holistic approach to visualizing business models for the internet of things, *Communications in Mobile Computing* 1(1): 1–7.
- Teece, D. 2010. Business Models, Business Strategy and Innovation, *Long Range Planning* 43: 172–194.
- Thomke, S. 2001. Enlightened Experimentation, *Harvard Business Review* 79(2): 67–76.
- Tidd, J.; Bessant, J. 2013. *Managing Innovation: Integrating Technological, Market and Organisational Change*, 5th edition, Chichester: John Wiley & Sons.
- Tikkanen, H.; Lamberg, J. A.; Parvinen, P.; Kallunki, J. P. 2005. Managerial cognition, action and the business model of the firm, *Management decision* 43(6): 789–809.
- Topalian, A. 2002. Promoting Design Leadership through Skills Development Programs, *Design Management Journal* 13(3): 10–18.
- Trott, P. 2012. *Innovation Management and New Product Development*, 5th edition, London: Prentice Hall.
- Turber, S.; Smiela, C. 2014. *A Business Model Type for the Internet of Things*, Twenty Second European Conference on Information Systems, Tel Aviv 2014, 1–10.
- Turber, S.; vom Brocke, J.; Gassmann, O.; Fleisch, E. 2014. Designing business models in the era of Internet of Things, in Tremblay, M. C.; VanderMeer, D.; Rothenberger, M.; Gupta, A.; Yoon, V. (Eds.) *Advancing the Impact of Design Science: Moving from Theory to Practice*, Switzerland: Springer International Publishing, 17–31.
- Turner, R. 2013. *Design Leadership – Securing the Strategic Value of Design*, Gower Pub Co.
- Tvaronavičienė, M.; Černevičiūtė, J. 2015. Technology transfer phenomenon and its impact on sustainable development, *Journal of Security and Sustainability Issues* 5(1): 87–97. DOI: [http://dx.doi.org/10.9770/jssi.2015.5.1\(7\)](http://dx.doi.org/10.9770/jssi.2015.5.1(7))
- Uckelmann, D.; Harrison, M.; Michahelles, F. 2014. *An architectural approach towards the future internet of things*, Berlin Heidelberg: Springer.
- Vargo, S.; Lusch, R. 2004. Evolving to a New Dominant Logic for Marketing, *Journal of Marketing* 68: 1–17.
- Vargo, S.; Lusch, R. 2008. Service-dominant logic: continuing the evolution, *Journal of the Academy of Marketing Science* 36: 1–10.
- Vargo, S.; Maglio, P.; Akaka, M. 2008. On value and value co-creation: A service systems and service logic perspective, *European Management Journal* 26: 145–152.
- Veit, D.; Clemons, E.; Benlian, A.; Buxmann, P.; Hess, T.; Kundisch, D.; Leimeister, J. M.; Loos, P.; Spann, M. 2014. Business Models – An Information Systems Research Agenda, *Business & Information Systems Engineering* 6(1): 45–53.
- Verganti, R. 2008. Design, Meanings, and Radical Innovation: A Metamodel and Research Agenda, *Journal of Product Innovation Management* 25: 436–456.
- Voss, C. 1998. Made in Europe: Small companies, *Business Strategy Review* 9: 1–19.

- Vossen, R. 1999. Relative strengths and weaknesses of small firms in innovation, *International Small Business Journal* 16: 88–94.
- Walker, D. 1990. Managers and designers: Two tribes at war?, in Oakley, M.; Borja de Mozota, B.; Clipson, C. (Eds.) *Design management*, Cambridge: MA: Basil Blackwell, Inc., 145–154.
- Walsh, V. 2000. Design, Innovation and the Boundaries of the Firm, *Design Management Journal*, *Academic Review 2000*, reprinted from *Research Policy* 25, Vivien Walsh, “Design, innovation and the boundaries of the firm,” 509– 529.
- Wasserman, S.; Faust, K. 1994. *Social Network Analysis – methods and applications*, Cambridge University Press.
- Wernerfelt, B. 1984. A Resource–Based View of the Firm, *Strategic Management Journal* 5: 171–180.
- Westerlund, M., Leminen, S. and Rajahonka, M. 2014. Designing Business Models for the Internet of Things, *Technology and Innovation Management Review* 4(7): 5–14.
- Wetter Edman, K. 2011. *Service Design – a conceptualisation of an emerging practice*. Licentiate Thesis (PhD), Göteborg: Göteborgs Universitet.
- Whyte, J.; Bessant, J.; Neely, A. 2015. *Management of creativity and design within the firm*, DTI Thick Piece, 1–36.
- Yin, R. K. 2009. *Case Study Research: Design and Methods*, London: Sage Publications.
- Yin, R. K. 2012. *Applications of Case Study Research*, London: Sage Publications.
- Young, W.; Tilley, F. 2006. Can business move beyond efficiency? The shift toward efficiency and equity in the corporate sustainability debate, *Business Strategy and the Environment* 15(6): 402–415.
- Zhao, F. 2005. Exploring the synergy between entrepreneurship and innovation, *International Journal of Entrepreneurial Behaviour & Research* 11(1): 25–41.
- Zott, C.; Amit, R.; Massa, L. 2011. The Business Model: Recent Developments and Future Research, *Journal of Management* 37(4): 1019–1042.

Laima GERLITZ is a researcher at Wismar University of Applied Sciences: Technology, Business and Design and PhD Student at Tallinn University of Technology within the fields of project, design and transport related management. Since 2014, Laima Gerlitz is working on her PhD topic “Design as Success Factor for Innovation, Competitiveness and Smart Growth”. Key fields of research are design and innovation, strategic design management, design management for enterprises, competitiveness and value creation deriving from design-driven approaches in organisational settings, particularly in the context of small manufacturing and high-tech enterprises and start-ups.

Publisher



The International Journal

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

ISSN 2345-0282 (online) <http://jssidoi.org/jesi/aims-and-scope-of-research/>

2016 Volume 3 Number 3 (March)

THE IMPACT OF SERVANT LEADERSHIP ON LEADERSHIP SUSTAINABILITY: EMPIRICAL EVIDENCE FROM HIGHER EDUCATION IN SYRIAN UNIVERSITIES

SERENE DALATI

Arab International University, Ghabaghib, Daraa, Syria

E-mail: s-dalati@aiu.edu.sy; serene.dalati@gmail.com

Received 16 November 2015; accepted 20 January 2016

Abstract. The purpose of this research paper is to develop a theoretical framework of sustainable leadership model which could be applied to assess Higher education academic and administrative staff perception and level of endorsement of significant leadership behaviours at Higher Education industry. Leadership sustainability is relatively a new trend which requires further examination. The sustainable leadership model comprises a set of leadership behaviours including visionary, team oriented and servant leadership. A theoretical model is established, clarifying the significance of selection of the abovementioned leadership behaviours. Planned Methodology, measurement, empirical testing and application of the theoretical model is investigated. A quantitative approach is employed to design a questionnaire survey to identify the appropriate conceptualisation of integrated leadership attributes and behaviour items. The competitive advantage of the theoretical model is characterised by the combination and integration of various characteristics and attributes of leadership and its relationship to leadership sustainability, a newly defined leadership dimension in the context of higher education. The model argues the significance of the abovementioned leadership dimensions in Higher Education industry, particularly among rectors, faculty deans, vice dean and heads of departments. Cronbach alpha Reliability test shows very strong internal consistency and significance. Higher Education industry is investigated in this research study selecting a convenience sample from Higher Education institutions. Descriptive analysis shows high level of endorsement of perceived leadership dimensions among academic and administrative staff. The regression analysis shows strong and positive significance of servant leadership on perceived sustainability leadership in higher education. The research paper emphasizes the significance of leadership dimensions including vision, influence, team building, and service in higher education industry in Private and Public universities.

Keywords: leadership sustainability, vision, teambuilding, servant leadership, higher education

Reference to this paper should be made as follows: Dalati, S. 2016. The impact of servant leadership on leadership sustainability: empirical evidence from higher education in Syrian universities, *Entrepreneurship and Sustainability Issues* 3(3): 269-281.

DOI: [http://dx.doi.org/10.9770/jesi.2016.3.3\(4\)](http://dx.doi.org/10.9770/jesi.2016.3.3(4))

JEL Classifications: M10, O10

1. Introduction

Leadership in Higher Education is a significant area of research that requires further investigation. Furthermore, there is no significant research about leadership in higher education in Syria. The need for awareness and knowledge of effective managerial leadership behaviours which enhances successful visions and missions for Higher education institutions, effective communication and team building for academic and administrative managers, has become an increasingly

important discipline in organisational pure as well as practical research. The increasing demand for college's principals, skilful and effective heads of departments requires attention to the field of leadership capacity building (Lambert, 2012). Challenges associated with stressful work environment, information overload, technological advancement and connectivity, battle for analytical and managerial talent and increasing ethical dilemmas have been among important factors stimulating the need for effective principals, deans and rectors, who acquire required effective leadership qualities and behaviours that could transcend cultural, geographical, political, racial and national aspects. Furthermore the concept of sustainable leadership is contemporary as few research is developed in the field of sustainable leadership. The purpose of this research paper is to develop a model of sustainable leadership behaviours and attributes to be applied in higher education measuring academic and administrative staff perception of Sustainable Leadership in Higher Education in Syria. The research suggests a theoretical framework investigating the impact of perceived outstanding leadership behaviours on leadership sustainability in Higher Education in Syria.

2. Leadership Behaviours in Higher Education

Joo et al (2014) investigated Bolman and Deal framework of leadership investigating a dean in a private university in Malaysia, applying LOS self-instrument which was administered to the dean, and LOS other-instrument which was administered to 35 staff who were responding directly to her. Results of the study shows a difference in leadership orientation between self-assessment and other assessment. Results of the study also show that it is necessary for future deans to be trained for leadership skills to meet demands of the industry(Joo, Hee, & Piaw, 2014).

Chibani and Chibani (2013) explored leadership styles among school principals applying the Leadership Orientation Questionnaire which has two dimensions: one is self-rated by principals, and the other is addressed to school teachers to rate their principals on two dimensions. These include leadership and behavior. The study is divided into two parts. The sample of the study in part one were 8 schools principals and 158 school teachers selected from four private schools and one public school in Lebanon. In part two the sample was selected from two school principals and 40 school teachers from different schools. Results of the study showed that school principals crucially need creativity while school teacher need training(Chibani & Chibani, 2013).

According to Sotirofski (2011) there are internal and external factors to be considered when examining higher education institutions. One of these crucial factors is related to administrators' ability to exercise leadership qualities. The study examines the construct of instructional leadership in higher education institutions where a comparison between Turkish and Albanian universities' administrators is conducted. A questionnaire survey is administered among a sample of 613 lecturers in universities in Turkey and Albania. Results show no significant difference in the perception of administrator's instructional leadership roles, university mission, managing learning and teaching process. With regard to academic staff, there is a significant difference between Turkish and Albanian lecturers' perceptions of administrator instructional leadership, in the sense that Turkish lecturers have more positive perception than Albanians (Sotirofski, 2011).

3. Higher Education in Syria

Primary, secondary and Higher Education is provided by state in Syria. However a legislation applied in 2001 allowed for the formation of private schools and colleges. Public higher education institutions in Syria are state controlled and financed. This is achieved through ministry of higher education and the Higher education Council. There are six public universities, and over fifteen private universities, and six higher institutions and tens of intermediate vocational, professional and technical training institutions that are under the responsibility of the ministry of Higher Education. The most influential legislative reforms for higher education in Syria was the presidential decree no. 36 for the year 2001, which governs the work of private universities in Syria. The other legal framework that governs higher education in Syria is Law No. 6 for the

year 2006. This law governs the work of public universities in Syria which is called “The University regulation Law”. The new law gives more autonomy to universities with regard to staff appointment and promotions. The ministry of the Higher Education is striving to set priorities, set plans and implement them and continue the process of modernizing of HE industry in Syria (Al-ahmar & Ahmar-dakna, 2009).

The prevalent organizational environment of Higher Education industry in Syria, particularly public universities, could be characterized by a traditional managerial approaches with strong bureaucratic environment, application of outdated methodologies, lack of individual recognition, lack of effective encouragement of outstanding performance; limited collaboration with international conferences and academic journals, and most important a turbulent political environment which goes back to the past five years, represented by a political and national crisis in Syria. Against this background, a theoretical framework of leadership sustainability in higher education is developed in this research.

4. Sustainable Leadership in Higher Education

Sustainable leadership is a newly defined term in organisational leadership research (Hargreaves 2007, Lambert 2012). The term was coined by Hargreaves and Fink where sustainable leadership was stressed as a leadership paradigm which “matters, spreads and lasts. It is a shared responsibility that does not unduly deplete human or financial resources and that cares for and avoids exerting damage on the surrounding educational and community environment (Hargreaves & Fink, 2003).

