

INNOVATION MANAGEMENT, ENTREPRENEURSHIP AND SUSTAINABILITY 2019

Proceedings of the 7th International Conference





Proceedings of the 7th International Conference
**Innovation Management,
Entrepreneurship and Sustainability**

May 30 – 31, 2019, Prague



Organized by:
Department of Entrepreneurship
Faculty of Business Administration
University of Economics, Prague

Foreword

The 7th International Conference Innovation Management, Entrepreneurship and Sustainability (IMES 2019) took place on May 30 – 31, 2019 at the University of Economics, Prague. The conference was organised by the Department of Entrepreneurship of the University of Economics, Prague, Czech Republic in cooperation with

- Faculty of Management, Comenius University in Bratislava, Slovakia
- School of Business and Economics, Linnaeus University in Vaxjo, Sweden
- Corvinus University of Budapest, Hungary
- European Council for Small Business and Entrepreneurship (ECSB)

and other partners.

Sound keynote speakers – Martina Musteen (San Diego State University, USA), Ilan Alon (University of Agder, Norway), Andrew Burke (Trinity Business School, Ireland), Arnim Wiek (Arizona State University, USA), Søren Salomo (Technical University Berlin, Germany) and Roy Thurik (Erasmus University Rotterdam, Netherlands) discussed the trends in the fields of innovation management, entrepreneurship and sustainability. The conference aimed to achieve academic excellence in a regional context and to establish a platform for mutual collaboration, exchange and dissemination of ideas among researchers and professionals.

These conference proceedings contain contributions of the conference participants presented during both days of the conference. Authors of papers come from 22 countries all over the world, namely from Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Colombia, Croatia, Czech Republic, Finland, France, Germany, Hungary, India, Mexico, Paraguay, Poland, Portugal, Russian Federation, Slovakia, Sweden, Switzerland, USA and Vietnam. All these contributions have successfully passed the doubleblind peer-review process.

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IMPACT OF PERSONAL CHARACTERISTICS OF HUMAN RESOURCES MANAGERS ON IMPLEMENTATION OF DIVERSITY MANAGEMENT PRACTICES IN EGYPT

Ayman Alshaabani

Abstract

Purpose: This study aimed to determine which leadership style is more associated with implementing diversity management and which leadership style has more influence on it. Moreover, the study purposed to determine whether there are any differences in the levels of implementing diversity management practices related to the HR managers.

Design/methodology/approach: A questionnaire was designed and distributed to the Human resource managers and middle-level managers in the big Egyptian companies the data collected in 2018. The questionnaire was sent online to 150 HR managers, 103 questionnaires were returned with response rate 68.6% the companies' list was taken from the Egyptian exchange market. After collecting data, a face validity, normality test for metric variables, and reliability test were done to check the data validation. One-way ANOVA, hierarchal regression analysis and correlations were applied to fulfill the research aims.

Findings: The results showed that implementing diversity management can be determined from the leadership styles, but the age, work experience, and gender couldn't determine this. On the other hand, the age of leaders, their work experience did have an effect on the relationship between leadership style and diversity management, also, it was found that most of the men are transactional leaders, most of the women are transformational leaders.

Research/practical implications: The study provides observations from the perspective of an Egyptian emerging economy.

Originality/value: This study provided an attempt to figure out the types of leaders prevailing in the Egyptian companies and what the relationship between the leaders' characteristics and their implementation of diversity management which could be considered a new study in this research area.

Keywords: Diversity Management, Leadership Styles, Age, Gender, Work Experience

JEL Classification: M20, M1, M0

Introduction

In the last decade, companies are becoming more diverse in their workplace and diversity management is becoming a trend for Human resources management. this trend is taking place as a result of several factors; first, The rapid change in the demographic factors in countries and in their labor markets. second, the globalization of the markets which increased the competency between companies. third, the increased legislation by governments and finally, seeking to have and retain talented employees regardless of gender,qs race or any characteristics, which increases diversity at the workplaces influenced the researcher to study diversity and how it can be managed, and which practices should be implemented.

Scholars found that Workplace environment has an impact on the employees' performance which leads to influence company's performance turnover, decision making and productivity (Armstrong et al, 2010). More importantly, when diversity not managed properly it could lead to a negative influence on the workplace environment such as poor communication, stereotyping and increase in conflict (Hsiao et al, 2015).

Human resources managers have become more aware of what impacts their employees' performance and their satisfaction since the importance of retaining talented employees and achieving a good workplace environment is now one of the most important topics for human resources managers. Diversity can be recognized through different levels of characteristics. researchers have divided these levels into surface-level characteristics which are the demographic factors such as age, gender, ethnicity, work experience, educational background and organizational tenure (Lawrence, 1997) and deep-level characteristics such as leadership style, value orientation, and personality (Harrison et al, 2018)

In this research, the researcher will study some characteristics from the surface level such (age, gender, and work experience), and other characteristics from deep-level the leadership styles.

It can be observed that not much attention has been given to the research area on leaders and how they respond to economic and environmental pressures which encourages the implementation of diversity practices both in literature and in the context of Egyptian practices.

However, it should be mentioned that some scholars tried to study the impact of managers or leaders on diversity management.

Previous literature which tried to study the phenomenon on leaders and the diversity management in the Egyptian organizations, were shallow, even though Egypt has become an

important destination for many international companies. It would be interesting to explore more about the diversity in the Egyptian organizations and their HR leaders' characteristics, how these characteristics can be related to implementing diversity management practices. Which will mean the first step toward making further researches in the area of diversity management practices in the Egyptian context? Based on this, the research question can be formulated as: What is the relationship between personal characteristics of human resources managers (at the surface and deep levels) and implementing diversity management practices in the Egyptian organizations which are working in Egypt?

Therefore, this study aims to (i) determine which leadership style is more associated with implementing diversity management and how it affects its implementation. (ii) To determine whether there are any differences in levels of implementing diversity management practices related to the demographic factors (age, gender, work experience). (iii) To assess the moderating role of the demographic variables on the relationship between some leadership styles and the implementation of diversity management.

This paper will be of great interest to the Egyptian managers and leaders who may want to start implementing diversity management at their workplaces and may not understand how the personal characteristics of their HR managers may affect this step and where the main focus of attention should be. on the other hand, this paper can be a good start for scholars who are interested in diversity management practices issues in the Egyptian context. As it was mentioned earlier there is a very low number of studies which focused on diversity management in Egypt.

1 Literature Review

1.1 Personal characteristics & Diversity management practices

Scholars recognized different surface and deep levels of characteristics between the leaders at the workplace. With the surface level some scholars studied the relationship between Gender of the leaders or managers and making strategic decisions (Smith et al, 2006), others studied age and diversity management practices and between work experience and strategic decisions (Worthy et al., 2011).

On the other hand, other scholars focused on the deep level, one of them is the leadership styles of the leaders in the organizations, for example, the leadership style can be related to the strategic decision making (Tatum et al, 2003) and since diversity management is considered a strategic approach for human resources management and any decision related to implementing it is considered a strategic one (Besler and Sezerelb, 2012), it could be said that leadership styles are connected directly with the implementation of diversity management practices.

The leadership style focuses on "what leaders do" whereas leader identity, focuses on "who leaders are". The leadership styles can be divided into transactional leadership style, transformational leadership style, and laissez faire leadership style. Transactional leadership style's concept is based on economic contract, cost-benefit concept, or economic exchange. The manager focusses on reward and punishment as a way for motivating their employees. While transformational leadership style's concept is based on the relationship between leaders and followers and how the leader affects his/her follower who will admire and trust his/her transformational leader, transformational leadership consists of behaviors which were grouped into (Idealized influencer, inspirational motivator, intellectual stimulations, and individualized conspirator). Laissez-faire is the French phrase for "Let it be". Leaders in this style allow their followers to finish work on their own way and make their own decisions (Bass and Avolio, 1994)

Researchers have proposed that employees vary in the importance of their influence on the success of their organization ,this difference of importance has made the organizations implement different human resources practices for diverse employees groups on the basis of their diverse levels such as their level of knowledge, personal attributes, skills, their age, gender, and their work experience, organizational commitment and so on . These practices by human resources are called diversity management practices

According to (Besler and Sezerelb, 2012) diversity is considered a strategic approach for human resources management and any decision related to implementing it is considered as a strategic decision, this strategic decision can influence the organizational outcomes and the organization performance (Ng and Sears, 2012) based on this strategic approach the study connected the leader's personal characteristics with implementing diversity management practices as a strategic decision.

Some researchers have studied the relationship between the leadership style (transactional and transformational) and diversity management, moreover, they tried to study the moderating role

of age and values in this relationship and they found that the age and the values moderating the relationship between the leadership styles and implementing diversity with noticing that it differed between transactional and transformational leaders (Ng and Sears, 2012). Another study (Tripathi et al, 2016) tried to explore the relationship between some demographic variables and diversity management practices and found that some demographic factors such as gender and age have a direct relationship with implementing diversity management. Other researchers tried to study the moderating effect of demographic factors of the leaders on making strategical decisions such diversity management and they found that some demographic variables could play a moderating role in the relationship between the leadership style and diversity management (Ng and Sears, 2012).in the Egyptian context few studies tried to figure out the personal characteristics of the leaders in Egypt for instance (Metwally, 2012) found that gender can determine the leadership styles of the Egyptian leaders, while (El-zayaty,2018) tried to find out which leadership style is prevailing between top managers in Egypt and she found that transactional leadership style is the most common leadership style between those managers.

Hypotheses of the study

- H1.** There is a significant positive relationship between transactional leadership style and implementation of diversity practices.
- H2.** There is a significant positive relationship between transformational leadership style and implementation of diversity management practices.
- H3.** There is a significant negative relation between Laissez-faire leadership style and implementation of diversity practices.
- H4.** Women and men leaders are not significantly different in implementing diversity management practices.
- H5.** The leaders are significantly different related to their Age when implementing diversity management practices.
- H6.** The leaders are significantly different related to their work experience when implementing diversity management practices.
- H7.** The gender of the leader will moderate positively the relationship between transactional leadership styles and implementing diversity management practice.

H8. The work experience of the leader will moderate positively the relationship between transformational leadership styles and implementing diversity management practices.

H9. The age of the leader will moderate positively the relationship between laissez-faire leadership style and implementing diversity management practices.

2 Materials and Methods

A questionnaire was designed and distributed to 150 top managers and middle-level managers in Human Resources departments in the big size companies in the Egyptian market divide between local and international organizations, 103 questionnaires were returned and valid for statistical analysis with a response rate 68.6%. A purposive sampling method was applied, the society of the study was the big companies which are registered at the Egyptian stock exchange market the number of listed companies according to the official website¹ 275 company. The researcher supposed that at each company there is one HR manager and another middle level human resources manager, so the total number of the society was 550 managers. The data was collected in the first quarter of 2018.

The questionnaire was sent online (Emails, and Social Media / Special Human Resource Groups). The questionnaire consisted of three sections (demographic variables, Leadership styles, and Diversity management). The questionnaire was set based on two categories, the first category was adopted from a model called MLQ x5 short form which divides the leadership styles into (transactional leadership, transformational leadership, and laissez-faire leadership) and it was developed by (Bass and Avolio, 1994) the second one was adopted from (Downey et al, 2015; Ng and Sears, 2012). After collecting data, a face validity, normality test for metric variables to check their validity, and alpha Cronbach test were made to check the reliability of the hypotheses, and it was found that the reliability test exceeded 70% for each variable which is an acceptable percentage. Descriptive analysis was done for the results, one-way ANOVA, hierarchical regression analysis, and correlation analysis.

¹ <http://www.egx.com.eg/en/homepage.aspx>

3 Results

3.1 The sample demographic characteristic

The first part of the questionnaire was collecting data about some demographic variables like:

Gender, the managers were asked to fill their gender male or female. Percentage of each gender was 56.3% of the surveyed were male, 43.7% were female. **Age group**, the managers were asked to choose their age group. The range of age groups was between 20-29 and older than 50 years old. The percentage of each age group was; (between 20-29 years old, 31.1%) (between 30-39 years old, 39.8%) (between 40-49 years old, 18.4%) (Older than 50 years old, 10.7%). Work experience, the managers were asked to choose their work experience range of years. The range of work experience years was between 1-3 years to more than 10 years. The percentages of each group were as follows; (between 1 to 3 years, 19.4%), (between 3 to 5 years, 21.4%), (between 5-10 years, 30.1%), and (above than 10 years, 29.1%).

3.2 Transformational Leadership style and implementing Diversity management practice

The person rank correlation was applied, and the results showed that there is a positive medium significant relationship ($\rho=0.339$, $p<0.001$) between using transformational leadership style by managers and implementing diversity management

3.3 Transactional Leadership style and implementing Diversity management practice

The person rank correlation was applied, and the results showed that there is the positive medium relationship between transactional leadership style and implementing diversity management practices, however, it was not significant ($\rho=0.164$, $P>0.05$). so, it could be concluded that the transactional leadership style has no relationship with implementing diversity management practices and we reject our second hypothesis.

3.4 Laissez-faire Leadership style and implementing Diversity management practice

The person rank correlation was applied, the results showed that there is a strong significant negative relationship ($\rho=-0.267$, $P=0.006$) between the Laissez-faire leadership style and implementing diversity management practices. The Table (1) shows the correlations between the previous mentioned leadership styles and diversity.

Tab. 1: Correlations between leadership styles and Diversity Management practice

| | | Diversity |
|------------------|---------------------|-----------|
| Transactional | Pearson Correlation | .164 |
| | Sig. (2-tailed) | .098 |
| | N | 103 |
| Transformational | Pearson Correlation | .339 |
| | Sig. (2-tailed) | .000 |
| | N | 103 |
| Laissez -Fair | Pearson Correlation | -.267- |
| | Sig. (2-tailed) | .006 |
| | N | 103 |
| Diversity | Pearson Correlation | 1 |
| | N | 103 |

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Developed by researcher, standard questionnaire, 2018, N=103

3.5 Gender, Age, Work experience and implementing Diversity management practices

In order to answer the question (Is there any difference in levels of implementing diversity management practices related to the demographic variables?) we have hypothesized three different hypotheses in order to check them we applied descriptive analysis and one-way ANOVA.

The results showed that there is no significant difference between males and females related to implementing diversity management practices. the same statistical methods were used, and it was found that there is no significant difference between the age and work experience of HR managers related to implementing diversity management practices.

3.6 Moderating effect of demographic variables on the relationship between leadership styles and implementing diversity management practices

To study the moderating effects of some demographic variables on the relationship between some leadership styles and implementing Diversity management, a hierarchal regression analysis method was used to check whether there is moderating effect or not. this method was used by many researchers like (Ng and Sears, 2012). In this method, the regression analysis should be divided into two blocks first one the demographic variable and the diversity management, while the second block has the interaction between leadership style and demographic variable which is being studied.

The first moderating factor is gender and its moderating effect on the relationship between transactional leadership style and implementing diversity management practices. The results showed that the R square has increased from 0.28 to 0.79 after using the moderator in the study, and it was found that the gender made a moderating effect on the relationship and gender with transactional leadership style can predict implementing diversity management since the model of the second model of the study became significant (table 2). So, the gender of the leader moderates positively the relationship between transactional leadership styles and implementing diversity management practices.

Tab. 2: Hierarchal regression analysis (gender and transactional leadership)

| ANOVA ^a | | | | | | |
|--|------------|----------------|-----|-------------|-------|-------------------|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 97.475 | 1 | 97.475 | 2.953 | .089 ^b |
| | Residual | 3334.020 | 101 | 33.010 | | |
| | Total | 3431.495 | 102 | | | |
| 2 | Regression | 270.007 | 2 | 135.003 | 4.270 | .017 ^c |
| | Residual | 3161.489 | 100 | 31.615 | | |
| | Total | 3431.495 | 102 | | | |
| a. Dependent Variable: diversity | | | | | | |
| b. Predictors: (Constant), Gender | | | | | | |
| c. Predictors: (Constant), Gender, transactional | | | | | | |

Source: Developed by researcher, standard questionnaire, 2018, N=103

The same hierarchal regression analysis method was applied to study the moderating effect of work experience of the leaders on the relationship between the transactional leadership style and implementing diversity management, the R square has increased from 0.025 to 0.132 after using the moderator in the study , and it was conclude that the work experience of the leader moderates positively the relationship between transformational leadership styles and implementing diversity management practices.

Tab. 3: Hierarchal regression analysis (Work Experience and transformational leadership)

| ANOVA ^a | | | | | | |
|--|----------------|----------|-------------|---------|-------|-------------------|
| Model | Sum of Squares | df | Mean Square | F | Sig. | |
| 1 | Regression | 85.076 | 1 | 85.076 | 2.568 | .112 ^b |
| | Residual | 3346.419 | 101 | 33.133 | | |
| | Total | 3431.495 | 102 | | | |
| 2 | Regression | 453.791 | 2 | 226.896 | 7.620 | .001 ^c |
| | Residual | 2977.704 | 100 | 29.777 | | |
| | Total | 3431.495 | 102 | | | |
| a. Dependent Variable: diversity | | | | | | |
| b. Predictors: (Constant), work experience | | | | | | |
| c. Predictors: (Constant), work experience, transformational | | | | | | |

Source: Developed by researcher, standard questionnaire, 2018, N=103

Also, the same hierarchal regression analysis method again was used to study the moderating effect of the age of leaders on the relationship between Laissez-Faire leadership styles and implementing diversity management practices. The R square has increased from 0.010 to 0.089 after using the moderator in the study. It was deduced that the age of the leader will moderate positively the relationship between laissez-faire leadership styles and implementing diversity management practices.

Tab. 4: Hierarchal regression analysis (age and Laizzes-fair leadership)

| ANOVA ^a | | | | | | |
|--|------------|----------------|-----|-------------|-------|-------------------|
| Model | | Sum of Squares | df | Mean Square | F | Sig. |
| 1 | Regression | 34.898 | 1 | 34.898 | 1.038 | .311 ^b |
| | Residual | 3396.597 | 101 | 33.630 | | |
| | Total | 3431.495 | 102 | | | |
| 2 | Regression | 296.744 | 2 | 148.372 | 4.733 | .011 ^c |
| | Residual | 3134.751 | 100 | 31.348 | | |
| | Total | 3431.495 | 102 | | | |
| a. Dependent Variable: diversity | | | | | | |
| b. Predictors: (Constant), age | | | | | | |
| c. Predictors: (Constant), age, laizzes-fair | | | | | | |

Source: Developed by researcher, standard questionnaire, 2018, N=103

Conclusion

Leadership styles play an important role in deciding how to implement diversity management practices at the workplace. Transformational leaders in Egypt are more associated with implanting diversity management practices which means that organizations who have this kind of leaders, would have diversity management practices, whereas laissez-faire leaders will not tend to implement diversity management at the workplace in Egypt. While a transactional leader won't implement diversity management practices by themselves it is suggested that they try to study the effects of the law legislation on this leadership style when it comes to implementing diversity management.

Gender, age and work experience of the leader (are) is not enough to determine whether the leader would implement the diversity management practices or not.

Gender, however, impacts (moderated) positively on the relationship between transactional leadership styles and implementing diversity management. Men are more likely to use transactional leadership style compared with females, this is because women in a leadership position forms only 21% according to World Bank data (Fahmy, 2014) of the leaders in Egypt.

It can be said that the leadership style which is mostly prevailing in Egypt is Transactional leadership style. Therefore, it will be important for the government to put some legislation in order to influence the leaders to implement diversity management.

work experience also has a direct correlation on the relationship between transformational leadership style and implementing diversity management practices, the more experience the transformational leaders have the more likely they will implement diversity management. Furthermore, the younger leaders who inclined to use this leadership style are less likely to implement diversity management, so it could be said that when an organization has human resources manager with more than 10 years' experience and follows the transformational leadership style, s/he will be more likely to implement diversity management practices compared with other transformational leaders.