According to Hargreaves & Fink 2003 a model of Sustainable leadership in Higher education was developed which consists of seven components which includes depth, length, breadth, justice, diversity, resourcefulness and conversation. The term was introduced to develop a framework which could balance between short term organisational objectives and long term grand goal regardless the change of the individual leader represented by the institution rector or faculty dean or department head in the institution.

Lambert (2012) develops a model for sustainable leadership to be implemented as a tool for organisational capacity building in Higher Education institutions. The model consists of six components including capacity building in staff, strategic distribution, consolidation, building long term objectives from short term targets, diversity and conservation.

5. Developing a Model of Leadership Sustainability in Higher Education

The theoretical model examines a set of sustainable leadership behaviors and dimensions, which are building on prior research on leadership in organizations not exclusively in Higher Education sector. The model builds on a set of independent variables of outstanding leadership behaviors which are predicted to have an impact on perceived leadership sustainability

5.1. Visionary Leadership

The first component in the theory of sustainable leadership at Higher Education builds on prior research of outstanding leadership in organizations emphasizing the importance of vision in organizations (Tichy & Devanna 1986, Bennis & Biederman 2009, Conger & Kanungo 1998, Yammarino et al. 1993, Kouzes & Posner 1995, Conger & Hunt 1999). Organisational vision is defined as a set of idealized future goals developed by the leader which represents purpose and values shared by followers who embrace ideology of the leader (Strange & Mumford 2005, House 1999, Collins & Porras 1994, Ergeneli et al. 2007). According to Zaccaro & Banks (2001) to improve a business competitive advantage, managers and business leaders need greater strategic flexibility which is developed through several factors, two of which include firstly ability to manage change, and secondly developing organizational vision which could be translated into a strategic

plan. Building on previous research on leadership in organisations, vision as a quality and competency possessed by leaders at higher education sector, is developed as the first component in sustainable leadership in Higher Education model. Visionary leadership reflects leader's ability to inspire and motivate followers, establishing clear image of the tasks and what could be done better in the future of the organization. Visionary leadership behaviour comprises subscales including (a) visionary, (b) future oriented, (c) performance oriented, (d) risk taker, (e) industry knowledgeable and (f) agent of change.

5.2. Team oriented Leadership

The second component emphasises the significance of teambuilding in Higher Education and the importance of developing team leaders who can play crucial roles at individual, departmental and institutional levels. House et al. (2004) define team-oriented leadership behaviour as a leadership variable which emphasizes effective teambuilding and accomplishment of common goals among team members. A team is composed of some number of relatively independent individuals who are connected together in a work activity and each have their own needs, goals and expected outcomes that motivate their behaviour (Day et al. 2004, Tolle 1988, Salas et al. 1992, Salas et al. 2005, Cannon-Bowers et al. 1993). Team-oriented leadership reflects ability and knowledge of teambuilding, establishing common purpose for team members and social collective identity for followers. Team oriented leadership behaviour comprises subscales including (a) team builder (b) collective (c) sensitive to team needs (d) role model (e) communicative.

5.3. Servant Leadership

The third component emphasizes service, fairness, self-sacrifice and modesty as components of a sustainable leader. The dimension of servant leadership is originated from prior research demonstrating aspects (Greenleaf 1977, Graham 1991, Farling et al. 1999, Liden et al. 2015, Mittal & Dorfman 2012). Servant Leadership behaviour reflects ability of building trust by selflessly serving others; stressing personal integrity and, sensitivity to the needs of stakeholders including larger society. Servant leadership behaviour comprises subscales including (a) just (b) sincere (c) humble (d) dependable (e) self-sacrificial.

5.4 Leadership Sustainability in Higher Education

The fourth illustrates perceived leadership sustainability as a characteristic quality and behaviour within leaders in higher education. Promoting and encouraging diversity as a behaviour and values in higher education setting would be represented by demonstrating leader's awareness of differences among individuals related to higher education including students, academic and administrative staff and stakeholders in general. Sustainable leadership behaviours comprises subscales including (a) trustworthy (b) egalitarian (c) culturally aware (d) performance oriented (e) self – interest transcendent.

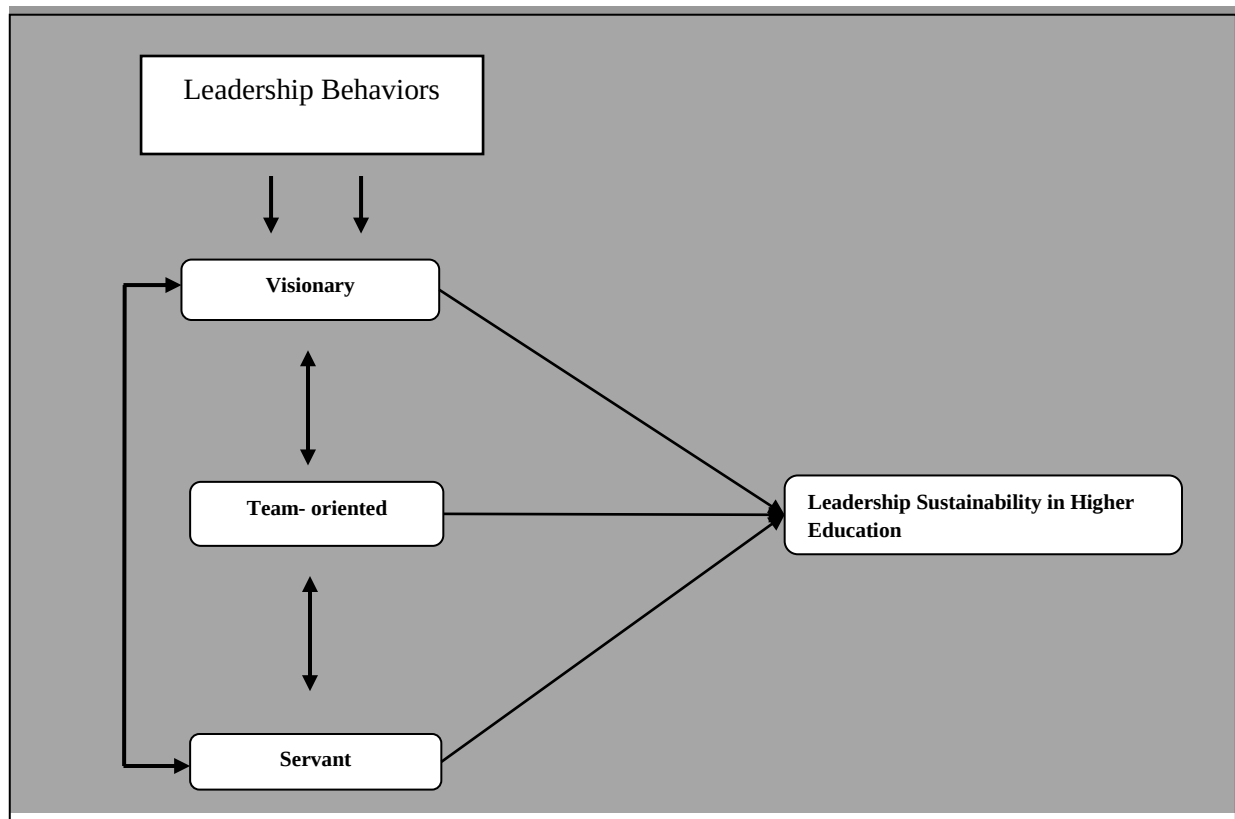


Figure 1: a Framework of Sustainable Leadership in Higher Education –Source: Researcher.

Source: author

5. 5. Research Hypotheses

According to Leithwood & Duke (1999) there develops a set of leadership behaviors which are correlated with educational leadership. They include instructional leadership, moral leadership, transformational leadership, participative leadership, managerial leadership and contingency leadership approaches. Summarizing previous studies, a positive relationship between the prospective leadership behaviors is suggested.

H1

Visionary, team oriented and servant leadership behaviours are positively associated in the Higher Education environment.

H2

Visionary, team oriented and servant leadership are predicted to have a positive impact on leadership sustainability in Higher Education.

6. Methodology Design

The Managerial Leadership behaviors theoretical framework employed the application of a quantitative approach collecting primary data through self-administered questionnaire. The methodology of research is developed through the design of a self-administered questionnaire. According to Cooper & Schindler (2014) advantages of self-administered survey include

less cost, sample accessibility. Leadership behaviours scale is based and originated from prior leadership (Conger & Kanungo 1998, Kouzes & Posner 1995, Strange & Mumford 2002, Kotter 1996, House, Paul J Hanges, et al. 2004, Mittal & Dorfman 2012b). The questionnaire comprises a set of 36 items measuring perception of leadership behaviours and sustainability leadership.

6.1. Sampling Design and Strategy

Sampling design employed a convenience sampling strategy due to lack of resources to conduct a probability sampling strategy. The questionnaire survey was distributed to one private and one public Higher Education institutions. The total number of collected questionnaires is 68 responses. Only 56 of the questionnaires were employable due to lack of reliability in responses.

6. Reliability and Validity of the Scale

Cronbach alpha test is conducted to provide a measure of the internal consistency of the scales. Internal consistency describes the extent to which all the items measures the same construct and are connected to the interrelatedness of the items within the scale (Tavakol & Dennick, 2011). Cronbach alpha Reliability test shows optimal reliability ranging from 0.87 to 0.91 which is to be considered an excellent indication.

Table 1 Cronbach alpha reliability test (n=56)

Variable Components	Number of Items	Alpha (α) without deleting any item
Visionary	7	0.89
Team oriented	9	0.87
Servant	10	0.91
Leadership Sustainability	8	0.85

8. Descriptive Analysis

8.1 Demographic Profile of Respondents

The demographical profile of respondents includes respondents' age, gender, type of institution, work experience in Higher Education, work experience in their present organizations examined in this study. Descriptive data shows that the average age of respondents is 43, work experience in Higher Education average mean is 11 years and work experience in current institutions is 8 years. Table 1 illustrates demographical data of respondents. 77% of the respondents were male, 23 % female. 79 % of respondents are PhD holders and 68 % of academic staff are instructors (Table 2).

Table 2. Demographic Profile of Respondents (n=56)

Respondents Demographic Profile	f	%
Gender		
Male	39	75
Female	13	25
Higher Education Institution		
Private	28	53
Public	25	47
Faculty		
Business	13	26
Pharmacy	6	12
IT	7	13
Economics	23	45
Administration	2	4
Education Level		
Bachelor	7	13
Master	3	5
PhD	42	78
Other	2	4
Academic Level		
Instructor	23	56
Assistant Professor	10	24
Professor	8	20
Administrative Level		
Staff	8	35
Head of Department	6	26
Vice Dean	6	26
Dean	3	13

8.2 Descriptive Data Analysis

Descriptive analysis illustrates managerial leadership behaviours profile investigated in Higher Education institution in Syria. Descriptive analysis shows that perceived leadership behaviours in HE institutions in Syria have high scores (Table 3).

Table 3. Descriptive Data Analysis for Leadership Behaviours (n=56)

Servant Leadership Behaviours Items	Mean	SD
1. Sincere and means what they say	3.92	1.05
2. Reliable and dependable	3.92	1.05
3. Stimulating others	3.57	1.14
4. Encourages others to use their mind and challenge beliefs	3.50	1.26
5. Willing to give time, money and resources	3.54	1.05
6 .Tends to be good friend of subordinates	3.66	1.11
7. Has empathy for others	3.69	1.07
8. Tends to be helpful	3.74	1.01
9. Modest	3.88	0.968
10. Presents self in a modest way	3.75	1.06

Visionary Leadership Behaviours Items	Mean	SD
1. Idealises future goals	3.55	1.11
2. Risk Taker	3.41	1.24
3. Ability to interpret and use knowledge of industry	3.73	1.05
4. Ability to set future oriented goals	3.73	1.00
5. Awareness of organisational barriers that may impair organisational goals	3.87	1.06
6. Vision of future for organisation	3.67	1.14
7. Reviews performance and plan of action	3.38	1.22
Team oriented Leadership Behaviours Items	Mean	SD
1. ability to influence people to commit to team goals	3.81	1.25
2. aware of team members ability and what they could contribute to the team	3.83	1.09
3. sensitive to the abilities and emotional need of team members	3.40	1.08
4. Ability to communicate effectively and clearly with team members	3.67	1.02
5. works towards one collective team identity	3.53	0.971
6 .makes sure attitude is clear to the team	3.55	1.02
7. ability to establish common ground of understanding with team members	3.60	0.845
8. acts as a role model for team members	3.80	1.03
9. Change team members attitude to advocate a proposed vision	3.74	1.02
Leadership Sustainability	Mean	SD
1. Deserves trust and can be relied on to keep their word	3.89	1.05
2. Acts according to what is right or fair	3.76	1.02
3. Works jointly with others	3.62	1.18
4. Forgoes self-interest and make personal sacrifices	3.30	1.17
5. Performance and Standards of excellence	3.57	1.12
6. focuses on personal welfare of employees	3.25	1.04
7. aware of gender differences and treats team members with egalitarian approach	3.61	1.03
8. awareness of team members cultural backgrounds and values	3.58	1.02

9. Correlation Analysis

The correlation analysis shows positive and strong significance between the variables of the study and strong association between the aforementioned leadership dimensions. The correlation analysis shows strong association ranging from $r=0.71$ to $r = 0.91$. The correlation analysis indicate significant relationship between leadership variables which supports the first hypothesis (Table 4).

Table 4. Means, Standard Deviation and Correlations (n=56)

Variables	Mean	SD	1	2	3	4
1-Servant Leadership	3.72	0.806	1			
2-Visionary Leadership	3.62	0.887	0.821**	1		
3-Team oriented Leadership	3.66	0.732	0.780**	0.830**	1	
4- Leadership Sustainability	3.57	0.765	0.869**	0.806**	0.793**	1

10. Regression Analysis

A regression analysis is conducted between a set of outstanding leadership behaviours which are employed in this study as the predictor variables. Leadership sustainability is examined as the outcome variable. Multiple regression analysis between Leadership behaviours and sustainability in Higher Education is conducted. In the first model, the multiple regression analysis indicates a significant relationship between servant leadership and leadership sustainability where the multiple regression test produces a standardised beta value of 0.86^{**} , $p= 0.000$, confirming that servant leadership has an impact on leadership sustainability.

In the second model the regression test indicates a significant relationship between servant leadership and leadership sustainability. The regression test produces a standardised beta value of 0.64**, $p = .000$. The regression analysis also illustrates a significant relationship between team oriented leadership and leadership sustainability in higher education producing a standardised beta value of 0.29**, $p = .005$. The regression analysis confirms that servant and team oriented leadership have positive impact on Leadership sustainability. This result partially supports the second hypothesis. Table 5 illustrates the coefficient testing for hypothesis 2 regression analysis results reporting on standardised beta, F value and significance level (Table 5).

Table 5 Regression Analysis of Leadership behaviours and Leadership Sustainability (Dependent Variable: Leadership Sustainability)

Independent Variables	Beta	F	Sig
Servant Leadership	0.64**	166.370	0.000
Team oriented Leadership	0.29**	98.759	0.000

11. Results and Discussion

The descriptive analysis of the study shows generally high levels of perceived leadership behaviours among academic and administrative staff at Higher Education in Syria. The descriptive analysis results indicates high level of endorsement of the abovementioned behaviours and leadership styles. Results presented the research paper investigates descriptive analysis illustrated in table 3. With regard to managerial leadership dimensions in the study, few items were moderately rated. For example with regards to servant leadership, challenging beliefs and stereotypical approaches were moderately rated indicating that such a quality does not frequently exist in this culture or institution. That could be related to emphasize on religion and not encouraging provocative challenging questions. Risk taking is also an item which is perceived moderately, due to conservative aspect that characterizes Syrian Culture. The concept of challenging the status quo and motivating force for change is also perceived moderately in this research indicating possible lack or resistance or this quality. Leadership behaviours which include inspiring change, challenging thoughts and beliefs, questioning the status quo, are qualities that would need further consideration in the Syrian social and organisational environments. The correlation analysis shows positive and significant association between the variables of the study. The results of correlation analysis supports the first hypothesis. The regression analysis illustrates positive and significant relationship between servant and team oriented leadership and leadership sustainability indicating significant impact of servant leadership on leadership sustainability in higher education (Fig.2).

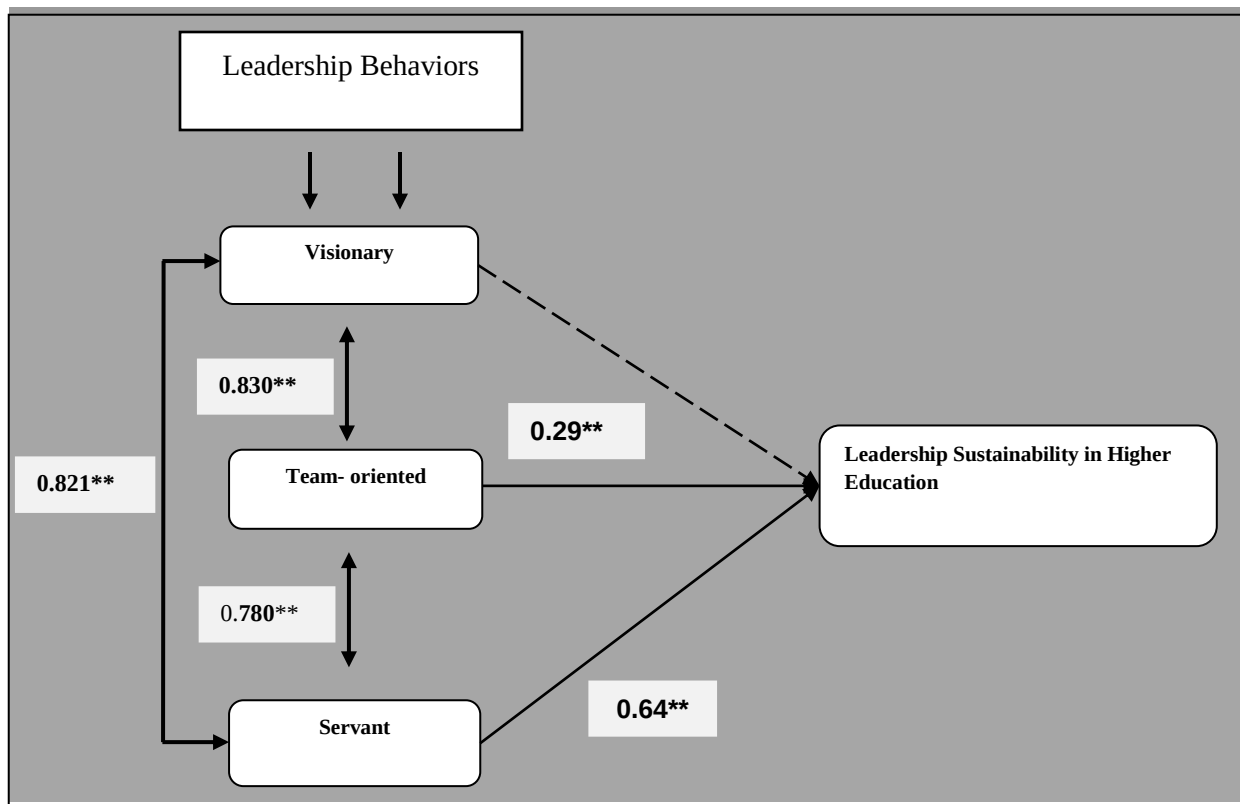


Figure 2: Regression Model for Leadership Behaviours and Leadership Sustainability

Source: author

The model emphasises the significance of team dynamics and servant leadership to leadership sustainability in higher education. The research paper argues the importance of such behaviours in a sensitive and demanding approach at higher education industry. The importance and significance of the research has a future implication as these dimension has relationships with many work related factors, such as job satisfaction, commitment, work stress and organisational citizenship. Unfortunately there is lack of prior literature on leadership behaviours in Higher Education in Syria to compare or relate to.

According to Selamat et al. (2013) there is a positive relationship between transformational leadership and organisational commitment, emphasizing the role of principal in practicing transformational behaviour to stimulate teachers' organisational commitment. The application of the proposed leadership behaviours model in higher education context is an interesting application.

Another motivating notion that could be investigated in higher education environment is the relationship between leadership behaviours and organisational cynicism. According to Mete (2013) organisational cynicism in a new notion in the discipline of organisational behaviours, and represents person's negative attitudes towards his/her organisation. The result of the study shows significant effect of ethical leadership of faculty administration on academics' organisational cynicism.

Obviously the constructs of ethical, servant, and transformational leadership behaviours are crucial dimensions of leadership in higher education. Honesty, integrity, humility, service, self-awareness, self-actualization and role model building are crucial element in building mentor- student relationship, as well relationship between deans and rectors and their relationships with staff.

What could also be discussed in this research is related to the research environment that exist in Syria. During fieldwork and data collection stage few observation could be concluded in this context. The first observation is related mainly to administrative staff conceptual understating of leadership in the sense that they have good understanding of management but not leadership. When asked to bring back from their collective memory and experience in Higher Education an example of a co-worker or a superior who possessed leadership abilities and assess him/her according to the scale, most of administrative staff had difficulty of relating to the concept of a leadership in organisational environment. Whereas the concept of bureaucratic management is strongly clear in the minds of academic and administrative staff, the notion of leadership in organisations is not familiar. Some of the respondents related to their immediate managers and preferred rating them, although they were told to relate to a character who possessed leadership qualities and demonstrated leadership behaviours. The concept of perceived leadership was somehow too abstract for some of the respondents.

12. Limitation of Research

The most important and significant limitation of the study is related to sample size and strategy. The most important concern in this research is that the small size of sample could jeopardize the validity, reliability and generalisation of the results of the study. The size of the sample is 56 which could be considered as a good pilot test with significant results. Reliability test shows excellent results, however, the lack of validity tests and probability sampling strategy could risk robustness and generalizability of the research results.

The second limitation of the study is related to the simplicity of the framework which is building relationships between significant leadership dimensions and behaviours, without attempting to develop a sophisticated model that would build causal relationships between leadership as a crucial organisational variable with, variables which could in this context include, organisational commitment, motivation, academic job satisfaction, and individual performance.

13. Future Research and managerial Implication

Future research of outstanding leadership behaviors could investigate empirical testing of the model at a cross cultural approach. An empirical testing could include samples selected from different regions representing Western, Middle Eastern, European and Ocean Pacific regions. Future research could also investigate a contingency model of leadership and culture examining leadership behaviors that could be applied in specific cultures. A cross cultural sample could be selected from different regions taking in consideration harmonizing the target industry and unit of analysis of the research. Questionnaire translation could also investigate better enhancement techniques. Back translation could be conducted for cross research purposes (Brislin, 1970).

Significant implication could be the application or benefit of this research in a practical approach. Few lessons that were learnt from this research is lack of training and awareness of managerial leadership in organisational aspect. Training leadership skills programs to both academic and administrative staff could make a difference in organisational culture sense in the target institutions. What is desperately needed is a social and organisational culture which stimulates an empowering leadership approach versus a conventional bureaucratic approach.

Conclusions

The research paper examines the development of a theoretical framework of leadership behaviours and leadership sustainability in organisational approaches. The empirical testing of the model, which is selected from two Higher Education institutions, shows high level of perceived leadership behaviours endorsement among academic and administrative staff in

Higher Education in Syria. The association between leadership shows strong and positive significance. The regression analysis shows positive and significant relationship and positive impact of servant and team oriented leadership on leadership sustainability.

Acknowledgement

Thanks go to both academic and administrative staff in both target Higher Education institutions for their help and cooperation. Thanks also go to deans, vice deans and heads of departments who participated in research questionnaire survey.