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**EVALUATING THE IMPACT OF MARKETING,
ORGANISATIONAL AND PROCESS INNOVATION ON
INNOVATION OUTPUT OF INFORMATION TECHNOLOGY
FIRMS: CZECH REPUBLIC AND ESTONIA**

Henry Junior Anderson – Jan Stejskal

Abstract

Purpose: As technological innovation has enabled Information technology (IT) to seamlessly merge into daily routines playing an irreplaceable role in innovation generation and dissemination the research aims to assess the impact of marketing, organisational and process innovation on innovation in Czech Republic and Estonia.

Design/methodology/approach: Data from Community Innovation Survey (2012-2014) was used whilst multiple regression analysis. 395 firms were selected for both Czech Republic and Estonia. These member states were selected due to their dwindling performance on the innovation scale relative to EU in 2010; IT and information service firms was also chosen as the unit of analysis.

Findings: Public funding at the National and European Union level was only significant to innovation output in Estonia whilst organisational innovation was insignificant in both countries. Process innovation was significant to innovation output although with different direction of significance between both countries whilst marketing innovation variables were also fully significant in Czech Republic but partly significant in Estonia.

Research/practical implications: The study provides insights into innovation behaviour of the Czech and Estonian companies.

Originality/value: Furthering the innovation report of European Union and selectively focusing on the key innovation variables, the paper adds to the literature by detailing the response of the innovation output of Czech Republic and Estonia to marketing, organisational and process innovation of IT and information service firms.

Keywords: Marketing Innovation, Organisational Innovation, Process Innovation, Czech Republic, Estonia

JEL codes: O31, O32

Introduction

In an era of knowledge-based economies and spatially organized structures as vital prerequisites for innovation, actors of regions are supposed to be poised and proactively innovate to move in line with the rapidly changing environmental conditions. In an economy where, competitive advantages are sharpened by other regional players related to firms (Cooke, 2001), it is expedient to ensure the proper handling of inputs for innovation assigned to regional and organisational leaders to ensure improved effectiveness and efficiency. Odei and Stejskal (2018) found collaboration as an innovation driver in increasing competitiveness of firms and regions. Other inputs, however, have been lauded as the determinants of the regional innovation output ranging from human capital and financial investment (Franco and De Oliveira, 2017) and research expenditures paired with Gross Domestic products.

Owing to the evidence of innovation on firm growth, national and supranational entities actively engage in financial support schemes for private and public entities to create and/or utilize regional infrastructures for regional competitiveness; However, socio-economic factors peculiar to regions actively assist in transforming not just financial inputs but also human capital inputs into outputs for the regions (Cooke, 2001). Czech Republic and Estonia lie very close on the European Innovation Scoreboard, with Czech Republic possessing an average ranking of 84.4 and Estonia 79.8 as of 2017 whilst recording declining innovation performance relative to EU in 2010 (European Innovation Scoreboard, 2018).

On the evidence of the significance of innovation inputs to output of innovation and on the back of the differences in socio-economic conditions of region, and the evidence of Information technology as a driver of growth in the European Union, the research sought to identify the impacts of marketing, organization and process innovation on the innovation output of Information technology and information service firms measured with sales of new or significantly developed product (Cassiman and Veugelers, 2006) in both Czech Republic and Estonia. . Based on EU report in 2009 on diffusion of innovation which admonished focus on in-firm culture and structures for innovation, we hypothesise that “*organisational innovation has a significant impact on sales of newly produced goods of firms*”- H1 and *market innovation also has a significant impact in sales of newly produced goods*- H2. Based on Lundvall (2017) reverence of process innovation as a relevant input for innovation creation and diffusion by the European Commission, it is finally hypothesised that *process innovation is also a significant factor affecting sales of newly produced goods of firms*- H3.

The paper is organised as follows: this current section is the introduction, the next section, Section 2, discusses the theoretical review, the section 3, data and methodology, Section 4 expresses the results and the analysis of the results of the research. The final part, section 5, concludes information of the research findings and the resolutions of the research and its recommendations.

1 Theoretical review

Innovation has long been understood as a fundamental factor in economic growth of regions. Various authors from diverse studying backgrounds, ranging from economics, geography and social sciences have examined the effects of innovation on economic growth, the factors associated with the production of innovations, and the even geographic distribution of innovations and knowledge spillovers (Tavassoli and Carbonara, 2014). These studies revealed a positive influence of entrepreneurial and industrial activities on innovation, consequently, growth of regions. Innovation has been represented in many forms such as product and process innovation and with these varied forms come different measuring methods such as with patent counts, innovative sales or research and development intensity (Buesa, Hejis and Baumert, 2010). To determine the real driver of innovation, some researchers classified knowledge created and diffused as an output of innovation whilst also referring to institutions, infrastructures, human capital and research, business sophistication, and market specialization as inputs of innovation (Franco and Oliveira, 2017). Human capital of organizations as well as intramural expenditure on research and development was also recognized as relevant inputs (Lundvall, 2017) of regional innovation.

As part of regional efforts to develop, such inputs of innovation are granted to innovation-oriented firms and are, expectedly, relied on to provide significant results owing to the growing and currently overwhelming abundance of evidence on the positive relationship of innovation drivers on sales of innovative products (Cassiman and Veugelers, 2006). Non-material inputs such as interaction, learning, knowledge transfer and proximity have also been raised important requirements for facilitating innovation. Research on proximity of regions have also affirmed the need for cluster creation and the reliance on proximity for information transmission and knowledge diffusion in a spatial context, on the contrary, there may also be reservations about creating too much geographical proximity among such firms as they could result in lock in learning and innovation processes and inadvertently render all investment efforts to cluster such firms non-productive. On the use of material inputs such as expenditures

and personnel, firm management of these investments was deemed a sensitive factor for appropriating outputs from such inputs (Prokop, Stejskal and Kuvikova, 2017) whilst organisational culture was also realized to affect the density of connections among related and interacting firms with the purpose of innovation which, in sum, has the potential to affect the learning orientation and innovative productivity of firms to develop their competitive advantage and new products in regions.

Avalanche of researches on inputs and outputs of innovation have shown enormous evidence of the validity of inputs on the outputs of innovation used, whether on knowledge created or diffused (Franco and De Oliveira, 2017) or the amount of sales of innovative products (Cassiman and Veugelers, 2006) or patents submitted to the EPO office (Buesa et al., 2010). Science and technology investment was found relevant total sales of innovative activities by Lundvall (2017) and has been widely recognized as relevant input within European Union's Horizon 2020s initiative. Europe, however, has long indulged in financial policies oriented at accelerating investments with the linear objective of creating and facilitating a stronger innovation sphere within the Union to stimulate employment, income and growth. Recent policies such as the Horizon 2020 and the European Union strategy 2020 that advocates regions to set aside 3% of their Gross Domestic Product (GDP) are obvious cases in point. Such public policies may be strategically aimed at accelerating innovation and subsequently regional productivity growth in all regions but strongly hinges on firms innovatively excelling to boost regional output. Although the presence of investment does not adequately guarantee a transformation to growth as there are institutional factors, externally influential and intrinsic regional factors that may impede the transformation (Prokop et al., 2017). As the growth of Czech Republic and Estonia have been strongly boosted by information assimilation and growth of information technology in the past years as reported by the European Commission, the objective of the research is to identify the impact of marketing, organisational and process innovation on output of innovation.

2 Data and Methodology

Since our study is focused on analysing the impact of selected innovation inputs on innovation output of the Czech Republic and Estonia, for data, we resorted to the retrieval and the usage of binary data of Community Innovation Survey (2012-2014) conducted by the European Commission. The variables focused on were expenditure of Information technology and information service firms on innovation, organisational innovation, product innovation and

market innovation and sales of new or significantly improved products as a measure of innovation output. As applied by Cassiman and Veugelers (2006) and Rickne (2001), sales of new or significantly improved products were used as a measure of innovation output and dissemination although it has its downsides (Buesa et al., 2010).

The research used combination of inputs and output variables namely: TURNMAR- percentage of turnover in new or improved products introduced during 2012-2014 that were new to the market; INPSPD- Introduction onto the market a new or significantly improved method of production; INPSLG- Introduction onto the market a new or significantly improved logistic, delivery or distribution system; ROEK- Engagement in acquisition of external knowledge; RRDEX- Engagement in extramural research and development; RTR- Engagement in training for innovative activities; RMAR- Engagement in market introduction of innovation; FUNGMT- Public funding from central government; FUNEU- Public funding from the EU; MKTDGP- Significant changes to the aesthetic design or packaging; MKTPDL- New methods for product placement or sales channels; ORGBUP- New business practices for organising procedures.

With regards to the sample, Czech Republic and Estonia of Eastern Europe, for comparison purposes, Information technology and other information service firms were chosen as the unit of analysis. Three hundred and fourteen firms (314) from all regions in the Czech Republic and eighty one (81) from Estonia were used. This large difference is comprehensible owing to wide population differences of both countries as Czech Republic recorded a population of 10.1 million inhabitants and 1.3 million inhabitants in Estonia as of 2017 as recorded by European Union. Firms chosen had their headquarters in the country of operation or in another European Union, in an European Free Trade Association candidate country or located in the rest of the world. Employment of the last calendar year was used as the indicator of the size of the enterprises. For the purpose of this research, we didn't differentiate according to sizes. We used all firms that employed between ten (10) to five hundred (500) employees. Owing to the degree to which Information technology has permeated and seamlessly formed an irreplaceable foundation of the Estonian economy and their quite close EU innovation rankings and contrasting innovation strengths, results of both firms could be useful for each other for benchmarking and modelling purposes. Multiple regression analysis was used as the tool of analysis due to the intent of assessment of impact of a set of independent variables on a dependent variable, as used by (Cassiman and Veugelers, 2006; Buesa et al., 2010).

3 Results and Analysis

Initially, a conjoined analysis was conducted and results of the data signifies the varying and although synergetic impact the different variables of innovation has on the entire measure of firm's innovation using sales of innovative product . Below is a descriptive statistics of the analysis for both the Czech Republic and Estonia.

Tab. 1: Descriptive statistics of the innovation variables for the Czech Republic

| | Sales | Production methods | Logistics | External Research & development | External Knowledge | Training | National funding | EU funding | Organisation of procedures | Product design | Sales channels |
|---------------------|-------|--------------------|-----------|---------------------------------|--------------------|----------|------------------|------------|----------------------------|----------------|----------------|
| Valid | 314 | 314 | 314 | 314 | 314 | 314 | 314 | 314 | 314 | 314 | 314 |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | 0.089 | 0.280 | 0.057 | 0.175 | 0.127 | 0.366 | 0.127 | 0.159 | 0.226 | 0.166 | 0.134 |
| Std. Deviation | 0.212 | 0.450 | 0.233 | 0.381 | 0.334 | 0.483 | 0.334 | 0.366 | 0.419 | 0.372 | 0.341 |
| Minimum | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Maximum | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| No. of observations | 314 | | | | | | | | | | |

Source: Author's calculation

Tab. 2: Descriptive statistics of the innovation variables for the Estonia

| | Sales | Production methods | Logistics | External Research & development | External Knowledge | Training | National funding | EU funding | Organisation of procedures | Product design | Sales channels |
|---------------------|-------|--------------------|-----------|---------------------------------|--------------------|----------|------------------|------------|----------------------------|----------------|----------------|
| Valid | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 | 81 |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | 0.087 | 0.185 | 0.049 | 0.247 | 0.333 | 0.333 | 0.123 | 0.086 | 0.210 | 0.160 | 0.185 |
| Median | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Std. Deviation | 0.211 | 0.391 | 0.218 | 0.434 | 0.474 | 0.474 | 0.331 | 0.283 | 0.410 | 0.369 | 0.391 |
| Minimum | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Maximum | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| No. of observations | 81 | | | | | | | | | | |

Source: Author's calculation

From Table 3 below, it could be observed that organisational innovation was found to be insignificant for both countries. This contrasted with the findings of Koren and Palčič (2015) who found high usages of technical and organisational concepts have a positive impact on the

product characteristics and their market performance. His findings showed that companies obtained more internal information about new products via sales departments whilst the customers were still the important external source of innovation. These findings effectively rejected H1 for both countries contrary to EU’s findings of impact of innovation culture on output of innovation in 2009. Introduction of a new or improved method of production and a new or improved delivery system for Czech Republic showed a strong and positive impact on sales growth of new products. In Estonia, introduction of a new or improved method of production was moderately positively significant to sales of new or developed products; However, introduction of a new or improved delivery system showed a moderately significant but negative impact on sales of new or developed products. This supports the findings Masso and Vauhter (2007) who revealed that whilst larger firms were more oriented to innovation as innovation is largely determined by size; innovation of processes had a positive effect on company’s performance in terms of productivity, but innovations of products did not seem to have that effect.

Tab. 3: Results of regression analysis for the Czech Republic and Estonia

| | EU Member States | Czech Republic | | | Estonia | | |
|-------------------------------------|-----------------------------------|---|----------|----------------|---|----------|----------------|
| Classification | Variables | TURNMAR | | | TURNMAR | | |
| | | Coefficients | p value | Standard error | Coefficients | p value | Standard error |
| | Intercept | 0.101 | 0.011 | 0.040 | 0.018 | 0.826 | 0.079 |
| Public funding | EU funding | -0.019 | 0.719 | 0.051 | -0.438 | 0.009*** | 0.132 |
| | National funding | -0.011 | 0.841 | 0.056 | -0.608 | 0.004*** | 0.155 |
| Process innovation | Logistics | 0.241 | 0.001*** | 0.075 | -0.232 | 0.068* | 0.112 |
| | New method of Production | 0.147 | 0.001*** | 0.043 | 0.318 | 0.010** | 0.099 |
| Marketing Innovation | Product design | 0.098 | 0.055* | 0.051 | 0.176 | 0.117 | 0.102 |
| | New sales channels | -0.164 | 0.005*** | 0.057 | -0.334 | 0.010** | 0.103 |
| Organisational Innovation | Organising procedures | 0.030 | 0.526 | 0.047 | 0.126 | 0.149 | 0.080 |
| Innovation activity and Expenditure | External Knowledge | 0.063 | 0.224 | 0.052 | -0.482 | 0.001*** | 0.102 |
| | External Research and development | -0.001 | 0.983 | 0.048 | 0.397 | 0.002*** | 0.088 |
| | Training for innovation | -0.043 | 0.366 | 0.047 | 0.580 | 0.000*** | 0.102 |
| | Model Statistics | P value < 0.001 R²= 0.17 Adjusted R ² = 0.11 Number of observations = 395 | | | P value < 0.00682 R²= 0.87 Adjusted R ² = 0.72 Number of observations = 395 | | |

Source: Author’s own; Legend: * significant at P< 0.10; ** significant at P < 0.05; *** significant at P < 0.01

It could be alluded a difficulty in initial product acceptance by new customers, competition difficulties or created by present firms in a supposedly dense market. This accepts H3 for both Czech Republic and Estonia.

Changes to aesthetic design and packaging had a weak but positive impact on sales of new products among Information Technology and information service firms in Czech Republic as it obviously appeals more to consumers. This finding is in line with the work of Seifert and Chattaraman (2017) who found that apparel designs with high-novelty will result in more positive aesthetic response than apparel designs with low-novelty. On the contrary, it wasn't significant in Estonia; however, new methods of product placement or sales channels were of strong significance to sales of new or developed product for both countries. This also supports the work of Verhoff, Kannan and Inman (2015) who, aside affirming the positive impact of multi sales channels on sales performance, revealed a gradual shift of multi channelling to omni channelling in recent times. These findings accept H2 for Czech Republic but not entirely for Estonia. Firms could be frustrated by the competitive strength of other firms in those channels, selling at wrong locations, inability to assimilate and efficiently use modern technologies and failure to reach their desired target market. Poor firm reputation, short ended preparations and unpopular distributors selected may also affect the publicity and ultimately the sales output of the firm.

Conclusion

The objective of the research was to assess the impact of selected innovation variables on innovation output of Information technology and information service firms between Czech Republic and Estonia.

Via the analysis, it was revealed that public funding information technology firms is a significant contributor to the total innovation output in Czech Republic, however in Estonia it turned out to have a strong negative significance to innovation output. Introduction of a new or significantly improved method of production or a new or significantly improved logistic, delivery or distribution system did have a strong bearing on innovation output in Czech Republic. Significantly improved logistic, delivery or distribution system was found to moderately improve the innovation in Estonia, however, new methods of production had a weak and negative impact on innovation. Business processes were found to affect innovation output in both countries, expenditure of firms on external research and on training personnel for innovation also had a strong and direct effect on innovation in Estonia even as external

knowledge acquisition was found to have a strong negative impact on innovation in these IT and information service firms.

Based on these findings, we recommend that National and European institutions, with one eye on possibility of market failure of their investment, should be directed and more focused on the business needs that are tied directly to innovation output of the firm. Discipline in the financial market should also be tampered with acceptable standards of corporate governance to ensure more relevant connection to the focus and the innovation output of these firms. Higher importance should also be placed on marketing channels as poor and unpopular channels may results in wasted efforts of conveying products to consumers, hence credibility of websites resorted to for sales as well as the potential of reach of these channels used and the assurance of reaching to the purported target market should be highly considered as well. Marketing channels that has a high potential of increasing sales volume should be designed and the impact of intermediaries should be limited to ensure strong control whilst also striving for new market opportunities. Strong accountability sessions and interim control measures should be held to ensure adequate significance to targets set and, finally, expenditure expended on external knowledge appropriated should be connected a lot more with research on customer's behavioural swings and the product's position with customers as well.

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BRAZILIAN STUDENTS' ENTREPRENEURIAL INTENTIONS, CONFIDENCE AND COMPETENCES

Diane Aparecida Reis – André Fleury

Abstract

Purpose: This study aims to evaluate students' entrepreneurial competences, intentions and confidence, before and after entrepreneurship teaching courses. Emerging in a scenario where entrepreneurs constantly face a challenging environment, and where the association of entrepreneurship with economic growth, innovation and job creation are always present. Some researchers believe that entrepreneurial competences can be teachable, not being innate, aiding entrepreneurs with better results and contributing to a nation's economic development.

Design/methodology/approach: The case study method applied in the research allows a comparison between different scenarios. The cases studies were developed in two courses, both with the same model and focus on teach entrepreneurship, at the University of São Paulo (USP), in the second half of 2018. Achieving as respond rate 62% in the pre-course questionnaire of both courses, and 42% and 51%, respectively, in the post-course questionnaire, with groups of 60 students and 79 students, respectively.

Findings: The study discovered that the courses always assist in develop the students' entrepreneurial intention and competences, but they do not always assist in develop the entrepreneurial confidence. The students expect to improve entrepreneurial competences and learn more about entrepreneurship, by attending the courses. Thus, this study contributes to ways of measuring the results of entrepreneurship teaching courses, a currently challenge.

Research/practical implications: The research contributed with ways of measuring the outcomes of entrepreneurship teaching courses. Leaving for future research the investigation of the students' entrepreneurial competences, confidence and intention in other scenarios.

Originality/value: This study is original because it explored an unexplored database, evolving a data collection and analysis, besides being an attempt to measure the outcomes of entrepreneurship teaching courses, contributing to the entrepreneurship education evolution.

Keywords: Entrepreneurship, Entrepreneurship Education, Entrepreneurial Competences

JEL Codes: O31, O33

Introduction

Entrepreneurship is typically associated with job creation, economic growth, technological progress and innovation (Al-Atabi & Deboer, 2014), leading to the currently increase of self-employment (Pauli et al., 2019). But entrepreneurs face a complex, difficult and problematic environment (Bissola et al., 2017). Emerging entrepreneurship education as an effort to develop competences that can contribute to the generation of employability and economic value (Al-Atabi & Deboer, 2014; Duval-Couetil, 2013).