References

- Al-ahmar, A., & Ahmar-dakna, S. (2009). THE NATIONAL PROJECT OR THE NATIONAL PROGRAMME : AN EVALUATION OF TEMPUS PROGRAMME CONTRIBUTION TO THE DEVELOPMENT OF THE HIGHER EDUCATION SECTOR IN SYRIA Rami Ayoubi. *Universitas Stuttgart*, (November).
- Bennis, W., & Biederman, W. (2009). The Essential Bennis. *Harvard Business Review*, (November), 465. Retrieved from <http://books.google.com/books?id=U1qSEhnyx8AC&pgis=1>
- Brislin, R. W. (1970). *Back-Translation for Cross-Cultural Research*. *Journal of Cross-Cultural Psychology* (Vol. 1). <http://doi.org/10.1177/135910457000100301>
- Cannon-Bowers, J. A., Salas, E., & Converse, S. A. (1993). Cognitive psychology and team training: Training shared mental models and complex systems. *Human Factors Society Bulletin*, 33, 1–4.
- Chibani, W. Al, & Chibani, P. H.- Al. (2013). Leadership styles of school principals in Lebanon : Multiple case study. *Procedia - Social and Behavioral Sciences*, 93, 174–176. <http://doi.org/10.1016/j.sbspro.2013.09.173>
- Collins, J. C., & Porras, J. I. (1994). SIOI ideology provides the glue together through time . *Harvard Business Review*, 74(5), 65–77. <http://doi.org/Article>
- Conger, J. a, & Hunt, J. G. (1999). Charismatic and transformational leadership. *The Leadership Quarterly*, 10(2), 121–127. [http://doi.org/10.1016/S1048-9843\(99\)00017-X](http://doi.org/10.1016/S1048-9843(99)00017-X)
- Conger, J. A., & Kanungo, R. N. (1998). *Charismatic leadership in organizations*. *Charismatic Leadership in Organizations*. <http://doi.org/10.2307/2667134>
- Cooper, D., & Schindler, P. (2014). Business Research Methods. *Social Research*, (12th Edition), 792. Retrieved from <http://www.amazon.com/Business-Research-Methods-Alan-Bryman/dp/0199284989/nhttp://130.209.236.149/headocs/31businessresearch.pdf>
- Day, D. V., Gronn, P., & Salas, E. (2004). Leadership capacity in teams. *Leadership Quarterly*, 15(6), 857–880. <http://doi.org/10.1016/j.leaqua.2004.09.001>
- Ergeneli, A., Gohar, R., & Temirbekova, Z. (2007). Transformational leadership: Its relationship to culture value dimensions. *International Journal of Intercultural Relations*, 31(6), 703–724. <http://doi.org/10.1016/j.ijintrel.2007.07.003>
- Farling, M. L., Stone, A. G., & Winston, B. E. (1999). Servant Leadership: Setting the Stage for Empirical Research. *Journal of Leadership & Organizational Studies*, 6(1-2), 49–72. <http://doi.org/10.1177/107179199900600104>
- Graham, J. W. (1991). Servant-leadership in organizations: Inspirational and moral. *The Leadership Quarterly*, 2(2), 105–119. [http://doi.org/10.1016/1048-9843\(91\)90025-W](http://doi.org/10.1016/1048-9843(91)90025-W)
- Greenleaf, R. K. (1977). Servant Leadership. *Leadership Excellence*, 23, 20.
- Hargreaves, A. (2007). Sustainable Leadership and Development in Education: Creating the future, conserving the past. *European Journal of Education*, 42(2), 223–233. <http://doi.org/10.1111/j.1465-3435.2007.00294.x>
- Hargreaves, A., & Fink, D. (2003). The Seven Principles of Sustainable Leadership by. *Educational Leadership*, 61(December), 8. Retrieved from http://www.marylandpublicschools.org/NR/rdonlyres/F7D49A8D-E9D0-4C49-9DE6-3A878BC9F1F4/18748/seven_principles.pdf
- House, R. J. (1999). Weber and the neo-charismatic leadership paradigm. *The Leadership Quarterly*, 10(4), 563–574. [http://doi.org/10.1016/S1048-9843\(99\)00032-6](http://doi.org/10.1016/S1048-9843(99)00032-6)
- House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (2004a). Culture and Leadership. *Culture, Leadership, and Organizations: The GLOBE Study of 62 Societies*, 301–340.
- House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (2004b). *Culture, Leadership , and Organizations. The GLOBE Study of 62 Societies*. Retrieved from http://books.google.de/books?id=_KsXEJQg9pkC&dq=intitle:Culture+Leadership+I+Organizations&hl=&cd=1&source=gbs_a

- pi\papers2://publication/uuid/512B92AA-A29D-4E9F-9B45-59376DAF9E6F
- Joo, M. T. H., Hee, T. F., & Piau, C. Y. (2014). Leadership Orientations of an Educational Leader in a Private University in Malaysia. *Procedia - Social and Behavioral Sciences*, 114(1990), 681–686. <http://doi.org/10.1016/j.sbspro.2013.12.767>
- Kotter, J. P. (1996). *Leading change*. Harvard Business School Press. Retrieved from <http://books.google.co.uk/books?id=ib9Xzb5eFGQC&printsec=frontcover#v=onepage&q&f=false> <http://books.google.com/books?hl=en&lr=&id=ib9Xzb5eFGQC&oi=fnd&pg=PR12&dq=Leading+Change&ots=MwncdHFLZ6&sig=-keCel5KTZpNVV5SJKbWTHJneeM>
- Kouzes, J. M., & Posner, B. Z. (1995). *The leadership challenge: How to keep getting extraordinary things done in organizations*. San Francisco JosseyBass (Vol. 2nd). Retrieved from <http://www.loc.gov/catdir/toc/onix07/95011314.html>
- Lambert, S. (2012). The perception and implementation of sustainable Leadership strategies in further education colleges. *Journal of Leadership Education*, 11(2), 102–120. <http://doi.org/10.12806/V11/I2/RF6>
- Leithwood, K., & Duke, D. (1999). A century's quest to understand school leadership. In *Handbook of research on educational administration* (pp. 45–73). <http://doi.org/10.4324/9780203463383>
- Liden, R. C., Wayne, S. J., Meuser, J. D., Hu, J., Wu, J., & Liao, C. (2015). Servant leadership: Validation of a short form of the SL-28. *The Leadership Quarterly*, 26(2), 254–269. <http://doi.org/10.1016/j.leaqua.2014.12.002>
- Mete, Y. A. (2013). Relationship between Organizational Cynicism and Ethical Leadership Behaviour: A Study at Higher Education. *Procedia - Social and Behavioral Sciences*, 89, 476–483. <http://doi.org/10.1016/j.sbspro.2013.08.880>
- Mittal, R., & Dorfman, P. W. (2012a). Servant leadership across cultures. *Journal of World Business*, 47(4), 555–570. <http://doi.org/10.1016/j.jwb.2012.01.009>
- Mittal, R., & Dorfman, P. W. (2012b). Servant leadership across cultures. *Journal of World Business*, 47(4), 555–570. <http://doi.org/10.1016/j.jwb.2012.01.009>
- Salas, E., Dickinson, T. L., Converse, S. A., & Tannenbaum, S. I. (1992). Toward an understanding of team performance and training. In *Teams Their training and performance* (pp. 3–29). Retrieved from <http://scholar.google.com/scholar?cluster=3558551026404344212&hl=de#0>
- Salas, E., Sims, D. E., & Burke, C. S. (2005). Is there a “Big Five” in Teamwork? *Small Group Research*, 36(5), 555–599. Retrieved from <http://sgr.sagepub.com/cgi/content/abstract/36/5/555>
- Selamat, N., Nordin, N., & Adnan, A. A. (2013). Rekindle Teacher's Organizational Commitment: The Effect of Transformational Leadership Behavior. *Procedia - Social and Behavioral Sciences*, 90(InCULT 2012), 566–574. <http://doi.org/10.1016/j.sbspro.2013.07.127>
- Sotirofski, K. (2011). Comparing the educational leadership roles of Albanian and Turkish higher education institutions administrators. *Procedia - Social and Behavioral Sciences*, 15, 3560–3565. <http://doi.org/10.1016/j.sbspro.2011.04.335>
- Strange, J. M., & Mumford, M. D. (2002). The origins of vision. Charismatic versus ideological leadership. *Leadership Quarterly*, 13(4), 343–377. [http://doi.org/10.1016/S1048-9843\(02\)00125-X](http://doi.org/10.1016/S1048-9843(02)00125-X)
- Strange, J. M., & Mumford, M. D. (2005). The origins of vision: Effects of reflection, models, and analysis. *Leadership Quarterly*, 16(1), 121–148. <http://doi.org/10.1016/j.leaqua.2004.07.006>
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <http://doi.org/10.5116/ijme.4dfb.8dfd>
- Tichy, N. M., & Devanna, M. A. (1986). The transformational leader. *Training & Development Journal*, 40(7), 27–32. <http://doi.org/10.5465/AME.1987.4275914>
- Tolle, E. F. (1988). Management team building: Yes but! *Engineering Management International*. [http://doi.org/10.1016/0167-5419\(88\)90006-3](http://doi.org/10.1016/0167-5419(88)90006-3)
- Yammarino, F. J., Spangler, W. D., & Bass, B. M. (1993). Transformational leadership and performance: A longitudinal investigation. *The Leadership Quarterly*, 4(1), 81–102. [http://doi.org/10.1016/1048-9843\(93\)90005-E](http://doi.org/10.1016/1048-9843(93)90005-E)
- Zaccaro, S. J., & Banks, D. (2001). Leadership, vision, and organizational effectiveness. In *organizational leadership: Understanding the performance imperatives confronting today's leaders* (pp. 181–218).

Dr. Serene DALATI is the Head of Management Department and a senior lecturer at the faculty of Business administration at the Arab International University, Syria. Dr. Dalati has obtained a PhD in Leadership, Organizational Culture and Job satisfaction in 2008 which was preceded by an MBA from Bangor University in 2002. Dr. Dalati teaches for areas in organizational Behaviour, Leadership, Culture and Job satisfaction. Fields of expertise of teaching also include Strategic Management, International Management, Marketing, and Entrepreneurial Small Business



The International Journal

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

ISSN 2345-0282 (online) <http://jssidoi.org/jesi/aims-and-scope-of-research/>

2016 Volume 3 Number 3 (March)

A NETWORK-BASED BUSINESS PARTNERSHIP MODEL FOR SMEs MANAGEMENT

David L. Fuschi¹, Manuela Tvaronavičienė²

¹*Bridging Consulting Ltd, Reading, RG6 5XE, UK*

²*Vilnius Gediminas Technical University, Saulėtekio 11, LT-10223, Vilnius, Lithuania*

¹d.fuschi@bridginconsulting.com; ²manuela.tvaronaviciene@vgtu.lt

Received 10 December 2015; accepted 25 February 2016

Abstract. This paper presents a network-based business partnership model designed in order to achieve an extremely effective and lightweight management in the context of consultancy firms. The approach has been developed through over twenty years of operation and several trials and errors cycles, but only now has been formalized. The presented paper suggests new approach towards managerial design of company, indicates context and differences from conventional organizational structures. Start-ups, SME's working in complex environment and participating in technology transfer process could benefit from provided insights and suggestions. The presented paper, we believe, contributes to development of theoretical foundations contemporary management.

Keywords: network, clusters, technology transfer, innovations, management, SMEs

Reference to this paper should be made as follows: Fuschi, D. L.: Tvaronavičienė, M. 2016. A network based business partnership model for SMEs management, *Entrepreneurship and Sustainability Issues* 3(3): 282-289.

DOI: [http://dx.doi.org/10.9770/jesi.2016.3.3\(5\)](http://dx.doi.org/10.9770/jesi.2016.3.3(5))

JEL Classifications: D21, D22

1. Introduction

One of the major problems in making business up-scale-able while retaining both the quality and the effectiveness of the single individual professional firm approach and yet increasing efficiency on a much larger scale, largely depends on the ability to develop and grow the human capital. The latter represents - along with knowledge, skills and experience - the primary asset of the freelancer professional.

2. Background

Designing a successful organizational structure for your small business involves analyzing the work that needs to be done and setting up a hierarchy that ensures work flows smoothly from one process to the next. An effective organizational structure allows you to control business processes, assign accountability, enable rapid responses to opportunities and threats, deliver on promises, empower employees to make decisions and beat out the competition.

When you have a complex business, create an organizational structure divided into multiple departments or functions. If your industry requires a great deal of formality, design your organization with a clear hierarchy. If your employees have extensive experience, enable them to participate in influencing decisions. To establish successful communication, allow personnel at every level to flow information through the organization. Create a functional, divisional or other reporting structure based on your type of environment.

In a functional structure, each separate department is led by an executive who reports to the chief executive officer. If you operate in a stable business environment that won't change quickly, this model works well. Additionally, if your company produces a small number of similar products, this division makes work more efficient. To be most successful, leaders in this type of structure need to balance the needs of each function. Otherwise, one function may dominate the other functions, causing tension and conflict.

Companies using a divisional organization consist of multiple divisions, each led by a manager who reports to the chief executive officer. Each division is accountable for its own performance. Within each division, business is structured into functional units. This may result in redundant departments and result in inefficiency. For example, each division may have its own training function and conduct the same professional skills classes. Small businesses may start with a simple structure but adopt a divisional structure to be more successful when the business grows too large for the CEO to make all the decisions.

In a matrix structure, employees report to more than one manager. This combines both functional and divisional structures. This promotes efficient sharing of resources but is often difficult to manage and maintain. Matrix management tends to work successfully in collaborative and cooperative companies that require flexibility in responding to customer demands.

In a network structure, a central core leader operates the main strategic business and outsources the functional work, such as manufacturing, marketing and distribution. This decreases control but typically increases cost effectiveness. Use these alternative reporting structures if they meet your company's needs.

Here we want stress, that classic management structures are gradually transformed into *ad hoc* structures, which ultimately only remotely remind pure classical structures indicated above. The main phenomenon, which causes such transformation is networking, which obtains various forms and takes place in variety of activities. The mostly discussed phenomenon is clustering, which as a rule leads to more efficient functioning to all parties involved into network (e.g. Ignatavičius et al. 2015; Tvaronavičienė et al. 2015a; 2015b; Tvaronavičienė, Černevičiūtė 2015; Branten, Purju 2015). Management is one of major factors affecting company's efficiency (Bistrova et al. 2014); and what is peculiar, it itself can be built on networking or even clustering principles. That novel approach can be compared to innovation freeing individual initiatives, creativity, leadership and creating new opportunities for employment internationally (Rezk at al. 2015; Oganisjana, Surikova, Laizāns 2015; Lace at al. 2015; Dlugoborskytė, Norvilaitė, Petraitė, 2015; Dalati 2015; Caurkubule,; Rubanovskis 2014; Smaliukiene, Korsakiene, Tvaronaviciene 2014).

3. Methodology

The analysis of several effective organizational structures combined with a thorough analysis of the work-flow of successful firms and the top quality practices adopted in project management were combined with motivational theory to define an operational model that would retain the benefits of both the “*freelancer*” and the “*corporate*” approaches to business management.

In more details, a desk research based on literature has been performed pertaining to motivation theories, organizational structures (focusing in particular on those described as successful), organization “*scale-up*” barriers, quality assurance methods and work-flow (once again focusing on the one of successful firm as per available case studies). The results of this research have then been completed with the analysis of secondary data available on the same areas of knowledge mostly referring to case studies. Finally a search on registered trademark or patent in the area has been carried out.

4. Proposed model

The proposed model foresees a layered (onion-like) approach with a minimal “*core*” nucleus of business partners bonded together by a formal partnership agreement. They would be contributing the initial funding, the strategy and the crucial human and intellectual capital of the entire system. The “*Core*” is surrounded by a first layer of collaborator labeled as “*Partners / 1st Order Partners*”. These professionals are highly skilled and trusted (as per what appertains to the relation with the Core Partners). Also in this case there are agreements in place between the Core Partners and the Partners / 1st Order Partners. This is a simple contract that scaffolds a cooperation approach based on the mutual strengths and abilities. These will be presented and offered as belonging to the Consultancy irrespective of the fact that are in possession of a Core or 1st Order Partner; for the customers these are all assets of the consultancy. This helps build the image of a fully-fledged consultancy able to address and cater for any need of the customer. The approach offers therefore flexibility as what is not in the reach of the Core Partners will be sourced by the 1st Order Partners or nth Order Partner depending on the location of such skill or capacity. The deployment of the service/product to the customer is ruled by a specific contract reporting clear terms and conditions (to ensure accountability and increase trust) and monitored by the Core Partners (Figure 1).

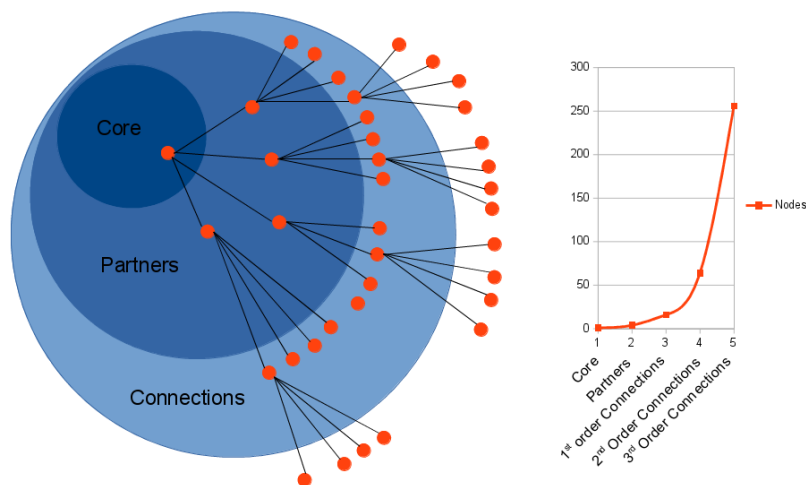


Figure 1. The layered model and a projection of nodes growth based on only 4 connections per partner on average

In this respect the system is operating like a law firm with a set of core lawyers and a number of associates. The main difference is that in our case each associate is still free to operate as a freelancer for all that is not concerned with the activities conducted under the framework of the system (this latter aspect is clearly detailed, specified and ruled in the partnership agreements terms and conditions which are inclusive of an ethical code and detailed instructions on how to avoid - or in case disclose - potential or actual conflicts of interest).

It is worth pointing out that the proposed approach is possible only thanks to the level of mutual trust and respect existing between the core partners in first instance and then in between each layer of connections. Furthermore, this approach requires the applicability of the Transitive Property reported hereafter.

$$\begin{array}{ll}
 A \in \{\text{Core Partners}\} & A \xleftrightarrow{\text{trust}} B \wedge B \xleftrightarrow{\text{trust}} C \\
 B \in \{1^{\text{st}} \text{ Order Partners}\} & A \xrightarrow{\text{trust}} B \Leftrightarrow A \xrightarrow{\text{trust}} C \\
 C \in \{2^{\text{nd}} \text{ Order Partners}\} & C \xrightarrow{\text{trust}} B \Leftrightarrow C \xrightarrow{\text{trust}} A
 \end{array}$$

The same has to apply to any set of three levels, or in other words:

$$\begin{array}{ll}
 A \in \{N^{\text{th}} \text{ Order Partners}\} & A \xleftrightarrow{\text{trust}} B \wedge B \xleftrightarrow{\text{trust}} C \\
 B \in \{N+1^{\text{st}} \text{ Order Partners}\} & A \xrightarrow{\text{trust}} B \Leftrightarrow A \xrightarrow{\text{trust}} C \\
 C \in \{N+2^{\text{nd}} \text{ Order Partners}\} & C \xrightarrow{\text{trust}} B \Leftrightarrow C \xrightarrow{\text{trust}} A
 \end{array}$$

It is expected that whenever required and beneficial a Partner may pass from an external level to an inner one. This is not necessarily to occur one level at the time, but is based on the benefit that the passage brings to the system and the level of trust acquired. This applies also to the passage to Core Partner although in this case it is necessary to have a further condition met, which is the growth of the business (in other words the need for a stable up-scaling of the system core).

The second level of the partnership (reported in Figure 1 as “**Connections**”) represents the trusted human capital of the 1st Order Partners (in the same fashion as for the relation between the 1st Order Partners and the Core ones). Exactly the same approach applies to all further layers although it is recommended, based on the experience gained so far, to limit the layers to two (beyond the core) as the larger the number of layers, the weaker is the trust relationship between the core partners and the members of the outer layer.

5. Related benefits

The major benefit of the proposed approach lays in the fact that it allows accessing to the right resources at the time of need. This is achieved via a “*ad-hoc project-based*” contracts that are internal to the system while for the customer, the service/product is provided solely by the contacted consultancy by some of its associates (that are bound to act for the project as employees or core partners of the consultancy) in a well-regulated and accountable fashion.

The proposed approach exhibits an exponential growth in respect of the number of available trusted experts whenever any of the system layer acquires new members, thus making it feasible to provide the best possible fit to the customer’s needs.

The adopted contractual approach presently in place ensures focus and commitment as the “*temporary*” established cluster of resources (planned to last for the duration of the related activity) is designed and built on the basis of mutual trust and commitment. The team has the required set of optimal expertise and skills and there is also a certain degree of redundancy ensuring the possibility to accommodate temporary unavailability of any resource. This arrangement allows avoiding to establish a fixed structure of employed personnel (at least while the dimension of the business is still in its initial phases). The fact that the system is founded on a basis of personal trust (in terms based on professional ability, transparency, accountability, reputation and commitment although in a context of full independence and freedom of action) ensures that each participant has a personal interest in making this system work smoothly. The better each team member performs, the more the system is rewarding as it will offer either the possibility to engage in another activity or to take up a personal assignment independently from the system if no other job is scheduled. This allows to maximize both own business (each associate partners’ business schedule and load) as well as the overall system performance, providing “*image*”, “*reputation*” and “*income*” (thus catering for both extrinsic and intrinsic motivations) thanks to quality and performance.

The key factor in motivating each member of the system to operate according to the ethos of this system can be considered the need for retaining the received trust. Just like in the Antwerp diamond market the given word is fully equivalent to a written contract, also in this approach each participant has the interest in performing as well as introducing the right people (i.e. trusted). Each participant can transit at any time from one outer layer to an inner one (based on achievements and performance), while any non-performing partner will be dropped if proven not trust-worthy. This latter case will also induce a certain level of disrepute that will quickly propagate in the network thus acting as a deterrent for personal and professional misbehavior. The system ability to scale is ensured by the adopted structure and cooperation mechanism as apparent also in Figure 2. The flexibility is offered by the adopted contractual approach for bonding participants to each other and as a team when dealing with the customer. The possibility to operate as part of a team or as a freelancer depending on the needs and opportunities is attractive to those skilled professional that enjoy working with trusted partners but at the same time may have the opportunity to be running their own activities autonomously.

The proposed approach allows to level the workload exploiting team work within joint projects and operate independently when there are gaps. The individual flexibility requires that in case of commitments/needs clashes - or conflicts of interest - a member has to refer a suitable replacement so as to ensure continuity in operation and smoothness of service/product deployment for the customers. Overall this approach allows to maximize management efficiency, quality of delivered products/services, work load allocation flexibility, resilience to change in customers’ needs or market evolution as well as deployment scalability. With this approach it is possible to implement with minimal overhead costs and infrastructure both small as well as large projects with high quality, efficiency and effectiveness and all is based on the connection criteria adopted (i.e. Professionalism and Trust).

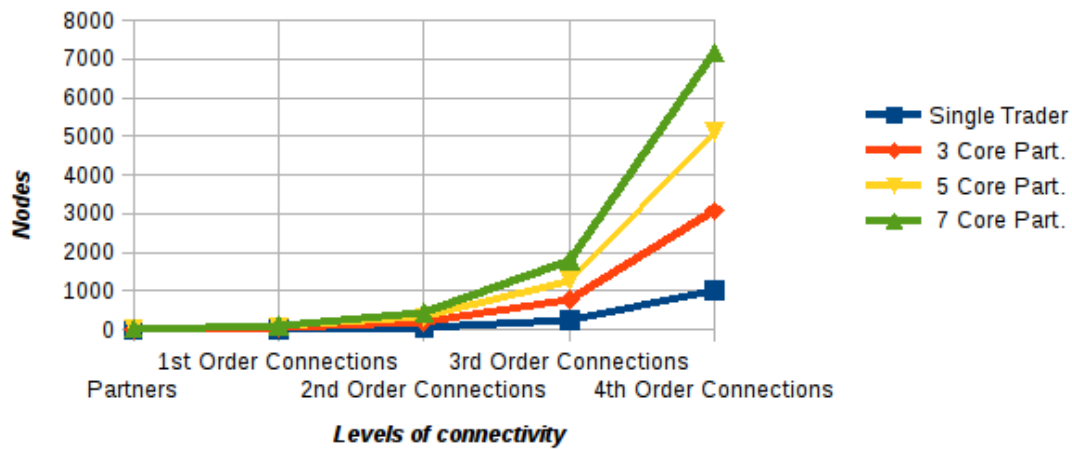


Figure 2. Projection of nodes growth based on only 4 connections per partner on average mapped while the core partnership moves from a single trader to a group of seven (7) partners

6. Presently achieved results

The proposed approach has been tested in the context of consultancy services focusing on project management, project rescuing, problem solving, software development and research & development (inclusive of the related fund raising). The results have been very positive as the system has been able to lead to the successful rescue of twelve international RTD project (for over 30 million Euro), the successful management and completion of over 98 international, national and corporate projects (for over 300 million Euro). Furthermore, this approach has been crucial in the acquisition of over 21 projects (for over 62 million Euro) and can count on a strong connection with industry and academia (over 100 industrial partners/customers and 50 universities/research centers). With a single trader social network of over two thousands (2000) 1st order contacts.

7. Future Work

The proposed approach has performed well, yet it exhibits some clear weaknesses, namely, if the trust relations are not strong enough or if the partners do not fully endorse the ethos of the system, the proposed approach is keen to create problems and frictions both inside the network and with the customers.

The next step in this work is related to a careful study of the law-firm approach to contractual obligations and rights that rule the internal functioning of the firm and achieve the related generalization required to ensure the desired level of allowed autonomy within a well regulated and conflict of interest free environment. This latter point is perceived necessary so as to ensure that trust / performance or quality issues may occur either with very low probability of occurrence or at all.