Entrepreneurship education is a phenomenon, composed of techniques and theory, recognized for being able of create entrepreneurs in greater numbers and quality, currently receiving a growing and significant attention from leaders (Neck & Greene, 2011), mainly consisting of teaching entrepreneurial attitudes and skills (Bae et al., 2014). Growing the Hypothesis Driven Entrepreneurship approach as it encourages rapid prototyping and iterative learning, having a strong relationship with Lean Startup and Business Model Canvas.

In this scenario, and based on the fact that entrepreneurial competences can be developed (Sánchez, 2013), it is necessary to identify, define and measure the evolution of entrepreneurial competences, before and after the entrepreneurship teaching courses (Morris et al., 2013). This study aims to evaluate students' entrepreneurial competences, intentions and confidence, before and after participating in the entrepreneurship teaching courses, at the University of São Paulo (USP). Answering to what the students expected to the courses and what they achieved, in terms of entrepreneurial competences, intention and confidence. Assisting in better understand the outcomes of entrepreneurship education, as suggested by Martin et al., 2013. Developing case studies in two entrepreneurial teaching courses, in the second half of 2018, both following the same model.

This research was structured as follows, the first section presented the objectives and justification of the research. Section two showed the literature review. Section three evidenced the method and details of the case studies. Section four highlighted the research results and discussion. Section five concluded the research.

1 Literature review

The literature review was based on entrepreneurship education, and in the main approaches that composed the model studied in the cases studies of this research. The model was based on the Hypothesis Driven Entrepreneurship, with the main approaches of Lean Startup and Business Model Canvas.

1.1 Entrepreneurship education

Entrepreneurship classes are growing exponentially, besides the traditional discussion between academics and non-academics about the impact of education on entrepreneur's success. Entrepreneurship education seeks to improve the management capability of small businesses, leading to more resilient and capable entrepreneurs (Fuller-Love, 2006).

Entrepreneurship education can be seen as part of a recent body of knowledge, not being completely defined, not having defined methods and tools, characterized by the predominant involvement of non-academics, rather than academics, and having as expected outcome the creation of new businesses, leading to economic development (Duval-Couetil, 2013). There is a mix of entrepreneurial competences differentiating the entrepreneurs from others, in a unique combination of knowledge, resources and skills (Fiet, 2000).

In entrepreneurship education the Hypothesis Drive Entrepreneurship has gained prominence, popularized for its effectiveness in assisting entrepreneurs in development of new products and/or services, based on the identification of hypotheses, which will be tested with customers, aligning the new business with the needs and desires of the customers (Eisenmann et al., 2011). Some of the approaches that can be used to assist in the application of Hypothesis Drive Entrepreneurship are Lean Startup and Business Model Canvas, the first for its advocacy of experimentation and testing, and the second for its ability to highlight the value and test hypotheses about new business.

1.2 Lean Startup

Lean Startup was initially developed for the software industry, but is currently applied in several other fields (Ries, 2011). It can be defined as an approach that constantly seeks innovations (Ries, 2011), also minimizing the risk of develop products and/or services that are neither needed nor desired by customers (Bajwa et al., 2017; Blank, 2012; Ries, 2011). Be guided by potential customers, and searching to eliminate waste (Bajwa et al., 2017).

Lean Startup advocates a validated learning process, where tests are performed on previously established problems, in the search to draw hypotheses, which will be validated or not by the potential customers (Bajwa et al., 2017; Ries, 2011). Developing a Business Model Canvas instead of a traditional business model (Blank, 2012).

1.3 Business Model Canvas

Business Model Canvas represents the business model in a summarized and agile format, assisting to identify the essential as well as prioritizing it, operating as a simplification of the traditional business model (Osterwalder & Pigneur, 2010), and offering superior value in terms of experimentation and testing (Trimi & Berbegal-Mirabent, 2012).

The Business Model Canvas assists in understanding how a business delivers value (Trimi & Berbegal-Mirabent, 2012). Highlighting how value was created, captured and delivered, evidencing the relationships between the different business fields (Osterwalder & Pigneur, 2010). Also having the ability to document, measure and communicate the entrepreneur's learning process (Maurya, 2012). Being divided into nine blocks, that show how a business generates financial return, evidencing its structure and processes (Osterwalder & Pigneur, 2010). Each block can be transformed into hypotheses that can be tested with potential customers to gain feedback and improve the business idea (Blank, 2012).

2 Method

The research method was based on case studies. Case studies can take a photograph, allowing the understanding of a particular context reality, using a unique combination of research methods that collect relevant data (Eisenhardt, 1989). Applied in this research to answer, in terms of entrepreneurial competences, intention and confidence, what the students expected, participating in the entrepreneurship teaching courses, and what they achieved. Assisting in the development of ways to measure the outcomes of entrepreneurship education.

The courses studied as cases have in common the same model, in a semester of face-to-face classes, where classes were divided into two halves, in the first half theories and real practical cases were presented, and the second half were dedicated to practice the theory, already presented, in the context of projects that are under development for student groups. The projects are developed since the beginning of the courses, with the students needing to compose groups of three to five students, to develop the same project, the project is a new business idea, which can be a new product and/or service.

The whole project involves four main deliveries: **Deliver 1** - refinement of the main idea and justification of the new business relevance; **Deliver 2** - better detailing of the project, development of the Business Model Canvas, and detailment the new business strategy; **Deliver 3** – evidences of the results of qualitative and quantitative tests with potential customers, as well as the development of the low-fidelity Minimum Viable Product (MVP), also presenting

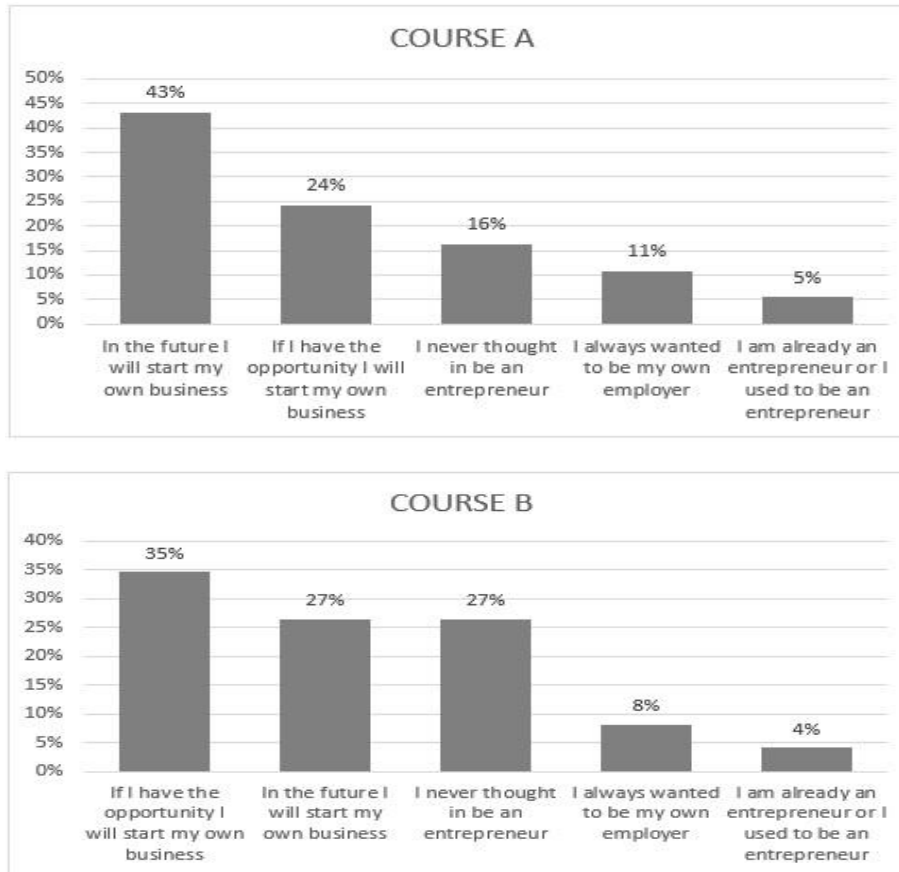
what has been developed until the moment; **Deliver 4** - presentation of the high-fidelity MVP, and all the results obtained throughout the development of the project, with final presentation of the idea and its applicability and feasibility.

3 Results

The courses analyzed were denominated as course A (compulsory for undergraduate students in production engineering) and course B (compulsory for undergraduate students in civil engineering). As a return rate, students in course A were in 60 students, 37 (62%) students answered the pre-course questionnaire and 25 (42%) students answered the post-course questionnaire, the course B were in 79 students, 49 (62%) students answered the pre-course questionnaire and 40 (51%) students answered the post-course questionnaire. Of the respondents, 32% of the students in course A started the undergraduate course in 2015 and 28% in 2017, merging the initial years, presenting an average age of 21 years old, in an interval from 19 to 25 years old, in the course B 45% of the students started the undergraduate course in 2017 and 30% in 2018, not mixing much the initial years, presenting an average age of 21 years old, in an interval from 18 to 25 years old. In the course A all the students live with the father or the mother (84%) or with the parents (16%), and the majority of the students of the course B lives with the mother or the father (90%). Most of the students studied in private high school, course A 68%, and course B 65%. Describing the profile of student employability, 14% of course A respondent's work, in companies of education or software, and only 6% of course B respondent's work, in companies of education or consultant.

Beginning to answer what the students expected participating of the courses and what they achieved, in terms of entrepreneurial competences, intention and confidence. In relation to being an entrepreneur, the Fig. 1 shows that most students in course A and course B, respectively, want to be entrepreneurs, starting their own business, creating the opportunity (43%; 27%), or want to start their own business, if they identify a good opportunity (24%; 35%). Only 20% of the students in both courses do not know any entrepreneurs.

Fig. 1: Thinking about being an entrepreneur



The entrepreneurial confidence and intention of the students were considered on a scale of 0 to 10. Considering the average, in course A, students confidence decreased in 7% (from 6.6 to 6.2) and intention increased in 5% (from 4.4 to 4.6), and in course B, the confidence and intention increased in 13% (from 6.1 to 7) and 10% (from 4.6 to 5.1), respectively. The students of course A answered that their lack of entrepreneurial confidence is associate with the difficult in be an entrepreneur in the Brazilian context and the fear of failure, aiming a stable financial life, and when the subject is entrepreneurial intention, the greatest fear is failure and not have no good idea, believing that their entrepreneurial confidence and intention can increase if they find a trustworthy opportunity and consider themselves sufficiently knowledgeable about what is takes to be an entrepreneur. For students from course B, their lack of entrepreneurial confidence is mainly associated with identify a good opportunity, losing their fear of failure, or taking a high risk, but some of them have not yet thought about their entrepreneurial confidence, about the entrepreneurial intention the greatest difficult is that students do not know what it is to be an entrepreneur or are afraid to failure, seeking financial stability, believing that entrepreneurial confidence and intention can increase if their know more about the market and how an entrepreneur it is.

This study worked with 42 different entrepreneurial competences, its distributions are evidenced in the Tab. 1, working with three main taxonomies, the competences that students believe they possess, the competences that the students expect to develop, doing the courses, and competences that the students believe to have developed with the courses. Applying the T-test for Tab. 1 it was evidenced that, in the case of the competences that the students possess and developed, there means equality, respectively, the results were $T\text{-Value} = 2.11$ $P\text{-Value} = 0.038$, and $T\text{-Value} = -11.18$ $P\text{-Value} = 0.000$, not rejecting the Hypothesis 0 on the equality of the mean. On the competences that students expect to develop Hypothesis 0 was rejected, indicating different mean, with the results $T\text{-Value} = -1.00$ $P\text{-Value} = 0.320$.

Tab. 1: Competences of students – Competences that the students possess, expect to develop and developed in entrepreneurship teaching courses

| Competence | Course A – Possess | | Course B - Possess | | Course A – Expect develop | | Course B - Expect develop | | Course A - Developed | | Course B - Developed | |
|--|--------------------|----|--------------------|----|---------------------------|----|---------------------------|----|----------------------|----|----------------------|----|
| | Count | % | Count | % | Count | % | Count | % | Count | % | Count | % |
| Accepting of responsibility | 39 | 4% | 28 | 4% | 29 | 4% | 17 | 2% | 7 | 5% | 23 | 3% |
| Adaptability and flexibility | 38 | 4% | 25 | 3% | 28 | 4% | 20 | 3% | 5 | 4% | 27 | 4% |
| Analytical ability | 27 | 3% | 29 | 4% | 19 | 3% | 22 | 3% | 3 | 2% | 34 | 5% |
| Applied orientation | 8 | 1% | 6 | 1% | 6 | 1% | 16 | 2% | 1 | 1% | 9 | 1% |
| Autonomy | 23 | 3% | 17 | 2% | 18 | 3% | 15 | 2% | 4 | 3% | 14 | 2% |
| Challenge ability | 36 | 4% | 23 | 3% | 27 | 4% | 28 | 4% | 6 | 5% | 30 | 4% |
| Communication skill | 23 | 3% | 20 | 3% | 17 | 3% | 18 | 2% | 1 | 1% | 19 | 3% |
| Competitiveness | 29 | 3% | 16 | 2% | 21 | 3% | 16 | 2% | 3 | 2% | 16 | 2% |
| Conscientiousness | 32 | 4% | 26 | 4% | 23 | 3% | 18 | 2% | 3 | 2% | 19 | 3% |
| Critical and strategic thinking | 31 | 3% | 31 | 4% | 24 | 4% | 24 | 3% | 4 | 3% | 32 | 4% |
| Desire to have high earning | 30 | 3% | 26 | 4% | 22 | 3% | 12 | 2% | 8 | 6% | 16 | 2% |
| Discipline | 31 | 3% | 19 | 3% | 24 | 4% | 12 | 2% | 2 | 2% | 15 | 2% |
| Dynamism | 16 | 2% | 19 | 3% | 11 | 2% | 19 | 3% | 4 | 3% | 16 | 2% |
| Embrace business with passion | 29 | 3% | 14 | 2% | 21 | 3% | 22 | 3% | | 0% | 14 | 2% |
| Emotional stability and resistance to stress | 27 | 3% | 18 | 2% | 22 | 3% | 14 | 2% | 2 | 2% | 18 | 2% |
| Estimation skills | 13 | 1% | 7 | 1% | 7 | 1% | 25 | 3% | 2 | 2% | 10 | 1% |
| Extroversion | 24 | 3% | 18 | 2% | 16 | 2% | 15 | 2% | 4 | 3% | 20 | 3% |
| Finance management | 13 | 1% | 7 | 1% | 10 | 1% | 21 | 3% | 3 | 2% | 9 | 1% |
| Heterogeneity | 12 | 1% | 12 | 2% | 9 | 1% | 9 | 1% | 1 | 1% | 6 | 1% |

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|--|----|----|----|----|----|----|----|----|---|----|----|----|
| Implementation abilities | 6 | 1% | 11 | 1% | 4 | 1% | 22 | 3% | | 0% | 12 | 2% |
| Innovativeness and creativity | 17 | 2% | 14 | 2% | 11 | 2% | 33 | 4% | 3 | 2% | 27 | 4% |
| Integration | 16 | 2% | 15 | 2% | 11 | 2% | 20 | 3% | 2 | 2% | 14 | 2% |
| Integrity | 29 | 3% | 25 | 3% | 21 | 3% | 10 | 1% | 4 | 3% | 15 | 2% |
| Intuitively ability (sixth sense) | 13 | 1% | 12 | 2% | 9 | 1% | 16 | 2% | 2 | 2% | 8 | 1% |
| Learn from feedback | 37 | 4% | 31 | 4% | 28 | 4% | 19 | 3% | 9 | 7% | 39 | 5% |
| Long-term and global vision of opportunities | 13 | 1% | 12 | 2% | 8 | 1% | 28 | 4% | 4 | 3% | 25 | 3% |
| Marketing, commercial and sales skills | 6 | 1% | 4 | 1% | 5 | 1% | 28 | 4% | 5 | 4% | 28 | 4% |
| Multi-experience | 10 | 1% | 5 | 1% | 7 | 1% | 15 | 2% | 2 | 2% | 17 | 2% |
| Need for power and dominance | 9 | 1% | 6 | 1% | 6 | 1% | 8 | 1% | | 0% | 4 | 1% |
| Network ability and ability to motivate others | 11 | 1% | 11 | 1% | 9 | 1% | 9 | 1% | 2 | 2% | 10 | 1% |
| Persistence and optimism | 30 | 3% | 23 | 3% | 21 | 3% | 16 | 2% | 3 | 2% | 12 | 2% |
| Pro-activity | 28 | 3% | 20 | 3% | 21 | 3% | 18 | 2% | 3 | 2% | 22 | 3% |
| Problem solving ability | 33 | 4% | 28 | 4% | 25 | 4% | 20 | 3% | 5 | 4% | 24 | 3% |
| Questioner | 14 | 2% | 11 | 1% | 12 | 2% | 8 | 1% | 2 | 2% | 14 | 2% |
| Scanning | 9 | 1% | 11 | 1% | 6 | 1% | 23 | 3% | 2 | 2% | 12 | 2% |
| Self-confidence | 22 | 2% | 17 | 2% | 17 | 3% | 11 | 1% | 2 | 2% | 13 | 2% |
| Self-efficacy | 11 | 1% | 9 | 1% | 4 | 1% | 11 | 1% | 2 | 2% | 7 | 1% |
| Self-evaluation | 26 | 3% | 26 | 4% | 19 | 3% | 13 | 2% | 4 | 3% | 21 | 3% |
| Sound judgment | 41 | 5% | 30 | 4% | 31 | 5% | 23 | 3% | 4 | 3% | 23 | 3% |
| Tenacity and Endurance | 24 | 3% | 22 | 3% | 21 | 3% | 9 | 1% | 4 | 3% | 14 | 2% |
| Time-management skills | 17 | 2% | 17 | 2% | 12 | 2% | 18 | 2% | 2 | 2% | 13 | 2% |
| Using Contacts and Connections | 8 | 1% | 13 | 2% | 7 | 1% | 13 | 2% | 2 | 2% | 13 | 2% |

Discussion

The courses were compulsory for some students, but also participated in courses students without compulsory, of different undergraduate courses, such as architecture. About employability, most students still do not work and want to be an entrepreneur, making the opportunity or if the opportunity appears. Students were a mix in years old in both courses, and

the course B students are most recent in undergraduate course. Most students live with their father or mother and attend private high school.

Answering what the students expected from the courses and what they achieved. When the subject is entrepreneurial confidence by applying pre-course and post-course questionnaires, students in course A have reduced entrepreneurial confidence and the students in course B have increased the entrepreneurial confidence. With many students worried about the difficult of being an entrepreneur in the Brazilian context, they are also afraid of failing because they are seeking a stable financial life. Students believe they can be more confidence and have more entrepreneurial intention if they know more about the market and how is be an entrepreneur. With only 20% of the students, of each course, knowing no entrepreneurs. The courses have always developed entrepreneurial competences in the students, but these competences have not always been the same as students expect to develop with the courses, and most of the time students only hope to improve competences that they believed to possess, something evidenced for by fact that the responds mark the same competence in the list of the competences that they believed to possess and hope to develop by taking the courses. Also being evidenced, by the T-test, difference in the competences that the students hope to develop.

Conclusion

Two cases were studied in the search to improve the ways of measuring the outcomes of entrepreneurship teaching courses, hoping to assist in the evolution of the entrepreneurship education. In a search to answer what students were expecting taking the entrepreneurship teaching courses and what they achieved in terms of entrepreneurial competences, intention and confidence.