Conclusions

The proposed approach to a network-based business partnership model for an extremely effective and lightweight management has been initially trailed in the context of international cooperation projects and then migrated to a consultancy environment. The preliminary results of this approach are very promising and it is expected that it will be possible to apply

for Trademark registration. The preliminary achieved results are extremely encouraging as it is apparent that in the implemented settings (with the involved partners having on average several hundreds of contacts) the dimension of the available network of expertise quickly reaches the level of millions at the third level even in the case of the single trader seed. The exponential growth in connection nodes and the trust based approach used for the connectivity is at the very core of the strength of the proposed approach.

References

- Bistrova, J.; Lace, N.; Tvaronavičienė, M. 2014. Corporate governance as a crucial factor in achieving sustainable corporate performance, *Journal of Systemic, Cybernetics and Informal* 12(3): 82-90. <http://www.iiisci.org/journal/sci/FullText.asp?var=&id=SA718DP14>
- Branten, E.; Purju, A. 2015. Cooperation projects between university and companies: process of formation and objectives of the stakeholders, *Entrepreneurship and Sustainability Issues* 3(2):149-156. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(3\)](http://dx.doi.org/10.9770/jesi.2015.3.2(3))
- Caurkubule, Ž.; Rubanovskis, A. 2014. Sustainable entrepreneurship through motivation: case of Latvian companies, *Entrepreneurship and Sustainability Issues* 2(1):43-48 DOI: [http://dx.doi.org/10.9770/jesi.2.1\(6\)](http://dx.doi.org/10.9770/jesi.2.1(6))
- Dalati, S. 2015. Leadership and sustainable entrepreneurship: classical approaches and contemporary contexts, *Entrepreneurship and Sustainability issues* 2(4): 209–219. DOI: [http://dx.doi.org/10.9770/jesi.2015.2.4\(4\)](http://dx.doi.org/10.9770/jesi.2015.2.4(4))
- Długoborski, V.; Norvilaitė, V.; Petraitė, M. 2015. Creativity and innovation management: team performance peculiarities, *Entrepreneurship and Sustainability Issues* 3(1): 25-39. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.1\(2\)T](http://dx.doi.org/10.9770/jesi.2015.3.1(2)T)
- Ignatavičius, R.; Tvaronavičienė, M.; Piccinetti, L. 2015. Sustainable development through technology transfer networks: case of Lithuania, *Journal of Security and Sustainability Issues* 4(3): 261-267. DOI: [http://dx.doi.org/10.9770/jesi.2015.4.3\(6\)](http://dx.doi.org/10.9770/jesi.2015.4.3(6))
- Lace, N.; Buldakova, N.; Rumbinaite, G. 2015. Organizational creativity as a driving force for company's innovative development, *Entrepreneurship and Sustainability Issues* 3(2): 137-148. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(2\)](http://dx.doi.org/10.9770/jesi.2015.3.2(2))
- Laužikas, M.; Tindale, H.; Augustinas Bilota, A.; Dvilė Bielousovaitė, D. 2015. Contributions of sustainable start-up ecosystem to dynamics of start-up companies: the case of Lithuania, *Entrepreneurship and Sustainability Issues* 3(1): 8-24. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.1\(1\)](http://dx.doi.org/10.9770/jesi.2015.3.1(1))
- Oganisjana, K.; Surikova, S.; Laizāns, T. 2015. Factors influencing social innovation processes in Latvia, *Entrepreneurship and Sustainability Issues* 3(2): 186-197. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(6\)](http://dx.doi.org/10.9770/jesi.2015.3.2(6))
- Smaliukienė, R.; Korsakienė, R.; Tvaronavičienė, M. 2014. Career Management Opportunities in International Labour Market: A Theoretical Perspective Original Research Article. *Procedia - Social and Behavioral Sciences*, 110: 293-300 http://www.sciencedirect.com/science?_ob=ArticleListURL&_method=list&_ArticleListID=-527271389&_st=13&view=c&_acct=C000228598&_version=1&_urlVersion=0&_userid=12975512&md5=19bc49a5c88c6c0594e3ead6d9fa7352&searchtype=a
- Rezk, M. R. A.; Ibrahim, H., H.; Tvaronavičienė, M.; Sakr, M. M.; Piccinetti, L. 2015. Measuring innovations in Egypt: case of industry, *Entrepreneurship and Sustainability Issues* 3(1): 47-55. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.1\(4\)](http://dx.doi.org/10.9770/jesi.2015.3.1(4))
- Tvaronavičienė M.; Razminienė, K.; Piccinetti, L. 2015b. Cluster efficiency study through benchmarking, *Entrepreneurship and Sustainability Issues* 3(2):120-128. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(0\)](http://dx.doi.org/10.9770/jesi.2015.3.2(0))
- Tvaronavičienė, M., Razminienė, K., Piccinetti, L. 2015a. Approaches towards cluster analysis, *Economics and Sociology*, Vol. 8, No 1, pp. 19-27. DOI: 10.14254/2071-789X.2015/8-1/2 http://www.economics-sociology.eu/files/ES_Vol8_1_TvaronavičienėC4%97.pdf
- Tvaronavičienė, M.; Černevičiūtė, J. 2015. Technology transfer phenomenon and its impact on sustainable development, *Journal of Security and Sustainability Issues* 5(1): 87–97. DOI: [http://dx.doi.org/10.9770/jesi.2015.5.1\(7\)](http://dx.doi.org/10.9770/jesi.2015.5.1(7))

David L. FUSCHI is Dr.; Fellow of the Royal Society for the encouragement of Arts, Manufactures and Commerce (RSA), Chartered Manager (CMgr) as well as Chartered Engineer (CEng). As Professional: almost 30 year experience, Director & Chairman at Bridging Consulting Ltd, member of the Professional Advisory Board of HP-MOS, Senior member of IEEE and ACM, and Project Expert Evaluator/Reviewer in over 12 Research Programmes. As Project Manager: a track record of over 98 projects (for over 300 million Euro) successful completion (12 rescued), acquisition of over 21 projects (for over 62 million Euro), and over 100 projects assessed. Strong connection with industry and academia (over 140 industrial partners, 70 universities/research centres and 20 cultural institutions) including HP, IBM, Microsoft, Siemens, EADS, THALES, NATO, Telefonica, Tiscali, Orange, BBC, Rai, Fraunhofer, Open University, SINTEF, VTT..As Academic: good experience in teaching and knowledge transfer both in academia and in industry; a book chapter and the market analysis adopted as the starting point of the EC Special Task Force for Multimedia & Education, several scientific articles, position papers, and very successful tutorials. Invited Professor of Project Management & Problem Solving at the Catholic University of Cordoba Argentina (Faculty of Engineering and ICDA Business School), Visiting Professor at Vilnius Technical University and at Kokshetau State University, Invited Lecturer at the School of Design of the Politecnico di Milano, Senior Trainer at Fondazione Clerici Milano, Visiting Research Fellow at Brunel University and Associated Senior Research Fellow at Reading University.

Manuela TVARONAVIČIENĖ is dr, professor at Vilnius Gediminas Technical University and The General Jonas Žemaitis Military Academy of Lithuania. Here research interests are: sustainable development, innovations, investments, entrepreneurship. She raised qualifications in USA, Canada, and Europe in various institutions, including such as IESE Business School of Navarra University, Harvard Business School of Harvard University, and Judge College of Cambridge University.

This is an open access journal and all published articles are licensed under a [Creative Commons Attribution 4.0 International License](#)

Copyright of Journal “Entrepreneurship and Sustainability Issues” © Entrepreneurship and Sustainability Center, All Rights Reserved

Publisher



The International Journal

ENTREPRENEURSHIP AND SUSTAINABILITY ISSUES

ISSN 2345-0282 (online) <http://jssidoi.org/jesi/aims-and-scope-of-research/>

2016 Volume 3 Number 3 (March)

START-UPS ACROSS THE EU: IF PARTICULAR TENDENCIES COULD BE TRACED

Manuela Tvaronavičienė

Vilnius Gediminas Technical University, Saulėtekio 11, LT-10223 Vilnius, Lithuania

E-mail: manuela.tvaronaviciene@vgtu.lt

Received 20 November 2015; accepted 15 January 2016

Abstract. The aim of presented paper is to provide interpretation of available statistical data on entrepreneurship processes in European countries. The author seeks to find answer the question if new business development processes are active and successful what consistent patterns (if any) could be traced. Success factors, such as education and age of entrepreneurs, which launched start-ups in European countries are taken in to accounts. Obtained results, it is believed, would contribute for understanding entrepreneurship phenomena in differently developed countries and, respectively, for finding ways how more efficiently to foster inception of successful and sustainable ventures in the nearest future.

Keywords: youth unemployment, sustainability, the Analytic Hierarchy Process (AHP).

Reference to this paper should be made as follows: Tvaronavičienė, M. 2016. Start-ups across the EU: if particular tendencies could be traced, *Entrepreneurship and Sustainability Issues* 290-298.

DOI: [http://dx.doi.org/10.9770/jesi.2016.3.3\(6\)](http://dx.doi.org/10.9770/jesi.2016.3.3(6))

JEL Classifications: M21

1. Introduction

Development of entrepreneurship has become an important aim of each country. Encouraging potential entrepreneurs to take this life path became one the most important task of educators and governments across the EU and other countries (Njaramba et al. 2015; Matetskaya 2015; Tunčikienė, Drejeris 2015; Rosha, Lace, 2015; Dobeles et al. 2015).

Entrepreneurship has received a lot of definitions. We would adopt one of vast array, rather simple, but at the same time reflecting its spirit. We support the following definition: “ entrepreneurship is ability to pull not necessarily available resources in order to fill in a gap in market and meet demand for goods and services of certain quality”. Another non-conflicting definitions is: “ entrepreneurs can create demand for certain goods or services by suggesting novel products or services, which attract customers”. We could continue on by looking for better definitions, but we tackle now a different issue. Since each idea, opportunity has to be implemented through business entity, we want to find out how those young business companies or start-ups are doing in various European countries, and what common characteristics of those

companies could be provided. We wonder if available data could be systemized and if particular general tendencies could be traced.

2. Methodology

In order to characterize entrepreneurial activity in European countries and possibly generalize contemporary practices, the metrics of such activity have to be set.

We adopt the following approach to the research. At first, we intend to search for available statistics on entrepreneurship subject. The second, out of available indicators, we will chose those, which to our opinion would be suitable for providing information about tendencies of development of entrepreneurial entities in countries of different development level. The third, we intend to clarify what profile of entrepreneurs is the most common, if any.

3. The context

Search of entrepreneurship data allowed to come to following insights: data on entrepreneurship in European counties is rather sporadic, it is impossible to provide trends, since values of one indicators are available for one years, while values for another indicators are available for another years; sequence is not maintained.

Before we take a closer look at the most valuable available data, let us clarify, what particular data is attributed to entrepreneurship statistics and how it differs from statistics of small and medium enterprises (SMEs). Statistics on SMEs, their role in economy is attributed to so called “structural business statistics”. As Eurostat indicates, “ Structural business statistics can be analysed by enterprise size class (defined in terms of the number of persons employed). The overwhelming majority (99.8 %) of enterprises active within the EU-28’s non-financial business economy in 2012 were micro, small and medium-sized enterprises (SMEs) — some 22.3 million — together they contributed 57.5 % of the value added generated within the EU’s non-financial business economy. More than 9 out of 10 (92.7 %) enterprises in the EU-28 were [micro enterprises](#) (employing less than 10 persons) and their share of value added within the non-financial business economy was considerably lower, around one fifth. Perhaps the most striking phenomenon of SMEs is their contribution to employment. No less than two thirds (67.1 %) of the EU’s non-financial business economy workforce was active in an SME in 2012. Some 23.4 million persons worked in SMEs in the distributive trades sector, 17.8 million in manufacturing and 11.1 million in construction; together, these three activities provided work to 58.2 % of the non-financial business economy workforce in SMEs. Micro enterprises employed more people than any other enterprise size class in all service sectors (at the section level of detail), with the exception of administrative and support service activities. This pattern was particularly pronounced for the repair of computers, personal and household goods where an absolute majority of the workforce in this sector worked in micro enterprises. By contrast, in mining and quarrying as well as electricity, gas, steam and air conditioning supply [large enterprises](#) employed more than half of the workforce, as they also did in administrative and support service activities.

The contribution of SMEs to non-financial business economy value added was lower than their contribution to employment, resulting in a lower level of apparent labour productivity. This pattern was particularly prevalent among activities such as manufacturing or information and communication services. However, it was also observed across most other activities, the exceptions were: administrative and support service activities; and electricity, gas, steam and air conditioning. As a result, large enterprises tended to record higher apparent labour productivity ratios than SMEs.” (Source: Eurostat (http://ec.europa.eu/eurostat/statisticsexplained/index.php/Structural_business_statistics_overview))

Above presented citation from Eurostat provides a clear picture of SMEs role in economy, which is being reflected by structural business statistics. Entrepreneurship statistics, which we intend to tackle, in Eurostat is called “Business demography” since it provides data on

- the active population of enterprises;
- their birth;

- survival (followed up to five years after birth),
- death.

As Eurostat reports, “business demography data has been collected on a voluntary basis since 2002”; „activities relating to industry, construction, distributive trades and services are covered, but agriculture, public administration, non-market activities of households, and extra-territorial agencies are not“ (Source:

<http://ec.europa.eu/eurostat/web/structural-business-statistics/entrepreneurship/business-demography>). Voluntary basis of data explains why available data is sporadic, as it was observed above.

Now let us examine available data and provide their scientific interpretation.

4. Analysis and interpretation of available data

Let us start our analysis from birth rate of companies, which is provided in Table 1, Fig. 1. The birth rate is provided as ratio, what gives us rather clear picture of propensity to start a new business or, to put it into another way, to inception a start-up. Data is available only for 6 countries for year 2014. Even basing on this information rather interesting insights could be formulated: Bulgaria, Latvia and Estonia demonstrate considerably higher propensity to start business if to compare to such developed countries as Belgium and Germany. We could draw a conclusion that more developed countries demonstrate lower propensity to start a new business due to mature markets, high competition and, especially, high opportunity costs. Such insight seems to be sufficiently logical, judging from theoretical point of view and could be treated as particular tendency or consistent pattern if not Estonia's data. According this insight Estonia's propensity to engage into new business should be similar to its Baltic neighbors – Lithuania and Estonia, meanwhile according available data Estonia more resembles behavior of Germany, despite maturity of markets in those countries differs considerably. What suppress Estonia's willingness to develop small business remains obscure.

Table 1. Birth rate: number of enterprise births in the reference period (t) divided by the number of enterprises active in t
(Industry, construction and services except insurance activities of holding companies)

GEO/ SIZECLAS	Total	From 1 to 4 employees	From 5 to 9 employees	10 employees or more
Belgium	2,96	3,88	1,23	0,67
Bulgaria	12,34	15,94	4,62	2,3
Germany (until 1990 former territory of the FRG)	7,03	10,36	1,76	0,61
Estonia	7,43	9,72	2,53	0,94
Latvia	12,6	16,76	7,19	1,97
Lithuania	12,52	18,64	5,87	2,51

Source: Eurostat, year 2014 (retrieved year 2016)

Another peculiar insight can be made about size of start-ups. Graphical reflection of available data (Fig.1) allow us to conclude that especially small companies of size from 1 to 4 employees dominate irrespective to country, in which company is started.

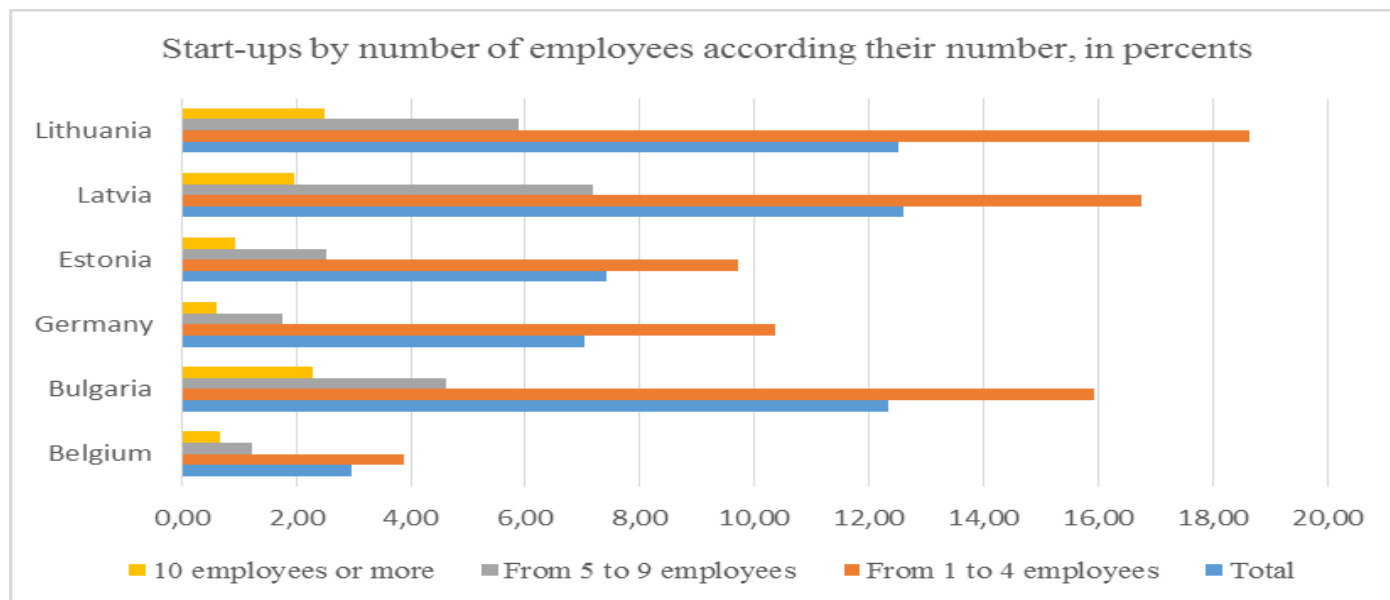


Fig. 1. Birth rate: number of enterprise births in the reference period (t) divided by the number of enterprises active in t Industry, construction and services except insurance activities of holding companies

Source: author, based on data from Eurostat, year 2014 (retrieved in year 2016)

After having formed impression about entrepreneurial behavior in listed above countries let us examine what kind of companies survive after 3 years of performance. It is a pity we cannot take the same countries and use statistics about their entrepreneurship statistics. We use statistics available, which provide us with data not exactly compatible with data we discussed above. Anyway, we believe that trends, generalized using scientific theories, basics of microeconomics, macroeconomics, industrial economics, organizational theories and entrepreneurship theory and practice, which is in possession of the writer of this paper would lead to insights, which have a potential to trigger responsive discussion and contribute to economics and management science.

Hence, critically observing and juxtaposing data, provided by Eurostat for listed below countries, year 2015 (Table 2), we can come to the following insights (see below Table 2).

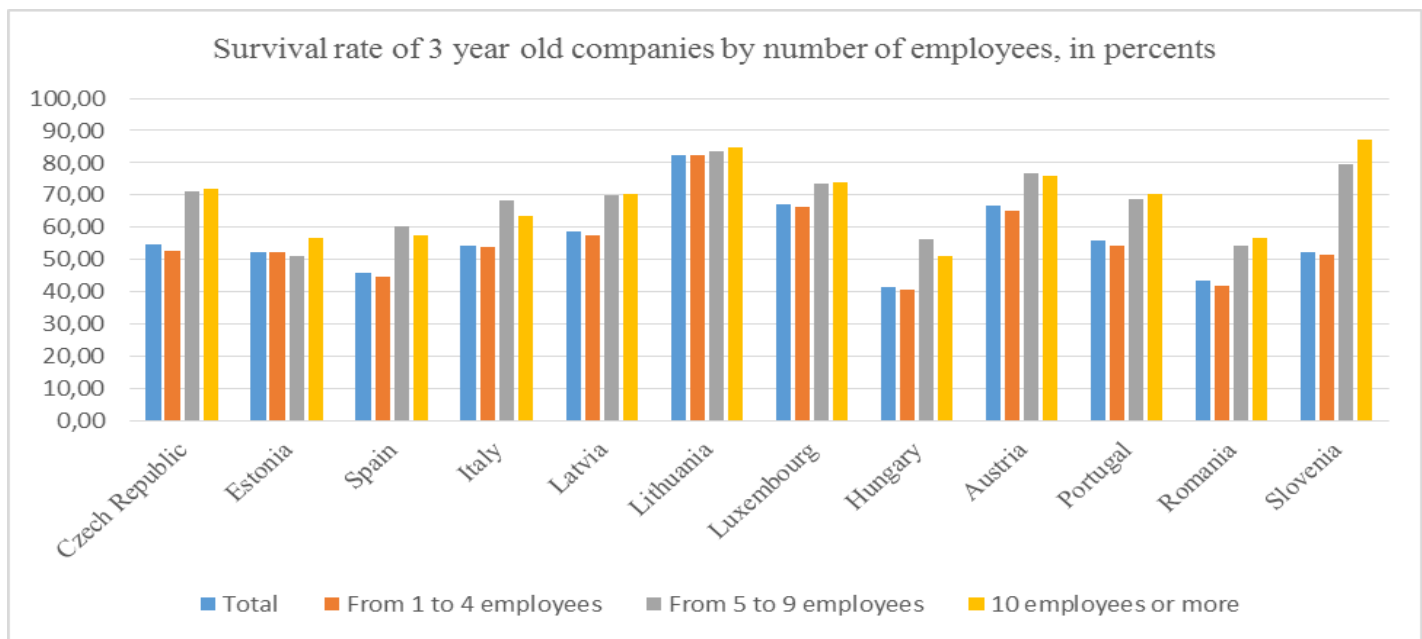


Fig. 2. Survival rate 3: number of enterprises in the reference period (t) newly born in t-3 having survived to t divided by the number of enterprise births in t-3

Source: author, based on data from Eurostat, last update year 2015(retrieved in year 2016)

Survival rates of different size companies suggest an insight that bigger companies (10 employees or more) have the greater chance to proceed if to compare to the smallest companies (from 1 to 4 employees). What is peculiar, that this tendency is characteristic to absolutely all 12 countries, for which data is available. Let us recall a conclusion, which was suggested above: paradoxically entrepreneurs are more prone to start the smallest companies, while, as it appears, they have lower chances to survive.

If to comment on general level of probability to survive for start-ups irrespective of size expressed in percentage terms across the countries of different development, we need to admit that consistent patterns are invisible. According available data, in Lithuania and Slovenia chances to survive are the highest (data for year 2015). Again particular tendencies, which would be characteristic for better developed and less developed countries are not traceable.

Factors of success, Propensity to innovate, ability be creative and ability to cooperate with another companies and, especially universities requires not only literacy, financial literacy, but formal education as well (Ignatavičius et al. 2015; Tvaronavičienė et al. 2015a, 2015b; Tvaronavičienė, Černevičiūtė 2015; Rezk et al. 2015). Certain level of education serves as one of success factors (Laužikas, Mokšėckienė 2013; Dzemyda, Raudeliūnienė 2014; Rosha, Lace 2015; Lace et al. 2015; Branten, Purju 2015; Njaramba et al. 2015; Matetskaya 2015). Level of education of startups across European countries is provided in Table 3.

Table 3. Enterprises managed by the founder - by education of the entrepreneur (Industry and services)

GEO/ ISCED97	All ISCED 1997 levels	Primary and lower secondary education (levels 1 and 2)	Primary and lower secondary education (levels 1 and 2)< %	Upper secondary education (level 3)	Upper secondary education (level 3), %	Post- secondary non- tertiary education (level 4)	Post- secondary non- tertiary education (level 4), %	First and second stage of tertiary education (levels 5 and 6)	First and second stage of tertiary education (levels 5 and 6),%
European Union	202 048	37 689	19	55 794	28	65 545	32	43 019	21
Bulgaria	25 918	481	2	8 943	35	4 400	17	12 094	47
Czech Republic	18 362	998	5	9 397	51	2 294	12	5 673	31
Denmark	7 433	1 660	22	1 543	21	1 248	17	2 982	40
Estonia	2 582	62	2	400	15	548	21	1 572	61
Italy	37 449	13 340	36	18 403	49	722	2	4 984	13
Latvia	7 939	139	2	2 972	37	844	11	3 984	50
Lithuania	7 704	67	1	947	12	1 531	20	5 159	67
Luxembourg	2 871	1 564	54	432	15	441	15	434	15
Austria	15 088	602	4	4 476	30	4 241	28	5 768	38
Portugal	49 319	26 173	53	11 574	23	2 993	6	8 580	17
Romania	71 054	16 356	23	4 576	6	49 156	69	966	1
Slovenia	2 168	94	4	807	37	578	27	689	32
Slovakia	10 249	1 539	15	4 877	48	351	3	3 482	34
Sweden	5 920	1 082	18	2 200	37	1 161	20	1 477	25

Source: Eurostat, last update year 2011(retrieved in year 2016)

Available data suggests that entrepreneurs with rather differing level of education rather similarly engage in new businesses development; average data is marked in green. Data which fall out general context highlighted in yellow. It should be mentioned that in Luxembourg and Portugal more than half start-ups in year 2011 was run by entrepreneurs with primary and lower education, meanwhile in Lithuania and Estonia 67 and respectively 61 percent of start-ups was managed by

especially educated entrepreneurs – with the first and second stage of tertiary education. Despite data is too sporadic to suggest generalizations, but anyway association is that the more educated entrepreneurs start more sophisticated businesses with the higher potential to survive. Let us recall that Lithuania with the best educated entrepreneurs demonstrates the highest rates of start-ups survival.