Evaluating the students' entrepreneurial competences, intentions and confidence, in a pre-course and post-course questionnaire, in the undergraduate engineering course at the University of São Paulo (USP), it is possible to conclude that entrepreneurial confidence after the course, which was compulsory for students of the undergraduate course in production engineering, have being reduced, and after the course, compulsory for undergraduate students in civil engineering, have increased, not being possible to established a standard, on entrepreneurial intention, after the two courses, have increased, there is possible to hypothesize that the curses contributed to the entrepreneurial intention. The courses have always contributed to the development of students' entrepreneurial competences, not always developing the competences that the students hope to develop in the courses, with the students actually hoping

to improve competences and not develop new competences. Based on these results, this study evidenced a greater need for research on the outcomes of entrepreneurship education, being a start point. Remaining for future research on students' entrepreneurial competencies, confidence and intention in other scenarios and with others tools, and the improvement of other ways of analyzing and measuring the outcomes of entrepreneurship education.

As limitations, this study investigated the undergraduate courses in engineering at USP, having a limited sample, and the students answering the questions, including their competences, based on their perception, with no psychological test or different observation.

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VERIFICATION OF THE ORGANIZATIONAL STRUCTURE EVOLUTION MODEL OF RETAIL TRADE ORGANIZATIONS USING CLUSTER ANALYSIS AND THE METHOD OF ROTATED COMPONENTS

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Abstract

Purpose: Purpose of the study is to clarify the theoretical model of organizational structure evolution, which is based on the hypothesis that two types of organizational structures – sequential and parallel, dialectically replace each other. It is assumed that the growth of organizations in the transition between two different types of organizational structures has a different nature – intensive or extensive.

Design/methodology/approach: Retail sector enterprises, whose organizational structure is largely determined by separate divisions, are selected. The cluster analysis is chosen as a research method to split the initial data set into groups. In order to clarify the results of the cluster analysis, the principal component method is used. For the study, 2,249 retail organizations of the Czech Republic were initially selected.

Findings: The analysis put us to make the following clarifications in the model: a) in the transition from a parallel organizational structure to a sequential one the growth of an organization is of an intensive nature, and in the transition from a sequential organizational structure, growth is extensive; b) development patterns are determined by three key factors: the size of an organization, the effectiveness of its activities and the age of an organization.

Research/practical implications: The results of the research generally confirmed the hypotheses put forward and showed coincidence with the proposed theoretical model of the evolution of the organizational structure.

Originality/value: The use of the proposed model allows owners and managers to more rationally undertake the development of commercial organizations in the long term.

Keywords: Organizational Development, Statistical Research Methods

JEL Codes: D23, L22, M21

Introduction

Contemporary scholarly concepts demonstrate that all the diversity of organizational structures, in one way or another, comes down to two alternative types: mechanical or organic (Burns and Stalker, 2011), high or flat (Ghiselli and Siegel, 1972), horizontal or vertical (Mintzberg, 1989, Aoki, 1986, Keeling et al., 2007). The defining characteristics of the organizational structure selected are the typification of production structures widely used in the post-Soviet space: sequential, parallel, and serial-parallel (Usubamatov, 2018, Freiheit et al., 2004). In order to concretize, the scientific approach was chosen as the basis for the defining features of the structure, which implies only two types of structures: sequential and parallel (Denisov, 2008). Our research is aimed at confirming the hypothesis about the existence of a development pattern of the organizational structure in the process of growth and development of commercial companies.

The pattern proved by the authors is that the two basic types of organizational structures – sequential and parallel, replace each other in the process of growth as commercial organizations develop. To prove the hypothesis in previous years, studies were conducted of retail organizations of the Czech Republic (Bobkov et al., 2017) and private educational organizations of the Czech Republic (Bobkov et al., 2018). The results showed that the development of commercial organizations can be described by spiral development: by moving from sequential organizational structures to parallel ones, and then, at a new stage of development, again to sequential ones.

Earlier studies on the identification of organizational development patterns using quantitative indicators were conducted by Hanks et al. (1993), Shirokova (2008). These studies were carried out according to the method similar to that used in this article, and included the following steps: collecting information about the companies studied, identifying variables that characterize the structure of the organization, conducting cluster analysis using the Word's method and interpreting the results obtained. The results of the research, according to the researchers themselves, did not enable to come to certain conclusions about the sequence of developmental stages of organizations assigned to different clusters. In fact, in these studies, an attempt was made to empirically identify the levels of development of organizations in accordance with the assignment to a particular cluster and then propose a model of their organizational development.

Analyzing the results of these studies (Shirokova, 2008, Shirokova and Skaletsky 2016), the following features should be noted:

1. Only structural variables were selected as variables during cluster analysis. Financial and economic performance indicators were used either to interpret the results, or not applied at all.
2. Baseline information was obtained by questioning the managers of the studied companies. Accordingly, the number of organizations in the samples was relatively small and in different studies did not exceed 160 companies.
3. Companies from various sectors of the economy were present in the sample, which, with a relatively small sample, only strengthened industry differences and did not allow researchers to unambiguously identify the patterns of organizational development.

Another feature of the research should also be noted. Qualitative variables chosen by researchers to identify organizational development patterns (in particular, the variables “type of organizational structure”, “formalization”, “centralization”, “characteristic of the organization’s development strategy”, etc.) could be interpreted by respondents in completely different ways. It is possible that this fact was reflected in the results obtained.

Since the authors have previously identified and generally confirmed the evolution patterns of commercial organizations, the next task is to evaluate the effectiveness of the studied commercial organizations and to verify the hypothesis about the growth of their effectiveness during the transition to the next level of development. At the same time, according to the authors, the increase in efficiency in the transition to the next level of development is determined by the method of transforming the organizational structure: during the transition from a parallel organizational structure to a sequential one, a higher efficiency increase is achieved than in a transition from a sequential organizational structure to a parallel one.

As the object of the study, the authors re-selected the retail trade organizations of the Czech Republic (Blažková and Dvouletý, 2019). The choice of retail organizations as the object of study is due to three factors. Firstly, the positive results of previous studies that have shown a consistent change in the sequential and parallel organizational structures of retail organizations in the Czech Republic. Secondly, by a large number of organizations in this sector of the economy compared to other sectors of the economy for which the authors have conducted research. Thirdly, by a greater opportunity to identify individual structural units using statistical analysis methods.

The most commonly used method for determining groups that combine objects that are homogeneous according to certain criteria is cluster analysis, which is a means of exploratory analysis designed to naturally split the initial data set into groups. The IBM SPSS Statistics computer program is used to identify clusters. Principal component analysis is used to reduce the dimension of the analyzed data and enable to identify the main factors that influence the object of study.

1 The evolution model of the organizational structure of retail organizations

When constructing a theoretical model, the authors proceeded from the assumption that in the process of developing an organization and improving its operational activities, a certain time limit is reached within the existing technological constraints, causing the limit of productivity growth. This understanding is largely based on approaches similar to the S-curve concept (Foster, 1986, Christensen, 2013). After that, the management of the organization, which does not have the possibility of rapid technological development (leap), needs a certain way to review the organizational structure. (Maly and Velinov, 2018).

Depending on the current level of development, such transformations can be carried out in one of two ways. If the organization forms a technologically sequential system for the production of goods or services, there is a duplication of the main activity and a transition to a parallel organizational structure or, in other words, to a horizontally integrated structure. The second method involves specialization and the division of labor, i.e. occurs by dividing tasks into smaller ones, or by extending the value chain – often on the basis of systems with a parallel structure within one larger organization and forming vertically integrated ones. The organizational characteristics of each level of development are presented in Table 1. A more detailed description of each of the development levels is presented by Bobkov et al. (2017).

Tab. 1: Levels of development of retail trade organizations

| Development level | Organization type | Organizational structure type |
|-------------------|---|-------------------------------|
| 1 | retailer / small shop (kiosk) | sequential |
| 2 | chain of small shops (kiosks) | parallel |
| 3 | supermarket | sequential |
| 4 | supermarket chain | parallel |
| 5* | B2B or companies, incl. wholesale trade | sequential |

* not being analyzed in this paper Source: based on: (Denisov, 2008)

Verification of the theoretical model of organizational structure evolution put forward by the authors is undertaken using cluster analysis in the IBM SPSS software. This approach is widely applied to analyze organizational structures (Boeva et al. 2017). Baseline data is obtained from the Albertina Gold Edition database (Bisnode Česká republika, a.s.). For the study, initially 2,249 retail trade organizations are selected based on the results of their business activities for the 2014 calendar year (from January 1, 2014 to December 31, 2014). The choice of the year is due to the completeness of the information. According to the results of the initial processing, the authors sifted out 554 trade organizations due to the lack of indicators required for the analysis. Financial indicators are calculated in the original currency – CZK.

The following variables are selected that characterize the activities of a particular organization:

- X_1 – number of outlets;
- X_2 – total average number of employees (people);
- X_3 – average number of employees per outlet (people);
- X_4 – labor productivity at value added (thousand CZK per person);
- X_5 – revenue per one outlet (thousand CZK);
- X_6 – total assets (thousand CZK);
- X_7 – amount of depreciation (thousand CZK);
- X_8 – organization age (total number of years in business).

The calculation of the matrix of pairwise Pearson's correlation coefficient is presented in Table 2.

Tab. 2: Matrix of pair coefficients of Pearson's mutual conjugacy

| | Number of outlets (X1) | Total average number of employees, people (X2) | Average number of employees per outlet, people (X3) | Labor productivity at value added, thousand CZK per person (X4) | Revenue per one outlet, thousand CZK (X5) | Total assets, thousand CZK (X6) | Amount of depreciation, thousand CZK (X7) | Organization age, total number of years in business (X8) |
|----------------|------------------------|--|---|---|---|---------------------------------|---|--|
| X ₁ | 1 | 0.788** | 0.060** | 0.026 | 0.023 | 0.797** | 0.769** | 0.018 |
| X ₂ | 0.788** | 1 | 0.296** | 0.007 | 0.096** | 0.824** | 0.915** | 0.026 |
| X ₃ | 0.060** | 0.296** | 1 | 0.042* | 0.580** | 0.134** | 0.200** | 0.039** |
| X ₄ | 0.026 | 0.007 | 0.042* | 1 | 0.274** | 0.044* | 0.038 | 0.040 |
| X ₅ | 0.023 | 0.096** | 0.580** | 0.274** | 1 | 0.092** | .082** | 0.037 |
| X ₆ | 0.797** | 0.824** | 0.134** | 0.044* | 0.092** | 1 | 0.903 | 0.003** |
| X ₇ | 0.769** | 0.915** | 0.200** | 0.038 | 0.082** | 0.903 | 1 | 0.012** |
| X ₈ | 0.018 | 0.026 | 0.039** | 0.040 | 0.037 | 0.003** | 0.012** | 1 |

* The correlation is significant at the 0.05 level (2 sides).

** The correlation is significant at the level of 0.01 (2-sides).

Source: based on: (Bobkov et al., 2017)

Since the features are equally informative and important for further analysis, the distance between objects is calculated using the formula of simple Euclidean distance:

$$\rho_E(x_i, x_j) = \sqrt{\sum_{e=1}^k (x_{ie} - x_{je})^2} \quad (1)$$

where: x_{ie}, x_{je} – the value of e component of i (j) object ($e=1, 2, \dots, k$), ($i, j=1, 2, \dots, n$).

The cluster analysis is carried out by the Ward's method, which allows one to divide the aggregate into a sufficient number of clusters corresponding to the economic essence of the phenomena studied. Due to the different units of measurement, the indicators under study are subjected to pre-standardization. Objects with data omissions, as well as objects with anomalously high value added values and total assets compared to other organizations are excluded from the analysis. Accordingly, the cluster analysis is conducted on a sample of 1,695 trade organizations.

The hypothesis of equality of dispersions within and between clusters is rejected for all variables at 5 and 1689 degrees of freedom. The value of p – the probability of error when accepting the hypothesis about the inequality of dispersions, is extremely low, not more than 0.001 (F-criterion is significant for all variables at a level of at least 0.01). This suggests that

the hypothesis about the inequality of variances is accepted and, accordingly, the clusters are formed correctly.

The cluster analysis resulted in the splitting of 1 695 retail trade organizations into 6 clusters (Table 3).

Tab. 3: Average values of variables in clusters, sorted by measure of the value of total assets (X₆)

| Cluster | Number of outlets (X ₁) | Total average number of employees, people (X ₂) | Average number of employees per outlet, people (X ₃) | Labor productivity at value added, thousand CZK per person (X ₄) | Revenue per one outlet, thousand CZK (X ₅) | Total assets, thousand CZK (X ₆) | Amount of depreciation, thousand CZK (X ₇) |
|-----------------|-------------------------------------|---|--|--|--|--|--|
| 4 N=1105 | 1.8 | 5.4 | 3.2 | 318.2 | 5 079.6 | 3 895.8 | 140.8 |
| 1 N=358 | 2.4 | 13.5 | 6.8 | 556.1 | 20 393.4 | 13 868.8 | 432.2 |
| 5 N=61 | 1.4 | 15.1 | 12.4 | 745.4 | 85 292.4 | 34 667.5 | 915.8 |
| 2 N=133 | 8.0 | 42.7 | 7.7 | 534.1 | 20 085.6 | 54 027.0 | 1 806.6 |
| 6 N=9 | 2.0 | 29.7 | 21.2 | 1 424.5 | 298 744.4 | 98 770.7 | 2 879.3 |
| 3 N=29 | 23.2 | 214.5 | 11.5 | 566.2 | 38 054.2 | 204 094.4 | 7 617.2 |
| Total N=1695 | 2.8 | 14.1 | 4.9 | 410.9 | 14 501.6 | 14 972.2 | 503.4 |

Source: based on: (Bobkov et al., 2017)

Evaluating the results of the distribution by clusters after sorting by indicator the value of total assets (X₆) (see Table 3), one can see a consistent increase and decrease in the values of the indicator number of outlets (X₁). Thus, if in cluster 4, which includes small trade organizations (1,105 organizations), the average number of outlets is 1.8, then in the next cluster (cluster 1 – 358 organizations), the average number of outlets has increased 2.4. Further, in cluster 5 (61 organizations), the average number of outlets decreased to 1.4. For subsequent clusters, this pattern is preserved.

The results of the cluster analysis as a whole confirm the proposed hypothesis about the alternation of the sequential and parallel structure of the organization of production (operational) activities. As can be seen from the average values of variables in clusters, with the growth of the size of organizations (X₆), a consistent change in the number of outlets (X₁)

is unambiguously observed. At the same time, analyzing the results obtained from the perspective of the hypothesis put forward, it can be assumed that the organizations included in clusters 1 and 2 are a network of small stores. And, most likely, they should be assigned to one group (see Table 4). This confirms almost the same value of the indicator X_5 (the amount of revenue per one outlet) for these trade organizations. Analyzing trade organizations included in clusters 5 and 6, we can also assume that they represent supermarkets (see Table 4). In this case, cluster 6 includes the largest supermarkets (9 organizations). And finally, in the third cluster are large supermarket chains (on average, over 23 outlets in each of them). At the same time, the number of employees in one outlet for such organizations is comparable to organizations in the fifth cluster (that is, individual supermarkets).

Tab. 4: Comparison of the analysis results with the proposed hypothesis

| Cluster | Number of trade organizations | Type of organization | Organizational structure type |
|---------|-------------------------------|-------------------------------|-------------------------------|
| 4 | 1 105 | retailer / small shop (kiosk) | sequential |
| 1 | 491 | chain of small shops (kiosks) | parallel |
| 2 | | | |
| 5 | 70 | supermarket | sequential |
| 6 | | | |
| 3 | 29 | supermarket chain | parallel |

Source: Own calculations

2 Analysis of key performance indicators of retail organizations

Based on the obtained results of the distribution of retail trade organizations by clusters and their comparison with the hypothesis put forward, the authors analyzed the main financial and economic indicators of the studied organizations (see Table 5) based on the average values in the respective clusters or groups of clusters.

Tab. 5: Key financial and economic indicators of retail organizations (average values in the respective clusters / clusters groups)

| Cluster | Number of trade organizations | Type of organization | Revenue, thousand CZK | EBIT, thousand CZK | Total assets, thousand CZK | The average number of employees, people. |
|---------|-------------------------------|-------------------------------|-----------------------|--------------------|----------------------------|--|
| 4 | 1 105 | retailer / small shop (kiosk) | 8 569.2 | 87.3 | 3 895.8 | 5.4 |
| 1 | 491 | chain of small shops (kiosks) | 50 979.6 | 1 037.6 | 24 746.6 | 21.4 |
| 2 | | | | | | |
| 5 | 70 | supermarket | 173 571.4 | 5 654.8 | 42 909.3 | 17.0 |
| 6 | | | | | | |
| 3 | 29 | supermarket chain | 495 275.0 | 8 871.5 | 204 094.4 | 214.5 |

Source: Own calculations

As can be seen from the data presented in Table 5, almost all of the presented indicators provide an increase in absolute values (with the exception of the average number of employees when moving from a network of small stores to supermarkets).

Moreover, if we analyze the changes in financial and economic indicators during the transition from a network of small stores to supermarkets (i.e., from a parallel organizational structure to a sequential one) and from supermarkets to a network of supermarkets (that is, from a sequential organizational structure to a parallel one), the intensive growth of organizations with a consistent structure is observed. That is, in the transition to a sequential organizational structure, revenue and Earnings Before Interest and Taxes (EBIT) grow faster than total assets (for example, during the transition from a small chain of stores to supermarkets, total assets grew 1.7 times, revenue grew 3.4 times, and EBIT increased almost 5.5 times). In turn, in the transition to a parallel organizational structure, revenue and EBIT grow slower than total assets (with total assets growing 4.7 times, revenue grew 2.8 times, and EBIT – 1.5 times), i.e. there is an extensive growth of such organizations.

Some discrepancy with this conclusion during the transition from retailers or small stores to a network of small stores (with total assets growing 6.3 times, revenues increased 5.9 times, and EBIT – almost 11.9 times) can be explained as features of their accounting policies and the wider use of leased property.

Thus, we can conclude that with the transition from a parallel organizational structure to a sequential one, the growth of the organization is intense (revenue and profit growth outpaced the growth of the organization's assets), and the transition from a sequential organizational structure to a parallel one leads to extensive growth (the growth of the assets of the organization is ahead of the growth of revenues and profits).

3 Identification of key factors determining the patterns of development of retail organizations

In order to identify the key factors that determine the patterns of development of retail organizations, we apply the principal component analysis, which is also used to analyze the links between the organizational structure and company performance (Shah and Ward 2003). The Varimax rotation method is used with Kaiser's normalization (rotation converged in 4 iterations). The calculations are carried out in IBM SPSS Statistics. The results are presented in table 6.

Tab. 6: Rotated component matrix

| № | Indicators | Component | | |
|-----|--|-----------|--------|--------|
| | | 1 | 2 | 3 |
| 1. | Organization age (total number of years in business) | 0.038 | 0.002 | 0.97 |
| 2. | Revenue (thousand CZK) | 0.767 | 0.302 | -0.066 |
| 3. | Total average number of employees (people) | 0.879 | -0.019 | -0.035 |
| 4. | Number of outlets | 0.834 | -0.205 | 0.042 |
| 5. | Average number of employees per outlet (people) | 0.223 | 0.597 | -0.128 |
| 6. | Revenue per one outlet (thousand CZK) | 0.151 | 0.809 | -0.118 |
| 7. | Total assets (thousand CZK) | 0.839 | 0.397 | 0.099 |
| 8. | Amount of total liabilities (thousand CZK) | 0.839 | 0.397 | 0.099 |
| 9. | Amount of depreciation (thous. CZK) | 0.871 | 0.204 | 0.017 |
| 10. | Value of assets per outlet (thousand CZK) | 0.091 | 0.93 | 0.12 |
| 11. | Amount of liabilities per outlet (thousand CZK) | 0.091 | 0.93 | 0.12 |
| 12. | Amount of depreciation per outlet (thousand CZK) | 0.131 | 0.77 | 0.023 |
| 13. | Value added (thousand CZK) | 0.87 | 0.234 | -0.032 |

Source: Own calculations

As can be seen from the presented Rotated Component Matrix, the patterns of development of retail organizations are determined by three key factors.