Experience of entrepreneurs as well is attributed to factors of success. Graphical reflection of available data across European countries is presented in Figure 3. It is obvious that mature entrepreneurs (40 years or over) prevail in all European countries irrespective of their development level.

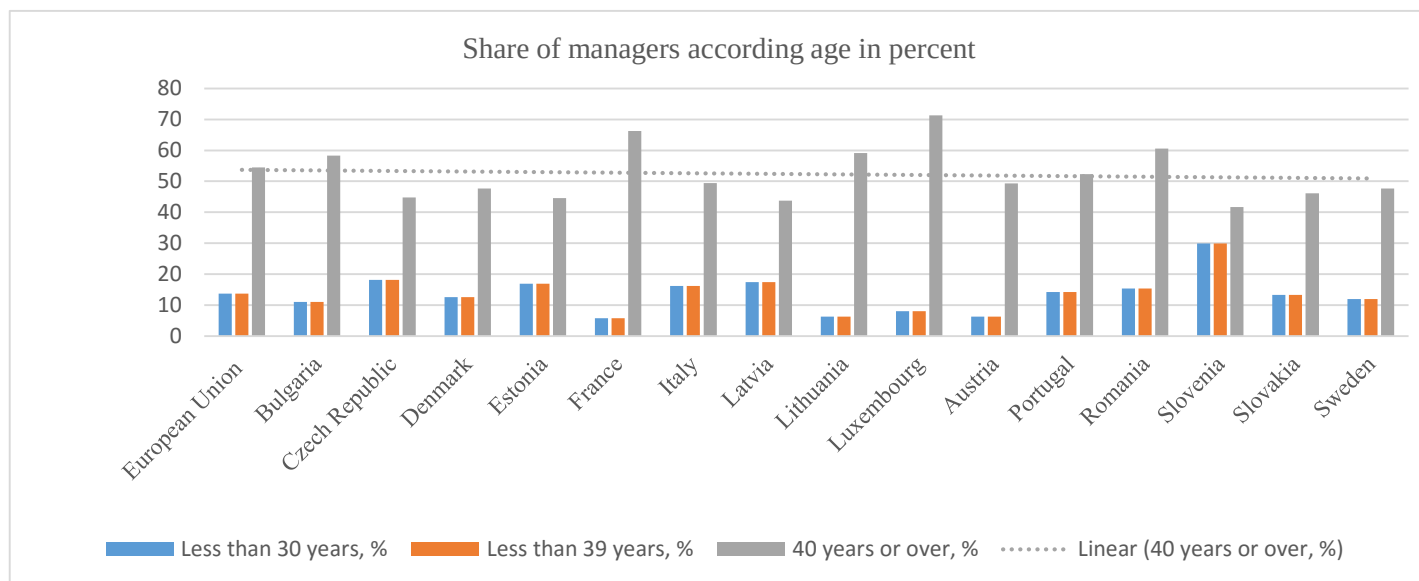


Fig. 3. Percentage share of start-up managers attributed to three age groups: less than 30 years old, in-between 30 and 40 years, and, respectively, 40 years or over.

Source: author, based on data from Eurostat, last update year 2005 (retrieved in year 2016)

This paper represent attempts to integrate rather fragmented data into a concise picture of start-up phenomena in European countries. Of course, the process is much more complex and is impacted by numerous factors, which were not discussed in this paper (e.g. (Laužikas et al. 2015; Tunčikienė, Drejeris 2015; Grubicka, Matuska 2015; Akhmadeev, Manakhov 2015; Kalyugina et al. 2015)). Anyway, despite of indicated research limitations, the some particular tendencies of start-ups development across European counties have been traced.

Conclusions

Answering a question raised at the very beginning of this paper about particular tendencies of start-ups demography and success factors, such as entrepreneurs' profiles in terms of their education level and age, we can indicate the following findings.

The first, we claim, that more developed countries demonstrate lower propensity to start a new business due to mature markets, high competition and, especially, high opportunity costs. Such insight seems to be sufficiently logical, judging from theoretical point of view and could be treated as particular tendency or consistent pattern if not Estonia's data

The second peculiar insight can be made about size of start-ups. Graphical reflection of available data allow us to conclude that especially small companies of size from 1 to 4 employees dominate irrespective to country, in which company is started.

The third, the survival rates of different size companies suggest an insight that bigger companies (10 employees or more) have the greater chance to proceed if to compare to the smallest companies (from 1 to 4 employees). What is peculiar, that this tendency is characteristic to absolutely all 12 countries, for which data is available.

The fourth, despite data is too sporadic to suggest generalizations, but anyway association is that the more educated entrepreneurs start more sophisticated businesses with the higher potential to survive. Let us recall that Lithuania with the best educated entrepreneurs demonstrates the highest rates of start-ups survival.

And the fifth, ultimately, we noticed that mature entrepreneurs (40 years or over) prevail in all European countries irrespective of their development level.

Formulated insights, we believed, could be verified further by employing bigger pools of data, when they are available, and, ultimately formulated insights could be contribute to generalization of entrepreneurial practice and contribute to more efficient policy formulations.

References

- Akhmadeev, B.; Manakhov, S. 2015 Effective and sustainable cooperation between start-ups, venture investors, and corporations, *Journal of Security and Sustainability Issues* 5(2): 269–284. DOI: [http://dx.doi.org/10.9770/jssi.2015.5.2\(12\)](http://dx.doi.org/10.9770/jssi.2015.5.2(12))
- Branten, E.; Purju, A. 2015. Cooperation projects between university and companies: process of formation and objectives of the stakeholders, *Entrepreneurship and Sustainability Issues* 3(2):149-156. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(3\)](http://dx.doi.org/10.9770/jesi.2015.3.2(3))
- Dobele, L.; Grinberga-Zalite, G.; Kelle, L. 2015. Sustainable economic development: scenarios for promotion of social innovation in Latvia, *Journal of Security and Sustainability Issues* 5(2): 149–158. DOI: [http://dx.doi.org/10.9770/jssi.2015.5.2\(2\)](http://dx.doi.org/10.9770/jssi.2015.5.2(2))
- Dzemyda, I.; Raudeliūnienė, J. 2014. Sustainable youth entrepreneurship in conditions of global economy toward energy security, *Entrepreneurship and Sustainability Issues* 1(4): 247–256. DOI: [http://dx.doi.org/10.9770/jesi.2014.1.4\(7\)](http://dx.doi.org/10.9770/jesi.2014.1.4(7))
- Eurostat; <http://ec.europa.eu/eurostat>
- Grubicka, J.; Matuska, E. 2015. Sustainable entrepreneurship in conditions of UN (Safety) and technological convergence, *Entrepreneurship and Sustainability Issues* 2(4):188–197. DOI: [http://dx.doi.org/10.9770/jesi.2015.2.4\(2\)](http://dx.doi.org/10.9770/jesi.2015.2.4(2))
- Ignatavičius, R.; Tvaronavičienė, M.; Piccinetti, L. 2015. Sustainable development through technology transfer networks: case of Lithuania, *Journal of Security and Sustainability Issues* 4(3): 261-267. DOI: [http://dx.doi.org/10.9770/jssi.2015.4.3\(6\)](http://dx.doi.org/10.9770/jssi.2015.4.3(6))
- Kalyugina, S.; Strielkowski, W.; Ushvitsky, L.; Astachova, E. 2015. Sustainable and secure development: facet of personal financial issues, *Journal of Security and Sustainability Issues* 5(2): 297–304. DOI: [http://dx.doi.org/10.9770/jssi.2015.5.2\(14\)](http://dx.doi.org/10.9770/jssi.2015.5.2(14))
- Lace, N.; Natalja, Buldakova, N.; Rumbinaite, G. 2015. Organizational creativity as a driving force for company's innovative development, *Entrepreneurship and Sustainability Issues* 3(2): 137-148. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(2\)](http://dx.doi.org/10.9770/jesi.2015.3.2(2))
- Laužikas, M.; Mokšėckienė, R. 2013. The role of creativity in sustainable business, *Entrepreneurship and Sustainability Issues* 1(1): 10-22. DOI: [http://dx.doi.org/10.9770/jesi.2013.1\(2\)](http://dx.doi.org/10.9770/jesi.2013.1(2))
- Laužikas, M.; Tindale, H.; Augustinas Bilota, A.; Dvilė Bielousovaitė, D. 2015. Contributions of sustainable start-up ecosystem to dynamics of start-up companies: the case of Lithuania, *Entrepreneurship and Sustainability Issues* 3(1): 8-24. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.1\(1\)](http://dx.doi.org/10.9770/jesi.2015.3.1(1))

- Matetskaya, M. 2015. Education programmes for entrepreneurs in the creative industries in St. Petersburg, *Entrepreneurship and Sustainability Issues* 3(1): 66-73. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.1\(6\)](http://dx.doi.org/10.9770/jesi.2015.3.1(6))
- Matetskaya, M. 2015. Education programmes for entrepreneurs in the creative industries in St. Petersburg, *Entrepreneurship and Sustainability Issues* 3(1): 66-73. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.1\(6\)](http://dx.doi.org/10.9770/jesi.2015.3.1(6))
- Njaramba, J.; Chigeza, P.; Whitehouse, H. 2015. Financial literacy: the case of migrant African-Australian women entrepreneurs in the Cairns region, *Entrepreneurship and Sustainability Issues* 3(2): 198-208. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(7\)](http://dx.doi.org/10.9770/jesi.2015.3.2(7))
- Njaramba, J.; Chigeza, P.; Whitehouse, H. 2015. Financial literacy: the case of migrant African-Australian women entrepreneurs in the Cairns region, *Entrepreneurship and Sustainability Issues* 3(2): 198-208. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(7\)](http://dx.doi.org/10.9770/jesi.2015.3.2(7))
- Rezk, M. R. A.; Ibrahim, H., H.; Tvaronavičienė, M.; Sakr, M. M.; Piccinetti, L. 2015. Measuring innovations in Egypt: case of industry, *Entrepreneurship and Sustainability Issues* 3(1): 47-55. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.1\(4\)](http://dx.doi.org/10.9770/jesi.2015.3.1(4))
- Rosha, A.; Lace, N. 2015. Sustainable development of organizations: coaching for innovation accelerating, *Journal of Security and Sustainability Issues* 5(2): 171–180. DOI: [http://dx.doi.org/10.9770/jssi.2015.5.2\(4\)](http://dx.doi.org/10.9770/jssi.2015.5.2(4))
- Tunčikienė, Ž.; Drejeris, R. 2015. Entrepreneurship ecosystem: methodological approaches to functions' review of public sector institutions, *Entrepreneurship and Sustainability Issues* 2(3): 118–132. DOI: [http://dx.doi.org/10.9770/jesi.2014.2.3\(1\)](http://dx.doi.org/10.9770/jesi.2014.2.3(1))
- Tvaronavičienė M.; Razminienė, K.; Piccinetti, L. 2015.b. Cluster efficiency study through benchmarking, *Entrepreneurship and Sustainability Issues* 3(2): 120-128. DOI: [http://dx.doi.org/10.9770/jesi.2015.3.2\(0\)](http://dx.doi.org/10.9770/jesi.2015.3.2(0))
- Tvaronavičienė, M., Razminienė, K., Piccinetti, L. 2015a, Approaches towards cluster analysis, *Economics and Sociology*, 8(1): 19-27. DOI: 10.14254/2071-789X.2015/8-1/2 http://www.economics-sociology.eu/files/ES_Vol8_1_Tvaronavicien%C4%97.pdf
- Tvaronavičienė, M.; Černevičiūtė, J. 2015. Technology transfer phenomenon and its impact on sustainable development, *Journal of Security and Sustainability Issues* 5(1): 87–97. DOI: [http://dx.doi.org/10.9770/jssi.2015.5.1\(7\)](http://dx.doi.org/10.9770/jssi.2015.5.1(7))

Manuela TVARONAVIČIENĖ is dr, professor at Vilnius Gediminas Technical University and The General Jonas Žemaitis Military Academy of Lithuania. Her research interests are: sustainable development, innovations, investments, entrepreneurship. She raised qualifications in USA, Canada, and Europe in various institutions, including such as IESE Business School of Navarra University, Harvard Business School of Harvard University, and Judge College of Cambridge University.