The first factor combines the indicators characterizing *the size of the organization*. This includes seven indicators of the financial and economic activities of organizations, which characterize the results of the activities of organizations as a whole: revenue (thousand CZK); the total average number of employees (people); number of outlets; total assets (thousand CZK); total liabilities (thousand CZK); the amount of depreciation (thousand CZK); value added (thousand CZK).

The second factor combines the indicators characterizing *the effectiveness of the organization*. This includes five indicators of efficiency of financial and economic activity per one outlet: the average number of employees per outlet (people); the amount of revenue per outlet (thousand CZK); the value of assets per outlet (thousand CZK); the value of the obligations per outlet (thousand CZK); the amount of depreciation per outlet (thousand CZK).

And finally, the third factor is *the age of the organization*.

The results of the selection of three key factors that determine the patterns of development of retail organizations – namely, the size of the organization, its effectiveness and age also confirm the evolution model proposed by the authors.

Thus, it can be argued that the growth in the size of an organization is accompanied or even determined by changes in the organizational structure (by alternating sequential and parallel structures) and is determined by the growth of its effectiveness at each subsequent level of development.

Conclusion

Taking into account the results of aforementioned studies (Hanks et al. 1993, Shirokova, 2008), the current study is grounded on a different approach. Based on the analysis of the concepts of organizational structures, two basic types of organizational structures are identified and, using cluster analysis, an attempt is made to prove their succession in the framework of organizational development. That is, the authors' approach is to simplify the proposed model of organizational development and confirm its key provisions followed by refinement. When selecting initial information, the authors abandoned the use of data from the questionnaires of the managers of organizations and chose a statistical database. This approach enabled to significantly increase the number of organizations in the sample compared to the studies described in the literature (Shirokova and Skaletsky 2016), and to conduct research separately for organizations of different industry sectors. According to the authors, an increase in the number of organizations in the sample has a positive effect on the results of the research, which can be seen from the comparison of the studies conducted by the authors in two sectors of the economy (Bobkov et al. 2017, Bobkov et al. 2018).

Moreover, when conducting research, the authors used both structural variables and indicators of the financial and economic activities of companies, which made it possible to more accurately and unambiguously interpret the attributions of the organizations under study to various levels of their organizational development.

Further research should refine the model of the organizational structure evolution. In particular, by increasing the structural variables when conducting research with the goal of increasing accuracy of quantitative evaluation of various development levels of organizations within the 63framework of the proposed model.

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EXPLORING THE ABILITY OF TOMORROW'S LEADERS TO SUPPORT SMART CITY PROJECTS

Djida Bounazef – Nathalie Crutzen

Abstract

Purpose: The concept of smart city is more and more explored in different disciplines. The citizen and the community in general are highlighted as the core of a successful smart city transition, in which strategic actors are transforming together a city. However, a dynamic collaborative model is effective only if communities are accepting and supporting the implemented projects. To explore this supportive willingness, this paper focuses on the image that tomorrow's leaders, which can be categorized as potential smart citizens, build regarding local smart city projects.

Design/methodology/approach: A quantitative research is developed on a sample composed by 215 tomorrow's leaders in Belgium. A survey was designed and distributed online asking respondents to select uncertainties, opportunities and threats that they associate to smart city projects developed locally. A factor analysis is proposed to analyze the data.

Findings: Smart city projects are perceived as an opportunity to reinforce sustainability, quality of life and city digitalization. As a result, tomorrow's leaders are more supportive if they have a clear vision of potential benefits and consequences induced by local smart city projects.

Research/practical implications: This research offers new insights on scholars developed by Jun and Weare. As for innovative programs, smart city projects need to be aligned to global social expectations and to subgroup-based interest (taking into account the age, the gender and the cultural identity) in order to reinforce the capacity of the ecosystem to accept change and to develop an adequate behavior.

Originality/value: The paper proposes an original research in the Belgian context, where smart city policies are focusing on human factors. Thus, these findings help Belgian cities in understanding how citizens think and behave in face of a progressive transforming city.

Keywords: Level of Acceptance, Changes, Risk Aversion, Cultural Identity, Community Involvement

JEL Codes: C92, O3, J2

Introduction

Local smart city projects change the face of a city government (Jun, Weare, 2010). These initiatives generate changes as a response to territorial challenges and fast urbanization (Dierwechter, 2013). Gil-Garcia, Pardo and Nam (2016, p. 2) recently published a book on a comprehension of the 21st century city. According to authors: “*Cities are working to respond to their changing reality and to become smarter*”. Based on this definition, we define in this paper local smart city projects as a set of programs operating to transform a city. An emerging literature review is exploring how to develop a smarter territory, or broadly how to become a smart city. This concept is regularly used by elected officials, civil society, private companies and academia to aggregate smart city projects improving aspects related to people, living, governance, mobility, economy and environment (Gil-Garcia, Pardo, Nam, 2016). Pressures based on social expectations of communities, and specially citizens, are a significant factor explaining the acceptance of changes generated by implementing local smart city projects (Albury, 2005; Jun, Weare, 2010).

This paper aims at exploring the level of support and acceptance of smart city projects of 215 tomorrow’s leaders in Belgian based on how they understand material and immaterial transformations generated by such projects. Based on the literature review, we suppose that local smart city projects generate different changes. These changes can be perceived as an opportunity to improve the city, or contrariwise, as a factor increasing uncertainty and risks. The paper is divided into four parts. The first one illustrates a literature review on the main theoretical concepts. The second part presents the process of collecting and analyzing the quantitative data. The two last part underline main findings and propose new theoretical insights on the effect of gender and cultural identity, selected as control variables, on the acceptance of innovation and change at local level.

1 Literature review

To develop innovation at local government level, different actors are involved to ensure structural and organizational improvements. Citizens get more involved in programs developed on their territory and their engagement reinforces a positive city image (responsible values, norms and cultures) (Hatch, Schultz, & Skov, 2015). Concepts such smart communities and citizenship are emerging in the literature regarding to the increasing engagement of diverse actors (Zhang, He, & Zhu, 2017). The primarily psychological perspective emphasizes the capacity of the ecosystem to accept change and to develop an adequate behavior to respond

positively to implemented innovations such local smart city projects (Jun, Weare, 2010). Based on scholars of Damanpour and Schneider (2009) and Danziger & al (1982) not all innovative initiative such local smart city projects are systematically accepted and supported. This ability to accept and support transformations depends on the characteristics of the project, the trust that citizens put on the project's initiator, social system and on the ecosystem and group-based interest in which the project is developed.

The perception of a territory combines consideration of landscape and ambiance. The increasing interest dedicated to well-being and quality of life in urban territories reinforces research on how citizens perceive their living environment (Surrallés & García Hierro, 2005). Perceptual foundations of territorial analysis are developed to study citizen engagement in urban thinking, implementing and monitoring. In the psychology of perception, a territory is perceived as a combination of material and immaterial components which define interactions, values, culture and norms. A territory is an image of individual and common co-construction of meanings based on experiences, practices and daily habits. Based on how they perceive environmental elements, individuals and groups structure physical and immaterial components of a complex ecosystem in order to build a global positive or negative image (Schleich & Faure, 2017). Changes generated by implementing smart city projects modify both the ambiance and the perception of landscape. These (economic, structural and social) changes impact on symbols, physical landmarks and on dynamic relationship between the self and its environment (Lynch, 1960).

If supported and accepted, citizens progressively adapt their cultural and social constructions (Pike, Dawley, & Tomaney, 2010). This support favors an increasing citizen engagement in the development of strategic territorial projects if citizens estimate that projects are well understood, are aligned with their territorial identity, and improve significantly their quality of life (Lynch, 1960). As observers and users, mental images and social representations of changes generated by smart city projects vary according to individuals, groups and societies. Even for a same observer and user, the living environment is perceived differently according to contexts and to both physical and psychological states. Thus, citizens belonging to a same social subcategory such gender, age, culture, native region, religion and socio-professional category develop similar perceptions of changes (Tajfel et al., 1971).

2 Methodology

The study focuses on business students with advanced knowledge in economy, entrepreneurship and management (Roth & Lee, 2004). As tomorrow's leaders, they gained through their training the qualified skills to develop a critical thinking, entrepreneurial, financial and managerial aptitudes (Carini, Kuh, & Klein, 2006) and to participate in empowering creativity in society (Booth & Ainscow, 2002). Thus, the research assumes that business students are trained to identify socioeconomic challenges, opportunities and threats associated to the development of smart city projects. To reinforce community involvement in Belgium, local governments collaborate with universities to sensitize students to innovate. Different Belgian smart city actors already expressed their willingness to understand how young educated citizens are familiar with smart city projects.

The survey necessitated important collaborations with regional public actors and private partners, and was addressed to students enrolled at HEC Liège (the most important business school in Wallonia (South Belgian region)). All master's students enrolled in their final year were invited to complete an online survey. The survey was shared on the internal platform of the university and was only available for our sample. The data collection lasted two months (from September 2017 to November 2017). 215 business students out of 300 completed the survey. The sample is composed by young students between 21 and 31 years (less or equal to 23: 72%, more than 23: 28%), 52% of males and 48% of women. 33% of the sample lives in the province of Liège, 51% in other Belgian provinces (majorly in Wallonia) and 15% comes from international European cities (Germany, Holland, Spain, France and Greece) and is enrolled as Erasmus students. We invited students to answer the survey on the city where they officially live since at least three years.

The survey composed by different closed questions, where students have the opportunity to check points that they associate to smart cities, explores the ability of tomorrow's leaders to develop a critical thinking about how such projects will transform their city (level of knowledge, understanding and fear, opportunities and threats generated by implementing smart city projects). The research proposes factor analysis with a critical significance of ($p > .50$). To ensure a better representativeness, the normalized Quatrimax rotation is selected. The gender and the territorial identity are integrated to the model to reinforce its robustness and to explore the impact of social categorization on potential supportive behaviors.

3 Main findings

The factor analysis highlights five main observations. The first factor illustrates that even if the research is developed on potential smart citizens (technology user friendly, high level of education, trained to develop a critical thinking and entrepreneurial aptitudes, sensitized to economic, sustainable and financial challenges...), the development of local smart city projects is understood as an uncertain and risky phenomenon which can engender an increasing power for private companies. Thus, it seems that tomorrow's leaders give more confidence to projects developed only by public authorities, and that public-private partnerships can be more oriented to a profitable goal rather than on an improving quality of life. This factor brings out the necessity of public authorities to develop more efficient communication campaigns on the smart city transition that they aim to develop. Tomorrow's leaders seem to be sensitive to the clarity and the availability of information related to smart city policies and projects. This aspect is socially important in order to guarantee an alignment between top-down initiatives and social cultural identities (in line with local cultures, values and norms). This alignment is strategic in fighting resistant behaviors which impact negatively on the development of collaborative models (table 1).

Tab.1: Synthesis of the more significant factor scores

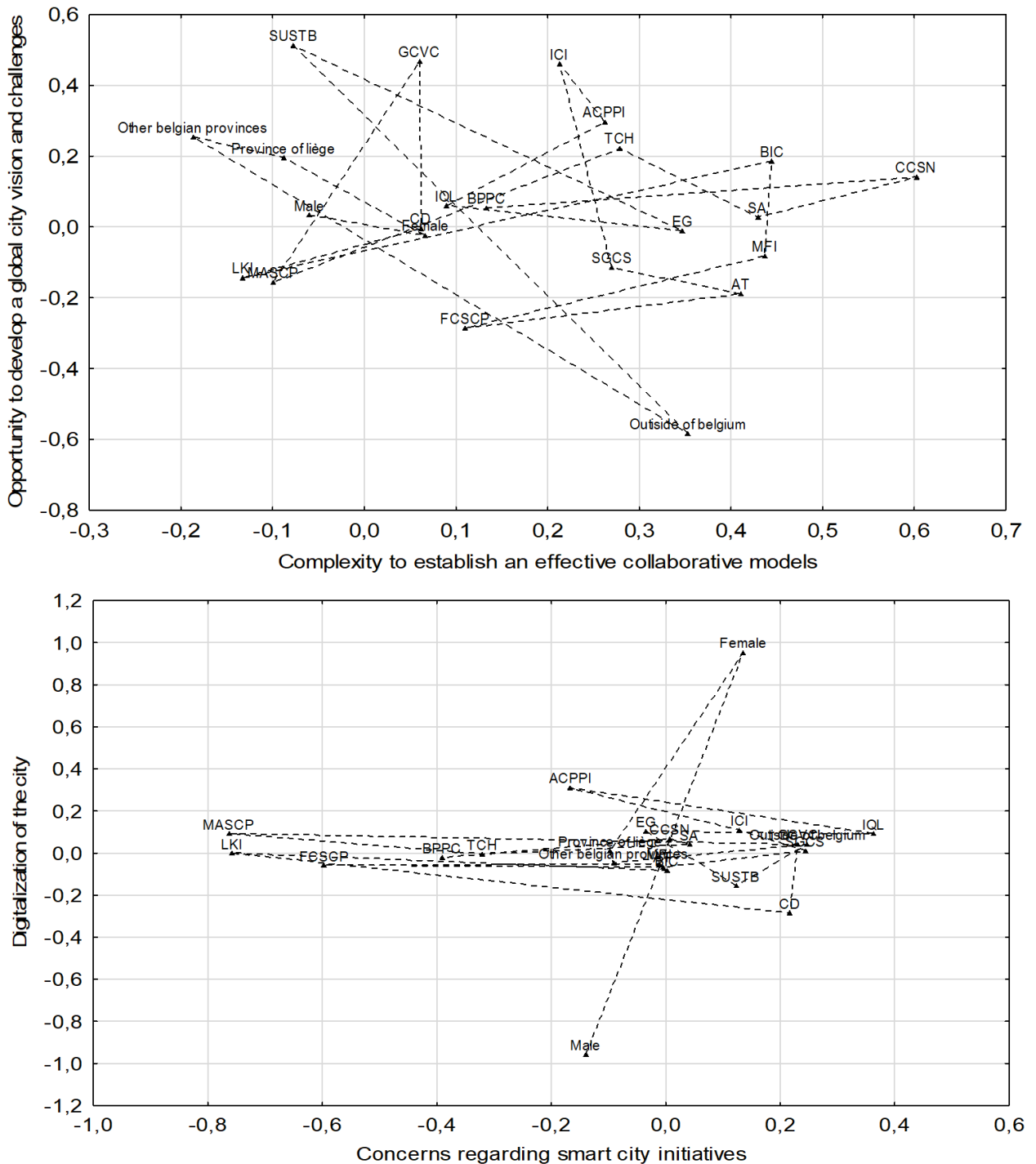
| Variable | Fact.1 | Fact.2 | Fact.3 | Fact.4 | Fact.5 |
|---|---------|---------|---------|--------|--------|
| MASCP - Misunderstanding the aim of smart city projects | -0,76** | | | | |
| LKI - Lack of knowledge and information | -0,76** | | | | |
| FCSCP - Fearing changes generated by smart city projects | -0,60* | | | | |
| BPPC - Bigger power for private companies | -0,39 | | | | |
| TCH - Threat to cultural heritage | -0,32 | | | | |
| IQL - Improved quality of life | 0,36 | | | | |
| Male | | -0,96** | | | |
| Female | | -0,28 | | | |
| ACPPI - Alignment of city planning to projects implemented | | 0,31 | | | |
| CD - City digitization | | 0,95** | | | |
| Province of Liège | | | -0,95** | | |
| Other Belgian provinces | | | 0,80** | | |
| EG - Economic growth | | | | 0,27 | |
| SGCS - Structured governing and collaborating standards | | | | 0,35 | |
| AT - Addiction to technology | | | | 0,41 | |
| MFI - Major financial investments | | | | 0,43 | |
| BIC - Brand image for cities | | | | 0,44 | |
| SA - Shared accountability | | | | 0,44 | |
| CCSN - Complexity to coordinate all stakeholders' needs in urban planning | | | | 0,60* | |
| Outside of Belgium | | | | | -0,58* |
| SUSTB - Sustainability | | | | | 0,46 |
| ICI - Inclusive community involvement | | | | | 0,47 |
| GCVC - Global city vision and challenges | | | | | 0,51* |
| Var. Expl. | 2,24 | 2,10 | 1,87 | 1,74 | 1,52 |
| Prp.Tot | 0,10 | 0,09 | 0,08 | 0,08 | 0,07 |

** : Highly significant ; * : Significant ; Only the highest factorial projection is illustrated per variable in the table

Based on the second factor, it seems that the gender does not significantly impact on the critical thinking of tomorrow's leaders, even if differences are pointed. As example, masculine tomorrow's leaders do not perceive smart city projects as an opportunity to develop digital and technological solutions. However, female ones perceive them as an opportunity to align city planning and to concrete projects that public authorities are implementing. The third factor shows the impact of the territorial identity. Thus, even if they are all enrolled in the same university and are all following courses in the same business school, students living in the province of Liège, in other Belgian provinces and outside of Belgium develop different associations. However, the fourth factor demonstrates the importance of the critical thinking that they commonly developed through their training in business sciences. Tomorrow's leaders seem to understand the importance of cross-cutting collaborations, but are aware of the readjustments and working standards that need to be readjusted to take into account all the

social pressures and expectations of different communities when defining the main directions of the city strategy and planning. As a result, a shared accountability is illustrated as a strategic component in developing structured governing and collaborating standards and in ensuring both an economic growth and a city attractiveness.

Fig.1: Plots of factorial scores



As future leaders, it seems that they understand the importance of developing a mature collaborative model to specially avoid a technology addiction and a weak return on investment. Based on that, we assume that tomorrow's leaders develop a mature critical thinking allowing them to accept, support and potentially participate in developing local initiatives. The last factor completes findings illustrated in the fourth factor. Tomorrow's leaders associate the challenge to develop a global city vision with sustainability and community inclusiveness in the context of developing smart city projects. Thus, the ecological impact seems to be important in transforming a city, and this point necessitates an increasing active participation of different public, private and civil stakeholders. This ideology is more sustained by tomorrow's leaders living in Belgian rather than by Erasmus students enrolled in the university.

Globally, the factor analysis shows that the transformations generated by smart city projects are accepted and approved if they are associated to a better quality of life and to the opportunity to work together in defining a global vision of territorial challenges. Elements such availability of information, structured changes and tangible benefits may then be strategic components increasing the willingness of tomorrow's leaders to participate as active actors. However, some questions are emerging. First, do smart city projects developed by multiple stakeholders target a better quality of life for citizens or a more profitable and attractive territory for companies? Second, developing smart city projects necessitates more transparency, open data and digital strategies. City digitalization increases the risk of technology addiction and data privacy. So, how can city governments protect citizens and their data from potential harmful usage of city data or personal data? These two points increase interest regarding to more inclusive economic growth benefitting not only the private sector.

The spots of the factorial scores point out other findings based on correlation of two different factors (Fig.1). As example, in the case of combining city digitalization (fact.1) and smart city concerns (fact.2), a flatter and concentrated point cloud is observed. Tomorrow's leaders with different gender associate differently the city digitalization to smart city projects, and this difference is justified by their ability to understand globally smart city projects as an opportunity for cities. the development of concerns regarding smart city projects seems to do not be significantly impacted by how tomorrow's leaders associate the smart city to technological factors. In the case of combining the opportunity to develop a city vision (fact.4) and the difficulty to establish an effective collaborative model (fact.5), the point cloud is more dynamic and projected in the space. Based on the projection, the capacity of public authorities to establish effective collaborative models impacts on the opportunity to develop a global city vision including all community expectations and sustainable prerequisites. This finding is

observed for tomorrow's leaders living in Belgium who also have the tendency to develop negative smart city concerns.

4 Discussion

The findings of this research proposes new insights in the literature of smart cities. The trust in public authorities is highly demonstrated as a strategic component. This finding is in line with scholars of (Kelly & Swindell, 2002) that define city understanding as an outcome of how citizens evaluate city government performance and innovative strategies that public authorities implement. Thus, when government policies meet citizens' needs, citizens will be more likely to adopt trustful behaviors and to support positive transformations in their city. The importance of trust is also illustrated in scholars of (Kopackova, 2019). Kopackova uses Maslow's hierarchy to highlight how important are citizens' needs in defining city government policies. His findings show that citizens need to be continually reassured, and ask, city governments to respond positively to their belongingness inquiries (importance of social and visual local symbols).

A case study proposed by (Yeh, 2017) proposes a step further by linking smart city services (defined as innovation concept) to personal innovativeness (capacity of citizens to understand and accept new services), city engagement (place attachment and civic involvement), service quality (capacity of city government to respond to citizens' need), acceptance/usage (attitude towards using), quality of life (material and physical wellbeing, activities related to helping the community) and trust (perception of city government's ability, benevolence and integrity, perception of risk). Based on these scholars, a trust relationship need to be established between citizens and public authorities to support smart city projects and a positive understanding of the concept of smart cities.

Even if the framework of Nam and Pardo (Nam & Pardo, 2014) proposes a commonly used smart city model, it seems that the technological dimension is more replaced by land factors. Thus, the model of (Dameri, 2014) is more adapted in exploring how citizens understand smart cities. This smart city model includes the territorial aspect and underlines government (smart city governance, powers distribution, political institutions), people (smart citizens, smart city actors, people involvement), infrastructure (better use of energy, buildings efficiency) and land (geographical aspects, cultural history and heritage, environmental aspects) factors (Dameri, Benevolo, Veglianti, & Li, 2018). Also, different aspects of the

multidimensional smart city framework of (Yigitcanlar et al., 2018) have been emerged in our research.

Conclusion

Scholars on innovation offers new insights for the literature review of smart cities. It seems that theories of (Albury, 2005) on the acceptance and adoption of innovations can be extrapolated to analyze how citizens can accept to live in a smarter city. As innovations, smart city policies need to be aligned with citizens' values and norms. Therefore, when citizens perceive positively smart city policies, city governments are then more motivated to implement new projects in order to respond to citizens' expectations. This willingness to develop different aspects in a city increases a dynamic collaboration between strategic actors. However, not all smart city projects can be easily accepted and adopted by citizens. As illustrated in this research, citizens are more commonly supportive for projects related to environment, governance, people and living/wellbeing. In terms of the perception of a city, the research demonstrates that a subcategory of citizens puts themselves as observers and users of social and material transformations (Engelbert, van Zoonen, & Hirzalla, 2018). Thus, the smart city is perceived as a set of cultural, material, visual, social and emotional references with a potential impact on the city identity and understandingability. In the extend literature, the framework of Lynch is mainly used to explore the perception of landscape with an urban perspective (limited only to visual and material transformations). This research shows that this framework can be used to explore social transformations such quality of life, cultural heritage and smart city dynamics.

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IMPROVING THE METHODOLOGY FOR MONITORING TRENDS IN THE DIGITAL DEVELOPMENT OF ECONOMIC SYSTEMS

Natalia Buletova – Olga Demushina

Abstract

Purpose: The authors set a goal to develop a model of investigating and comparing national economic systems according to the level of their servitization and digitalization.

Design/methodology/approach: The research methods include: 1) an author's structural analysis method based on the calculation of coordination indicators by aggregated values Gross value added, and supplemented by a method of graphical analysis of the results of measuring intersectoral proportions over time and the author's typology of national economic systems in terms of economic development, including digital development; 2) systematization of the results of international indices of digitization of the economy or public administration systems for correlation with the results of structural analysis.

Findings: It was found out that the results of structural analysis and a distribution of the countries according to their economic development are closely correlated with the results of international rankings which proves the validity of the model.

Research/practical implications: The research outcomes may be used by governments and researchers to evaluate and monitor economic development at the national and international level, and construct rankings of countries or regions according to their digitalization level.

Originality/value: The presented study is the first attempt to explore economic development of the countries according to the level of digitalization (from agrarian to highly industrial service-oriented, for which the dominant share of services in the structure of GVA and a high level of digitalization according to international ratings is typical). The proposed method of structural analysis and the model developed by the authors are unique. The only exception is the digitalization rating of the public administration system (an example of the E-Government Development Index), since it characterizes not the level of servitization the economy and the trend of its digitalization, but the result of the digitization of governmental functions.

Keywords: Digitalization Index, Digitalization Trends, Servitization of Economy, Original Typology of Economic Systems

JEL Codes: B41, C15, F43, F63, P51

Introduction

Digitalization can be considered as a typical trend for the contemporary national (or regional) economic system. Kagermann (2015) argues that the contemporary society is influenced by digitalization as a part of the fourth industrial revolution (Industry 4.0), meanwhile it affects not only production of goods and services, but also activities of government agencies in different fields (mobile communication, social networks, local digital services). As the development of digital technologies is moving forward particularly fast in the service sector for national or transnational corporations, this stage in the evolution of national economic systems (since the first Industrial Revolution) could be related to the extension of service sector (non-material services) in the structure of gross value added in the public economy. For instance, the USA has achieved higher level manifested in domination of service exports (Olney & Pacitti, 2017).

The analysis of the literature on economy systems shows a lack of studies dedicated to the role of service sector in the national economies. Although there is a number of researchers exploring and comparing countries according to their level of economic development (Grabowski, Self, & Shields, 2014; Kontolaimou, Giotopoulos, & Tsakanikas, 2016; Siggel, 2016), we have identified only few attempts to investigate economic development considering the achieved servitization and digitalization level (Nebel, 2014; Cruz-Jesus, Oliveira, Bacao, & Irani, 2017). This study can contribute to the existing literature by developing a new model of investigating and comparing national economic systems according to the level of their servitization and digitalization.

Applying the Clark-Fisher theory of intersectoral structural changes (Fisher, 1935; Clark, 1967), the authors present a short summary of their approach to the structural analysis on the base of economic systems typology and correlation with the digitalization level within the national economies in the sample of the countries.

1 Method of structural analysis and its results at the level of national economies for the sample of the countries

If we determine the level of economic development of the country in accordance with its digitalization based on Clark-Fisher theory, the following stages of economic evolution can be considered:

1) Aggregation of the elements presented in the Gross value added (GVA) has been carried out according to the following scheme:

- Agricultural sector (D_A) includes ISIC A-B;
- Industrial sector (D_I) includes ISIC C-E;
- Service sector (D_S) consists of sections that follow in succession within the GVA structure: ISIC G-H, ISIC I and ISIC J-P.

It should be clarified that Section F “Construction” is not included in any of these sectors, but is a part of D_G , an additional indicator of our analysis which accumulates in itself all goods produced within the national or regional economy

2) Dominance of the agricultural sector (D_A) within the Gross value added (GVA) defined as the difference between the gross output and intermediate consumption, according to this the gross domestic product is defined and profitability of economic activity at the macro and meso level is evaluated.

3) During the industrial revolution the sector of industrial goods (D_I) is growing and its share in GVA over the agricultural sector is increasing ($D_I > D_A$).

4) The service sector (D_S) is emerging at the next stage of economic evolution when against the background of the successful agricultural and industrial production, potential for growth is implemented through increase of the service production. The following correlation shows a balance between the parts of GVA: $D_S > D_I > D_A$.

5) The next stage of economic development is characterized by predominance of non-material services over material services production: $D_{NMS} > D_{MS}$.

1.1 Theoretical and methodological basis of the method of structural analysis

The essence of the method is to calculate and interpret the graphic distribution of the countries according to intersectoral proportions:

1) Based on the international statistics data (UN), GVA elements are systemitized into three basic groups: D_A , D_I и D_S .

2) Additional indicators of structural analysis are:

- D_G – share of activity in production of goods that summed with D_S adds up to GVA;
- D_{MS} and D_{NS} , which are calculated to ensure both completeness of typology and depth of the structural analysis and which divide D_S into two parts: share of producing material services and share of producing non-material services.

3) Indicators of coordination of the first level analysis t_α and t_β are calculated in accordance with the formulas (1) and (2), based on which the graphic model of the countries distribution according to the dynamics of the structural changes is built

$$t_\alpha = D_I/D_A \quad (1)$$

$$t_\beta = D_S/D_I \quad (2)$$

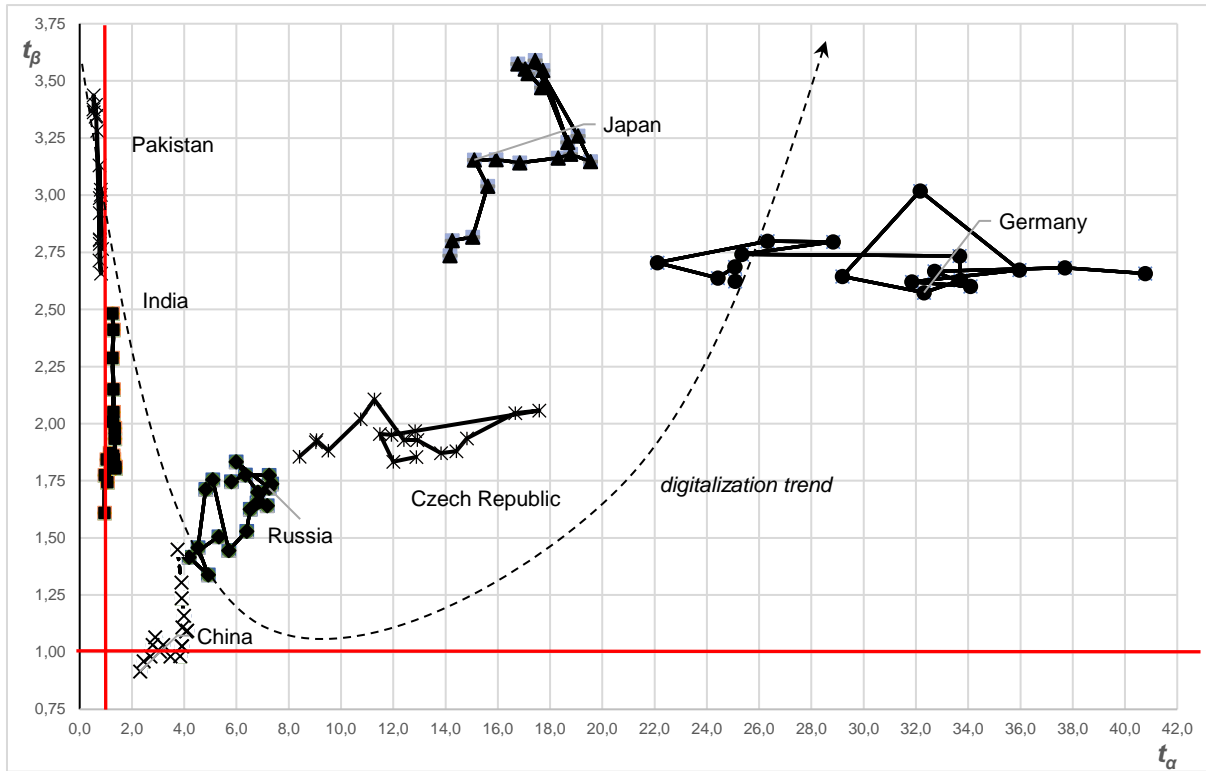
where t_α - degree of industrialization which shows how many units of GVA created in industry account for one unit created in agricultural sector;

t_β – degree of servitization which shows how many units of GVA created in service sector account for one unit created in industry.

4) Using t_α and t_β a graph of distribution of countries according to their level of economic development has been built. In this research the authors present the following sample countries: Japan, Germany, Russia, Czech Republic, China, India and Pakistan to show various types of economic development and latitude in their interpretation.

The presented distribution of the countries according the indicators t_α and t_β shows that the higher the level of economy digitalization and digital inclusion, the farther the indicators are located from the beginning the coordinate axis. For instance, Germany is characterized by active increase of the industry sector which exceeds forty times over the agrarian sector during the analyzed period (Figure 1), while Japan is trying to increase the service sector where it is possible to develop digital economy faster and more efficiently.

Fig. 2: Distribution of the countries on the indicators t_α and t_β describing the results of structural changes for the period 1998-2015 (correlation field dependence between t_α and t_β)



Source: Compiled by the authors according to the United Nations data

We can conclude that the more D_S exceeds D_I , and D_I exceeds D_A , the higher is the digitalization level achieved by national or regional economy.

Table 1 shows the results of the indicators of structural changes in the sample countries for 1998-2015.

Tab. 1: Results of systematization of DA, DI and DS indicators

| Indicators | D _A | D _I | D _S | Evaluation for the period | |
|----------------|----------------|----------------|----------------|---|---|
| | | | | In dynamics | In comparison (2015) |
| Japan | | | | | |
| in 1998 | 1,7 | 24,3 | 66,45 | D _A 2015 < D _A 1998 D _I 2015 < D _I 1998 D _S 2015 > D _S 1998 | D _I > D _A more than 15 times (industrial type) D _S > D _I more than 3 times (service type) Type 3.2.3. Highly industrial service oriented |
| in 2015 | 1,2 | 20,5 | 72,4 | | |
| Germany | | | | | |
| in 1998 | 1,03 | 25,8 | 67,6 | D _A 2015 < D _A 1998 D _I 2015 = D _I 1998 D _S 2015 > D _S 1998 | D _I > D _A more than 40 times (industrial type) D _S > D _I more than 2,5 times (service type) Type 3.2.3. Highly industrial service oriented |
| in 2015 | 0,64 | 25,9 | 68,9 | | |
| Czech Republic | | | | | |
| in 1998 | 3,7 | 31,1 | 57,7 | D _A 2015 < D _A 1998 D _I 2015 > D _I 1998 D _S 2015 > D _S 1998 | D _I > D _A more than 10 times (industrial type) D _S > D _I more than 1,5 times (service type) Type 3.2.3. Highly industrial service oriented |
| in 2015 | 2,5 | 32,1 | 59,9 | | |
| Russia | | | | | |
| in 1998 | 5,7 | 30,3 | 45,6 | D _A 2015 ≤ D _A 1998 D _I 2015 > D _I 1998 D _S 2015 > D _S 1998 | D _I > D _A more than 5,5 times (industrial type) D _S > D _I more than 1,5 times (service type) Type 3.2.2. Middle industrial service oriented |
| in 2015 | 5,5 | 31,9 | 55,7 | | |
| China | | | | | |
| in 1998 | 17,4 | 40,1 | 36,7 | D _A 2015 < D _A 1998 D _I 2015 < D _I 1998 D _S 2015 > D _S 1998 | D _I > D _A more than 3,5 times (industrial type) D _S > D _I more than 1,4 times (service type) Type 2.2. Middle industrial |
| in 2015 | 9,2 | 34,3 | 49,7 | | |
| India | | | | | |
| in 1998 | 26,9 | 25,6 | 41,3 | D _A 2015 < D _A 1998 D _I 2015 < D _I 1998 D _S 2015 > D _S 1998 | D _I > D _A more than 1,25times (industrial type) D _S > D _I more than 2,5 times (service type) Type 3.2.1. Less developed industrial |
| in 2015 | 17,0 | 21,4 | 53,2 | | |
| Pakistan | | | | | |
| in 1998 | 29,6 | 15,5 | 52,4 | D _A 2015 < D _A 1998 D _I 2015 > D _I 1998 D _S 2015 > D _S 1998 | D _A > D _I more than 1,5 times (agrarian type) D _S > D _I more than 3 times (service type) Type 3.1 Agrarian and service oriented |
| in 2015 | 25,5 | 16,9 | 55,5 | | |

Source: Compiled by the authors according to the data presented in Fig.1

Large digital companies in Japan were established on the base of the existing national corporations (Toyota, Sony, Toshiba), where the world's most popular innovations are being created. Germany can be deemed a pioneer in the development of industrial technologies related to the forth industrial revolution by the level of digitalization. It is estimated that about 10% of German population are employed in high technology industries which is twice as much as in Russia. China's level of digital economy is comparable with that of the USA, but these countries have different conditions and reasons of digitalization. Export orientation of big digital projects, active digitalization of citizens' life while low level of financial institutes and bank infrastructure are typical for China (Arsène, 2017). According to the estimates by the Russian association of electronic communications, a share of digital economy in GDP of Russia amounted to 5,1% in 2018, which exceeded that of agriculture by 0,7% (Russian Association of Electronic Communications, 2018). The same source indicates a 2,5-fold increase of this

ratio in comparison with 2015. The most common examples of digitalization in Russia are using digital technologies by Government (National Automated System, State Information System, e-budgeting, electronic public services, multifunctional centers for provision of public and local services) as well as by citizens (local digital services for delivering goods).

In July 2018 The United Nations presented new methodology used in calculating e-Government Development Index (EGDI), an indicator measuring governments' readiness to use electronic technologies in order to provide services for citizens. Table 2 shows characteristics of this index for the countries selected for the structural analysis (Table 1.) We can see a significant correlation between the findings of these two studies. For instance, Germany and Japan, the most innovative countries, show the most remarkable EGDI values among all the presented countries. The remaining countries are distributed in the same way as in the Figure 1 presenting the results of the structural analysis.

Tab. 2: Results of the EGDI calculation for the countries selected for the structural analysis, 2018

| Countries | Place in the overall world ranking | E-Government Development Index | | | | GNI Per Capitas (US dollars) |
|----------------|------------------------------------|--------------------------------|--|---------------------|-----------|------------------------------|
| | | Online Service Index | Telecommunication Infrastructure Index | Human Capital Index | EGDI 2018 | |
| A | B | 1 | 2 | 3 | 4 | 5 |
| Japan | 10 | 0,9514 | 0,8406 | 0,8428 | 0,8783 | 43540 |
| Germany | 12 | 0,9306 | 0,7952 | 0,9036 | 0,8765 | 49690 |
| Russia | 32 | 0,9167 | 0,6219 | 0,8522 | 0,7969 | 24120 |
| Czech Republic | 54 | 0,6528 | 0,5971 | 0,8752 | 0,7084 | 32350 |
| China | 65 | 0,8611 | 0,4735 | 0,7088 | 0,6811 | 15470 |
| India | 96 | 0,9514 | 0,2009 | 0,5484 | 0,5669 | 6490 |
| Pakistan | 148 | 0,5486 | 0,1529 | 0,3682 | 0,3566 | 5560 |
| World | - | 0,5691 | 0,4155 | 0,4155 | 0,5491 | |

Source: Compiled by the authors based on the data of the International Telecommunication Union

EGDI (table 2, column 4) is calculated as an arithmetic mean of the three main normalized indicators estimating the most significant e-government aspects: Online Service Index (OSI in the table 2, column 1), Telecommunications Infrastructure Index (TII in the table 2, column 2) and Human Capital Index (HCI table 2, column 3). Although Czech Republic has more advanced economy than Russia and China according to the the findings of the structural analysis, this country has lower EGDI index than Russia.

Other indicators estimating digitalization are:

- ICT Development Index presented by the International Telecommunication Union since 2007; their last report was prepared in 2018 (International Telecommunication Union, 2018).
- Networked Readiness Index calculated by the World Economic Forum in terms of the following dimensions: the quality of the regulatory, business and innovation environments, the degree of preparedness, the actual usage of ICTs, as well as the societal and economic impacts of ICTs (The World Economic Forum, 2016).

Table 3 presents the ranking of the sample countries according to these indexes. Its correlation with the results of the structural analysis and EGDI Index fully affirms our conclusions on the digitalization level of the sample countries. We showed the indicators of the NRI Index in the columns 3 and 4 in parentheses (Table 3) to make clearer the series of values characterizing index indicators.

Tab. 3: The sample countries in the overall ranking presenting ICT and NRI Indexes

| Countries | ICT Development Index ranking | | Networked Readiness Index ranking | |
|----------------|-------------------------------|------|-----------------------------------|-----------|
| | 2016 | 2017 | 2015 | 2016 |
| A | 1 | 2 | 3 | 4 |
| Japan | 11 | 10 | 10 (5,6) | 10 (5,6) |
| Germany | 13 | 12 | 13 (5,5) | 15 (5,6) |
| Czech Republic | 39 | 43 | 43 (4,5) | 36 (4,7) |
| Russia | 43 | 45 | 41 (4,5) | 41 (4,5) |
| China | 83 | 80 | 62 (4,2) | 59 (4,2) |
| India | 138 | 134 | 89 (3,7) | 91 (3,8) |
| Pakistan | 148 | 148 | 112 (3,3) | 110 (3,4) |

Source: Compiled by the authors based on the data of the Russian Association of Electronic Communications and the World Economic Forum

Conclusion

The method of structural analysis presented in the paper can be used to measure and compare digitalization level of the economic systems in addition with the other existing methods and indexes.

On the base of the proposed model, typology of countries by level of economic and digital development has been constructed; it was found out that the results of structural analysis

and a distribution of the countries according to their economic development are closely correlated with the results of international rankings which proves the validity of the model.

Key arguments in favor of originality and value of the proposed author's method of structural analysis:

- the level of economic development of each national economic system is correctly estimated in accordance with Clark-Fisher's intersectoral structural change theory, since the result of the graphical distribution of different countries in one correlation field of the industrialization level (t_α) and the level of service (t_β) allows to judge their place in the world economics in gradations from agrarian type to highly industrial service-oriented;
- the main feature of the digital economy in the structure of the GVA by type of economic activity is the dominance of the services sector (including intangibles); a pronounced global trend of digitalization can be traced in the correlation field, representing the "movement" of countries in the direction of growth of the level of service on the background of "favorable" values the level of industrialization, it gives the opportunity to determine the goal of economic development of all countries that are lagging behind the leaders of the economy of services and the economy of knowledge;
- the fact that the country's sample rating following a structural analysis and the international ratings of countries on the level of development of the digital economy coincide testify to the effectiveness of applying the author's structural analysis method to monitor the trajectory and outcome of economic development in accordance with the digitization trend built on the correlation field of the relationship between t_α and t_β .

The research outcomes may be used by governments to construct rankings of countries or regions according to their digitalization level, and to monitor economic development and governance quality.

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BUSINESS DEVELOPMENT PATTERNS OF SMALL KNOWLEDGE INTENSIVE ENTERPRISES FROM CZECH REPUBLIC

Veronika Bumberová – František Milichovský

Abstract

Purpose: Generally, there is agreement about the economic benefits of knowledge-intensive business services (KIBS) in the contemporary empirical literature. Therefore, drawing on a survey-based firm-level dataset, identify whether different service-market scenarios are associated with different innovation and change activities, evaluating the explanatory power of traditional classifications of the service sector, as well as the heterogeneity is driven by a firm.

Design/methodology/approach: The empirical evidence is based on quantitative data through an email questionnaire from July to September 2017. The basic population gathered from university database Amadeus after selected selection criteria included 1214 companies, operating in the knowledge-intensive business service sector. The total return rate from the survey was 128 valid answers in completely and correctly filled form (return 10.5%). The analysis is based on exploratory factor analyze, hierarchical cluster analysis and validation techniques such as one-way ANOVA and Duncan multiple range test to the original variables and testing for homogeneity within and differences between clusters.

Findings: The analyses indicate four patterns of business development activities. Besides a conservative category of KIBS in cluster 1, that do not carry out any relevant development activity, we found cluster 2, characterized by market penetration through service modification of existing services, cluster 3 is represented by new service development and finally, a cluster 4 includes service repositioning strategy to the new markets.

Research/practical implications: The research contributions of this study are twofold. First, the results have implications for owners and managers involved in business development in the services industry and second, results could be useful for government efforts to support the development activities of KIBS as a heterogeneous category.

Key words: Business Development, Innovativeness, Small Enterprises, Knowledge-intensive Business Services

JEL Code: L10, O30, L84

Introduction

It is well known, that the knowledge-intensive business services (KIBS) as a small proportion of all services, is significant in terms of economic benefits and as the key part of the growth in value added, employment and labor productivity (Freel, 2006). The recognition of the relevance of KIBS firms is becoming especially acute in the European Union (Horváth & Rabetino, 2019) and even more important for many emerging economies (Miles et. al., 2017; Klimek, 2018). The empirical analysis of the Visegrád countries conducted by Klimek (2018) revealed, that despite of just a few years of development of advanced services in Central and Eastern Europe, they already play an important role as advance business providers, however many countries do not reveal much data (out of the V4 countries, only Hungary and Poland provide data such as FDI). Therefore, aggregate statistics are not useful for long-term analysis or drawing international comparisons.

In the Czech Republic, the importance of the manufacturing industry prevails, which is reflected in the relatively lower share of market services and thus the KIBS in the structure of the Czech economy (Pazour, 2008). However, this segment represents a facilitator of knowledge, external information, and an innovation to other business clients from private and public sector especially manufacturing sector (Shearmur & Doloreux, 2012). The interconnection between KIBS and the private manufacturing sector contributes to the many benefits of both KIBS and the manufacturing sector in enhancing their competitive edge and innovation (Horváth & Rabetino, 2019). The growing importance and recognition of KIBS's importance caused increasing number of European comparison studies on territorial servitization and the entrepreneurial ecosystem of European regions (see Horváth & Rodrigo Rabetino, 2019), various approaches to acquiring knowledge for innovation (see Zieba et al., 2017) and comparing of different innovation modes and strategies between KIBS (see Asikainen 2015).

The objective of the present study is performed empirically-based typology of business development for KIBS, and to identify whether different service-market scenarios are associated with different change activities. Drawing on a survey-based firm-level dataset, we analyze development patterns across KIBS, evaluating the explanatory power of traditional classifications of the service sector, as well as the heterogeneity driven by a firm. The results could be useful for managers and owners in this sector and government efforts to support the development activities of these companies. The next sections introduce the theoretical framework with the focus on KIBS sector and subsequent methodology provides the details of

data collection and analytical methods, the fourth section presents the findings of the analyses and final section summarizes the conclusions of the study.

2 Theoretical background

Small business development is a multi-faceted construct that includes the internal development capacity, the strategy or approach for adaptation, improvement, innovation, and change. However, the nature of services outputs brings difficulties in identifying and measuring these actions and activities. The services are more immediately perishable, inseparable (production and consumption occur at the same time) and tend to be more heterogeneous, than manufactured products; they are fundamentally different, and in ways that make them harder to identify and measure (McDermott & Prajogo, 2012).

2.1 Defining of KIBS and patterns of behavior

There are different approaches to defining KIBS (see e.g. Miles, 2005). Generally, this sector is characterized by the private sector of small enterprises with a high level of knowledge and orientation of its services to other organizations (private and public sector) that are predominantly non-routine (Muller & Doloreux, 2007). Over the last decade, the economic and business literature has been largely discussing competitive strategies and innovation patterns in KIBS, both from a theoretical perspective and, to a lesser extent, from an empirical point of view (Corrocher et al., 2009). As table 1 show, the empirical studies perform analyses and comparisons based on micro-level data from Community Innovation Survey (CIS), nomenclature classification (NACE) or on the a-priori distinction between p-KIBS and t-KIBS as firstly proposed by Miles (2005).

Tab. 1: Classification of KIBS activities according to NACE 2

| NACE Rev. 2 | Description of section | Description of division | Type KIBS |
|---------------|---|--|-----------|
| Section J, 62 | Information and Communication activities | Computer programming, consultancy and related activities | t-KIBS |
| Section J, 63 | | Information service activities | t-KIBS |
| Section M, 69 | Professional, scientific and technical activities | Legal, law and accounting, consulting activities | p-KIBS |
| Section M, 70 | | Activities of head offices; management consultancy activities | p-KIBS |
| Section M, 71 | | Architectural and engineering activities; technical testing and analysis | t-KIBS |
| Section M, 72 | | Scientific research and development | t-KIBS |
| Section M, 73 | | Advertising and market research | p-KIBS |
| Section M, 74 | | Other business activities | p-KIBS |

Source: Modified by authors according to Schnabl and Zenker (2013)

The KIBS have been generally intended as a homogeneous category and much attention has been paid to differentiating innovative approaches in manufacturing and services at large, and emphasizing the peculiarity of KIBS among tertiary activities, such a perspective neglects the remarkable heterogeneity within this same largely defined KIBS category (Corrocher et al., 2009, p. 175). In particular, it has been observed that traditional industrial classifications and economic nomenclatures, mainly based on the character of the goods and services produced, and on inputs, processes and technology of production – like for example those which refer to the NACE classification used in the European Community, can be inadequate when not misleading to differentiate the various types of firms that form the KIBS sector (Bolisani et al., 2014). The works by Tether (2003) and Freel (2006) provide important steps in the direction of exploring differences across KIBS. According to these authors, innovation strategies are much related to competitive circumstances, which represent a more relevant differentiating factor than other more objectively measurable variables, such as industry classification. It seems that heterogeneity of KIBS sector concerns not much factors as the size of companies, or the kind of services provided, but rather strategy adopted, cognitive aspects or knowledge features (Bolisani et al., 2014). The results clearly show, that KIBS are very heterogeneous and there is great need to deepen our understanding of the types of business development they undertake (Miles, 2005).

For example, Corrocher et al. (2009) explored the KIBS' 'black box' located in highly developed manufacturing area in Italy (Lombardy), investigating sectoral variety and common patterns across different typologies, as well as heterogeneity is driven by a firm and market-specific characteristics. The authors' results suggest, that there are four profiles of KIBS:

interactive innovation mode, product innovation mode, conservative innovation mode, and techno-organizational innovation mode and each cluster membership was associated with strategy adoption as the most significant determinant. Miles et al. (2017) found six solutions of clusters KIBS located in an emerging economy such as Russia: non-innovators; organizational change innovators; marketing innovators; technology-oriented innovators; non-technological innovators and diversified innovators and distribution of companies across the clusters in terms of their size and the type of services.

The empirical studies in present days represent an attempt to investigate patterns, scenarios or modes of competitive, cognitive and innovation activities in KIBS, irrespective of a priori nomenclature. They analyzing the KIBS sector with firm-level data and perform clustering which cuts across traditionally defined categories of tertiary activities.

3 Methodology

The principal research questions of this paper are: Is it possible to divide small KIBS by the features of development activities into homogeneous or similar areas? Which of these development activities contribute to considerable differences among the individual groups? To test and answer the research questions we used as the first exploratory factor analysis and then to explore the possibility that different types of business development strategies exist, a hierarchical cluster analysis was performed. For validating the cluster solutions, cluster membership was related (one-way ANOVA and Duncan multiple range test) to the original 14 development variables, testing for homogeneity within and differences between clusters.

Due to the continuous nature of change and innovation activities in services (McDermott & Prajogo, 2012), rather use dichotomous yes/no response format, we adopted existing scales (Avlonitis et al., 2001, Corrocher et al., 2009), which were modified and extended. The items were measured via five Likert-scale measures (1: strongly agree, 5: strongly disagree) and validated the values of Cronbach's alpha. We've also incorporated the changes in technology (SW, HW, other ICT technology) and marketing (segments, promotion, distribution channels, communication) constructed by the mean of sum eight (1: significant change, 5: remain the same) scaled questions.

The empirical evidence is based on quantitative data through an email questionnaire from July to September 2017. The basic population gathered from university database Amadeus after selection criteria (headquarters in the Czech Republic, only private profit sector; services operating more than 5 years, should not be a presumption of bankruptcy or insolvency; the size

determined by the total number of employees is 10-49; owner should be a senior executive (CEO) and must be in the top management and has majority share 50.1%) included 1214 companies, operating in knowledge-intensive business service sector.

The total return rate from the survey was 128 valid answers in completely and correctly filled form (return 10.5%). The resulting sample of respondents copies the theoretical database file structure (see Table 2).

Tab. 2: Classification of KIBS activities according to NACE 2

| KIBS by NACE Rev. 2 | Theoretical | | Empirical | | Type of KIBS |
|---------------------|-------------|----------|-----------|----------|--------------|
| | Absolute | Relative | Absolute | Relative | |
| Section J, 62 | 300 | 24.71% | 37 | 28.91% | t-KIBS |
| Section J, 63 | 21 | 1.73% | 3 | 2.34% | t-KIBS |
| Section M, 69 | 214 | 17.63% | 19 | 14.84% | p-KIBS |
| Section M, 70 | 64 | 5.27% | 7 | 5.47% | p-KIBS |
| Section M, 71 | 407 | 33.53% | 40 | 31.25% | t-KIBS |
| Section M, 72 | 17 | 1.40% | 4 | 3.13% | t-KIBS |
| Section M, 73 | 123 | 10.13% | 11 | 8.59% | p-KIBS |
| Section M, 74 | 68 | 5.60% | 7 | 5.47% | p-KIBS |
| KIBS total | 1214 | 100.00% | 128 | 100.00% | - |

Source: Own work

4 Results

As the first, we used exploratory factor analysis (PCA with Varimax rotation) to reduce the number of variables for an explanation of service-market strategies adopted by KIBS. The examination of output variables in terms of business development strategies is based on Sum Factors as the average score of multi-item scales. In evaluating the exploratory factor analysis, several criteria are used the total variance explained (≥ 0.50), the factor loading (≥ 0.50) and the internal consistency was measured with Cronbach's alpha giving results above the critical limit of 0.60. As can be seen from Table 3, the pattern of loadings suggests that the three-factor resolution which together explained 59.11% of the variance with KMO 0.734. All connections between individual variables are located in correlation matrix in Table 4.

Tab. 3: PCA with Varimax rotation

| Name of the factor and items included | | Loadings | Cronbach's alpha |
|---|--|----------|------------------|
| New service development (31.19% of variation) | The service was totally new to the company | 0.796 | 0.826 |
| | The service created a new product line for the company | 0.757 | |
| | The service supplemented an existing company line | 0.711 | |
| | The service was in response to changing customer needs or behavior | 0.699 | |
| | SUM Technology changes | 0.671 | |
| | The service was totally new to the market | 0.691 | |
| Service modification (18.37% of variation) | The service was a revision of existing services | 0.774 | 0.766 |
| | The service was a modification of existing services | 0.731 | |
| | The searching for niche or specialized markets | 0.714 | |
| | The company expands the current market | 0.656 | |
| | The service offered new features towards competition | 0.583 | |
| Repositioning (9.55% of variation) | The company entered a new market | 0.748 | 0.608 |
| | SUM Marketing changes | 0.657 | |
| | Existing service targeted into new markets | 0.608 | |

Source: Own work

Tab. 4: Correlation matrix

| | | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 | V13 |
|-----|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| V1 | The service was totally new to the company | | | | | | | | | | | | | |
| V2 | The service supplemented an existing company line | -0.172 | | | | | | | | | | | | |
| V3 | The service created a new product line for the company | -0.33 | -0.336 | | | | | | | | | | | |
| V4 | The service was totally new to the market | -0.516 | 0.075 | 0.088 | | | | | | | | | | |
| V5 | The service offered new features towards competition | 0.03 | -0.306 | 0.047 | -0.279 | | | | | | | | | |
| V6 | The service was in response to changing customer needs or behavior | 0.079 | -0.046 | -0.084 | -0.403 | -0.167 | | | | | | | | |
| V7 | The service was a modification of existing services | 0.167 | -0.248 | 0.186 | -0.023 | -0.265 | 0.052 | | | | | | | |
| V8 | The service was a revision of existing services | -0.048 | 0.047 | -0.075 | 0.085 | 0.017 | 0.115 | -0.356 | | | | | | |
| V9 | Existing service targeted into new markets | 0.045 | 0.172 | -0.004 | -0.160 | 0.014 | -0.057 | -0.098 | -0.259 | | | | | |
| V10 | The company entered a new market for the first time | 0.153 | 0.175 | -0.162 | 0.003 | -0.120 | -0.103 | -0.101 | 0.142 | -0,274 | | | | |
| V11 | The company expands current market | -0.218 | 0.005 | 0.115 | 0.231 | -0.388 | 0.122 | 0.132 | -0.140 | -0,07 | -0.369 | | | |
| V12 | The searching for niche or specialized markets | 0.241 | 0.115 | -0.171 | -0.203 | -0.031 | -0.056 | -0.089 | -0.213 | -0,13 | 0.317 | -0.400 | | |
| V13 | SUM_Marketing changes | 0.038 | 0.013 | -0.101 | 0.027 | -0.020 | -0.137 | 0.079 | 0.032 | -0,318 | -0.047 | 0.039 | 0.036 | |
| V14 | SUM_Technology changes | -0.185 | -0.006 | -0.183 | 0.108 | 0.032 | -0.210 | -0.208 | 0.008 | 0,242 | -0.100 | 0.007 | -0.117 | -0.433 |

Source: Own work

In order to explore the possibility that different types of business development adopted by KIBS exist, a hierarchical cluster analysis (Ward’s method) was performed in the 128 cases using the scores of the three factors. As you can see in Table 5, the 4 solutions were considered as the most acceptable one on the basis of maximum external isolation and internal cohesion, and parsimony of explanation. For validating the 4 cluster solution, first, cluster membership was related (one-way ANOVA) to the original 14 variables and testing for homogeneity within and differences between clusters. Clusters means were found significantly different on all variables at the 0.000 level (see Table 6). Figures represent mean values in each cluster. Minimum values are in brackets while maximum values are in parentheses (based on Duncan multiple-range test, $p < 0.05$). The sign indicates a level of significance based on one-way analysis variance.

Tab. 5: Descriptive statistics of cluster analysis output

| | Frequency | Valid percent | Cumulative Percent |
|-------|-----------|---------------|--------------------|
| 1 | 27 | 21.1 | 21.1 |
| 2 | 41 | 32.0 | 53.1 |
| 3 | 13 | 10.2 | 63.3 |
| 4 | 47 | 36.7 | 100.0 |
| Total | 128 | 100.0 | |

Source: Own work

As you can see in table 5, the results show four cluster membership of KIBS. A cluster 1 is represented by conservative strategy (21.1%), cluster 2 includes service modification strategy (32.0%), cluster 3 is described by new service development strategy (10.2%) based on changes in technology and cluster 4 is characterised by service repositioning strategy (36.7%) based on changes in marketing actions.

The first cluster called **conservative or non-innovatory category of KIBS**, do not carry out any relevant activity and probably rely upon established reputation and/or economic upturn in terms of growing customer demand to compete in the market. This cluster of conservative or non-innovative KIBS have been identified over the course of European studies and studies from emerging economies with approximately the same percentage of a total sample of KIBS (see Miles et al., 2017, Corrocher et al., 2009).

Another type of cluster is represented KIBS following a new service development strategy focusing mainly on service line extensions or complements to existing services based on changes in technology related to competitive circumstances. This is in line with the result

of Avlonitis et al. (2001), that this group of services is developed in order to meet or outstand the offerings of the company's competitors. Further, the results appear consistent with those of Rodriguez and Camacho (2010) and Miles et al. (2017), who identified technology as a factor reflecting companies' orientation towards product innovation.

Tab. 6: Patterns of business development of small KIBS

| Variables/Patterns | Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4 | F | Sig. |
|--|-----------|-----------|-----------|-----------|--------|-------|
| The service was totally new to the company | 3.78 | (4.44) | [1.46] | 2.70 | 34.869 | 0.000 |
| The service supplemented an existing company line | (2.93) | 2.63 | [1.00] | 1.81 | 13.848 | 0.000 |
| The service created a new product line for the company | 3.26 | (4.00) | [1.62] | 2.17 | 27.245 | 0.000 |
| The service was totally new to the market | (4.70) | 4.41 | [3.00] | 3.21 | 22.229 | 0.000 |
| The service offered new features towards competition | (4.33) | 2.44 | [1.77] | [1.79] | 65.891 | 0.000 |
| The service was in response to changing customer needs or behavior | (4.85) | 4.44 | [3.00] | 3.13 | 37.438 | 0.000 |
| The service was a modification of existing services | (3.33) | [1.85] | 1.92 | 1.98 | 14.046 | 0.000 |
| The service was a revision of existing services | (3.74) | [1.93] | 3.15 | 2.32 | 19.525 | 0.000 |
| Existing service targeted into new markets | 3.93 | 3.02 | (4.85) | [2.23] | 28.646 | 0.000 |
| The company entered a new market for the first time | 4.07 | 3.32 | (4.54) | [2.30] | 17.998 | 0.000 |
| The company expands the current market | (3.37) | [1.81] | 2.23 | 1.83 | 16.382 | 0.000 |
| The searching for niche or specialized markets | (2.93) | 2.00 | [1.77] | 2.00 | 7.526 | 0.000 |
| SUM_Marketing changes | 4.36 | (4.59) | 4.37 | [3.34] | 28.587 | 0.000 |
| SUM_Technology changes | (3.88) | (3.88) | [2.41] | 2.55 | 31.552 | 0.000 |

Source: Own work

The KIBS following a market penetration through service modification focuses mainly on modification or revision of existing services by an expansion of contemporary markets. The KIBS targeting to specific niche markets offer distinct advantages and can avoid having to compete solely on cost against larger enterprises with greater economies of scale and deliver high-quality products, they can thrive on small volumes with high margins. The KIBS following market extension through a repositioning of existing services implemented mainly changes in marketing actions. As Corrocher et al., (2009) suggest in their empirical study, the objective is to increase appeal for the firms' products and/or to enter new markets.

Firstly, ICT companies (J62, J63) are distributed fairly evenly in the various clusters with the greatest presence in cluster 4. Secondly, professional companies such as accounting and management consulting companies (section M69, M70) are mainly found in cluster 2 and cluster 4. Surprising, architectural and engineering, companies (M71) have the greatest presence in cluster 1 and 2, while R&D companies (M72) in cluster 4. However, these companies represent the largest share of conservative companies or non-innovators in KIBS sector. Finally, professional companies such as advertising and market research and other business activities (M73, M74) are distributed fairly evenly in the various clusters with the greatest presence in cluster 4. It can be observed in table 7, that companies of different sub-sectors are well distributed across the various clusters. In other words, no cluster can be identified on the basis of the sector to which companies typically belong. The analysis of the sectoral composition of the clusters provides interesting insights.

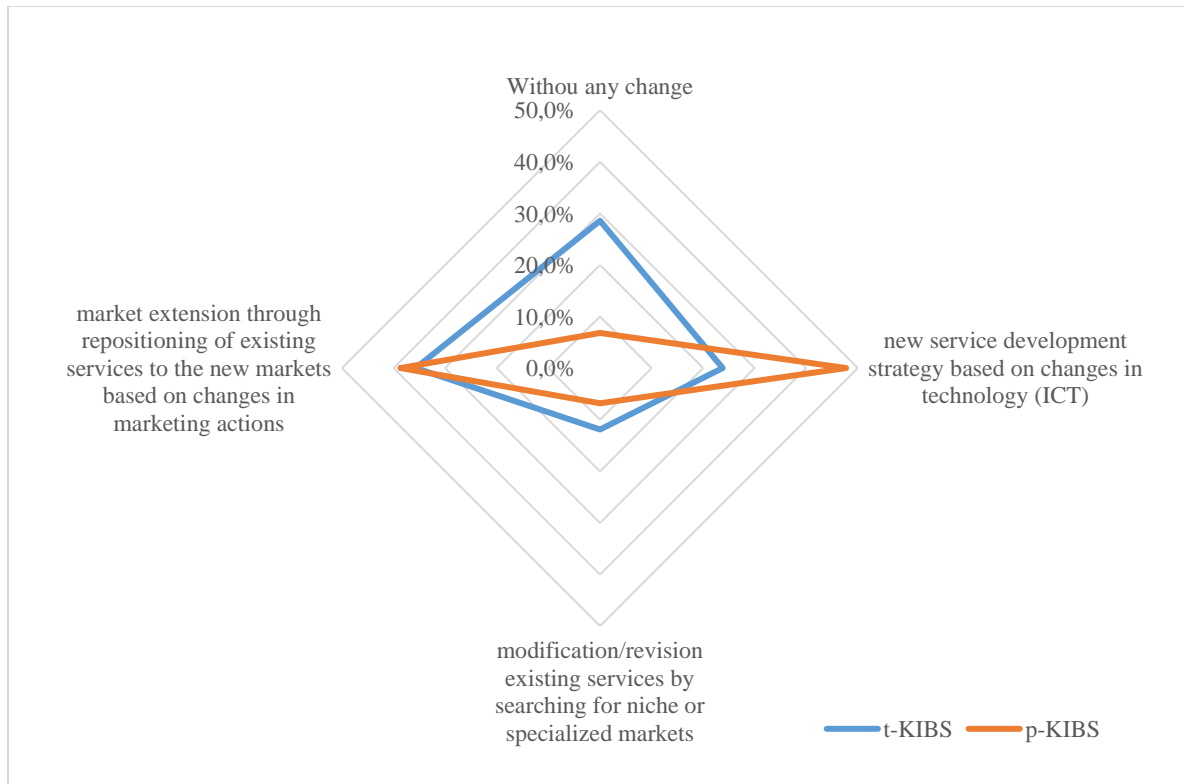
Tab. 7: The cluster membership of KIBS across NACE Rev. 2 classification

| CZ-NACE | Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4 | Total |
|---------------|-----------|-----------|-----------|-----------|---------|
| Section J, 62 | 16.22% | 10.81% | 16.22% | 56.76% | 28.91% |
| Section J, 63 | 0.00% | 0.00% | 0.00% | 100.00% | 2.34% |
| Section M, 69 | 10.53% | 68.42% | 10.53% | 10.53% | 14.84% |
| Section M, 70 | 0.00% | 71.43% | 0.00% | 28.57% | 5.47% |
| Section M, 71 | 42.50% | 37.50% | 10.00% | 10.00% | 31.25% |
| Section M, 72 | 25.00% | 25.00% | 0.00% | 50.00% | 3.13% |
| Section M, 73 | 0.00% | 18.18% | 0.00% | 81.82% | 8.59% |
| Section M, 74 | 14.29% | 14.29% | 14.29% | 57.14% | 5.47% |
| Total | 21.09% | 32.03% | 10.16% | 36.72% | 100.00% |

Source: Own work

Further, as you can see on Figure 1, it seems, that t-KIBS targeting to specific niche markets where they offer distinct advantages and offer highly customized services and p-KIBS more keen to adopt new technologies, while technical KIBS more focused on molding them (Corrocher et al., 2009).

Fig. 1: The cluster membership according to differentiation of t-KIBS and p-KIBS



Source: Own work

Conclusion

The P-KIBS are better technology adopters and users of new technologies. However, these technologies rely upon external drivers of innovation, such as specialized suppliers of tangible technological inputs (see Corrocher et al., 2009). A large share of t-KIBS is not active innovators. Non-innovative t-KIBS have been identified also in empirical study proposed by Miles et al. (2017). They suggest, that sometimes these type of KIBS are primarily engaged in rather basic technology or knowledge transfer and, perhaps, in some minor customization activity for standard products to meet specific client needs. However, we indeed that traditional t-KIBS and p-KIBS taxonomy have revealed to be rather rough since they do not allow to investigate within sector's variety and detect common patterns across different sub-sectors (Corrocher et al., 2009, Bolisani et al., 2014).

The findings are subject to some limitations. The KIBS will be pursuing simple or hybrid (more complex) development strategies simultaneously and their inclusion in solely clusters is not entirely correct. Thus, further in-depth research is required using advanced and multidimensional static methods with an association of factors such as adult, customization of services or regional context. We didn't incorporate other important dimensions of development activities such as structural changes and human resource management, cooperation activities and other organizational innovations (Corrocher et al., 2009, Miles et al., 2017). Currently, Miles expanded KIBS classification used creative business services (C-KIBS) such as advertising, marketing, and design, which represent another possibility for further research.

The research carried out on a sample that is rather small in size or in the range corresponding to the lower limit of usability of some suitable tools. From this point of view, the theoretical possibility is to be increased by another KIBS category sample research or at least to obtain a uniform representation of each of the sections, which was distorted by the representation of the two largest sample groups (ICT and architectural and engineering services) to validate the results. The empirical evidence is also gathered from the Czech Republic.

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LITIGATE OR NOT TO LITIGATE? SIMILARITIES BETWEEN VISEGRAD COUNTRIES

Csilla Kohlhoffer-Mizser

Abstract

Purpose: This study is focused on the actual status of the Hungarian society in connection with trials and conflict management. The paper aims to show the possible directions persons can decide in case of conflict. This article aims to summarize the position of mediation, provided the question litigate or not to litigate?

Design/methodology/approach: The approach to the topic is on the basis of statistical data collected from national statistical office of Hungary, from Ministry of Justice Hungary about disputes and resolutions, the subject scope of the paper is litigation and mediation.

Findings: The increase or stagnation of court cases shows a clear representation of society's attitude to conflict. Results in different contexts do not represent significant differences in the selection of alternative dispute resolution or litigation as conflict management strategies. The findings point to a general increase in alternative dispute resolution, while litigation seems to be on the rise as well at a slower pace.

Research/practical implications: It is implicated to have a progressive thinking about conflict resolution. It can be a change in societies to look at conflicts with another aspect. Persons can practice the “win-win situation” from the beginning of life, it can be implied in education. For future research there is an aim to show every possible level where alternative dispute resolution is able to effect, practicing nonviolent communication for the success of conflict management. Scholars and entrepreneurs can make use of this research to apply, use and train mediation tools when conflicts arise.

Originality/value: It is supported by literature that leadership styles are in relationship with conflict management styles. In trust based relationships liability has a significant role, to be liable for our decisions we may recognized as a profit in society, and look at alternative dispute resolution approach as a progress. Conflict can be found in human interactions as well as business interactions. Companies involved in formal conflict, search for lawyers and leaders that resolve conflict in an efficient way.

Key words: Alternative Dispute Resolution, Mediation, Litigation

JEL Codes: K00, K19, K36, K40, K42

Introduction

In the field of mediation, alternative dispute resolution, there are several subjects of research. We can lay stress on either on the methods we use, we can study the communication forms, the issue of contracts. Persons do not even have to think of an official document, informal settlements belong here, too (Kóczy and Kiss, 2017). This paper aims to emphasize the cases, the number of the cases, comparing the numbers of cases started before courts and before the mediators. Decision makers of companies, enterprises, who decides to use alternative dispute resolution instead of court and arbitration procedures has to work with particular regard to that generation gaps are also challenges. (Fodor, 2018) (Kolnhofer-Derecskei et al., 2017) Conflict management operates in cross-border disputes in business mediation, the paper emphasizes the aspect of the borderless nature of the subject. However the filed of business mediation can not be clearly separated from other mediation types, business mediation often fuse with them, furthermore research shows that mediation have to viewed as complementary elements of an integrated system and that the key to successfull dispute resolution in international business is conscious and creative design of conflict management process. (Bühring-Uhle et al. 2006) Research show paths of the negotiation space and negotiation strategies, agreements between nations, firms, and individuals facilitate trade and ensure smooth interaction. (Ott and Ghauri, 2018) This article aims to summarize the position of mediation, with a special focus on business mediation, based on Hungarian data and examples, through the regulation of the European Union with the aim of displaying methods that are globally, internationally usable and applicable without borders. Resarch argues that social capital as proxied by trust (McKnight, 1996), (Rousseau, 1998) increases aggregate productivity by affecting the organization of firms (Bloom, 2012) and that an institution-based view of international business strategy has emerged in emerging economies. (Peng, 2008)

1 Mediation in business-consensus instead of compromise

Modern international conflict resolution offers a variety of tools for management and strongly encourages the emergence of conflicts, as effective conflict management does not only affect the business and economic development and efficiency of the business, but also the stability and development of the national economy. (Simkó, 2012)

Business mediation is a kind of mediation which needs researches on the basis of definition of consensus. It will be the real win-win outcome and solution after the procedure where the companies were taking part in. In business mediation we will meet evaluation, we

will meet restoration and we will need really the transformation method. It is common in every mediation type, case, that evaluation involves an other evaluation and they are based on emotions. Observation without an evaluation is really necessary and useful in business mediation, where the consensus has to be reached. Transforming the conflict to connection is one of the most important aim in business mediation, where the interests are in the highest degree about economy. The restorative method is the method by which we can never be mistaken and will always be necessary during dispute settlement.

Conflict can be considered as a breakdown in the standard mechanisms of decision making, so that an individual or group experiences difficulty in selecting an alternative. (Rahim, 2011)

While mediation is often thought of in the context of personal or family disputes, business owners realize that mediation services are available to resolve business-related disputes as well. Research emphasizes the importance of participation of organizations in participatory procedures, their involvement in development policy. (Kr mer, 2004)

In alternative dispute resolution of business conflicts there are used the three methods, technics of mediation: the evaluataive mediation, the restorative mediation and the transformative mediation.

We could ascertain that compromise and consensus are one in the same, but there are very important differences between the two definitions.

To compromise is to make a deal between different parties where each party gives up a part of their demand. In arguments, compromise is a concept of finding agreement through communication, through a mutual acceptance of terms—often involving variations from an original goal or desire.

The idea of compromise is usually based upon competing demands and some willingness to give up some part of the demands. Each party says they are willing to give up on getting a portion of their demands to get the other to make an agreement. If there is agreement they feel like they lost or won but neither party trusts the other to follow through. The compromise soon collapses and is often forgotten. This leaves both parties with an increasing sense of powerlessness, bitterness and distrust. Figure 1 shows that the status of related companies in relation to the compromise is as follows: on the one hand they are not sure about their needs, on the other hand, it is urgent for them to agree with the other party with their opinions and interests.

Figure 1. The Compromise Process between companies

| | | |
|---|---|-------------|
| Company 1 -not sure about the needs: -have an urge to agree with their opinion | Company 2 -not sure about the needs: -have an urge to agree with their opinion | =Compromise |
|---|---|-------------|

Source: Prepared by the author

Consensus decision-making is a group decision making process that seeks the consent, not necessarily the agreement of participants and the resolution of objections. Consensus is defined as, first, general agreement, and second, group solidarity of belief or sentiment. It has its origin in the latin word *cōnsēnsus* (agreement), which is from *cōnsentiō* meaning literally feel together. It is used to describe both the decision and the process of reaching a decision.

The idea of consensus is based upon the reality of overlapping interests. Companies that have chosen to work together for some time and aims almost certainly have a long list of interest in common, especially if they have aims over taking profit. Thing may have become very difficult but there are strengths in the relationship derived by the strengths of each individual. These strengths usually represent a good portion of the shared values. In consensus parties shall realize they can stop trying to get the other to agree about stuff they do not agree about. They can instead focus on finding agreement to solve problems in any area of common interest.²

Figure 2 seeks to show that, in order to find a community of interests between companies, it is necessary to clearly define the interests and plans that can not work in reverse and the interests and designs that can be common and related.

Figure 2. Agreements and plans lead to common interest

| Company 1 | Company 2 |
|--|--|
| <ul style="list-style-type: none"> • Agreements and plans can not work: • collect them during the mediation process, with remark they can't lead to connection-compared with Company 2. | <ul style="list-style-type: none"> • Agreements and plans can not work: • collect them during the mediation process, with remark they can't lead to connection-compared with Company 1. |
| <ul style="list-style-type: none"> • Agreements and plans can work: common and most connecting options to work with Company 2. | <ul style="list-style-type: none"> • Agreements and plans can work: common and most connecting options to work with Company 1. |

Source: Prepared by the author

² Available from: <http://www.selftimeout.org/assets/consensus.pdf>

In business mediation conflict transformation theory regards the focus not on case, but it considers the case as an opportunity: as such kind of entrance, wherethrough the transformation of the conflict generating environment can be set in motion.

The transformation approach regards the conflict as the catalyzer of the progression. (Lederach, 2003) Leadership styles are expected to be significantly related to conflict management styles (Hendel, 2005) (Saeed et al, 2014).

In business dispute-resolving there can be used the four-part Nonviolent Communication Process (NVC). NVC serves our desire to do three things: 1. Increase our ability to live with choice, meaning, and connection 2. Connect empathically with self and others to have more satisfying relationships 3. Sharing of resources so everyone is able to. (www.nonviolentcommunication.com)

The four part of NVC as illustrated in Figure 3—needs, requests, observations, feelings can be incorporated by companies, businesses, and legal entities into their communications, conflict prevention and -if the conflict is already established- into conflict management.

Fig. 3: Nonviolent communication used by legal entities

| | |
|---|--|
| Company's Nonviolent communication schedule | Needs |
| | Requests |
| | Observations |
| | Feelings (activated through natural persons, representatives, employees) |

Source: Prepared by the author based on Rosenberg: Nonviolent Communication. A language of life. Second Edition. Puddle Dancer Press, 2003 p. 6.

Common strategies a mediator might use during a business mediation to help the parties reach settlement include:

- Brainstorming new options;
- Questioning parties regarding the facts, law, interests strengths, and weaknesses of their case and the other party's case;
- Exploring non-monetary settlement options;
- Conditional demands and offers;
- Backwards bargaining;
- Decision tree analysis;
- Last best demand and offer;
- Best alternative to negotiated settlement;
- Mediator's proposal;
- Attorney-only sessions;
- Triangulating the gap;
- Apologies;
- Timing of payments. (Buyer, 2012)
-

2 Facts and cases about disputes and resolutions

In the hungarian legal regulation there are several ways for businesses how to resolve disputes, how to resolve a conflict, how to continue with business partners. Of course, courts fulfill the task to decide in the complaints of clients, to run the procedures of trials.

What is the number of mediators and how many cases are there yearly to solve. From the year of the Act on Mediation has became to effect, from the year 2007, can we observe an increasing will of natural and legal persons to initiate mediation? The number of registered mediators at Ministry of Justice between 2010-2016 were the following:

Tab. 1: Registered mediators at Ministry of Justice Hungary 2010-2016

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|------|------|------|------|------|------|------|
| Number of registered mediators at Ministry of Justice Hungary | 1272 | 1408 | 1578 | 1615 | 993 | 1041 | 1168 |

Source: Prepared by the author based on the given data from Ministry of Justice, Hungary (2018)

After three years of increasing in number of registered mediators, a relapse can be observed in 2014, which has been followed by again with slow increase in 2015 and 2016. The requirements of further training and continuative education of mediators included in the legal regulation may influence the issued registered mediators.

The numbers of incoming cases speak about changes despite of the Hungarian indicated course line 'It is bad to litigate' (Ábrahám and Eörsi, 2003). Perhaps people and decision makers change their minds and make the choice to choose alternative dispute resolution. Between 2010 and 2016, on the basis of data giving of registered mediators Table 2 shows the conformation of mediated cases, separately the cases with a successful agreement at the end and separately the cases without a successful end.

Tab. 2: Incoming cases to registered mediators at Ministry of Justice Hungary 2010-2016

| | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--------------|------|------|------|------|------|------|------|
| Successful | 216 | 708 | 370 | 589 | 851 | 864 | 983 |
| Unsuccessful | 63 | 203 | 160 | 204 | 260 | 487 | 400 |

Source: Prepared by the author based on the given datas from Ministry of Justice, Hungary 2018

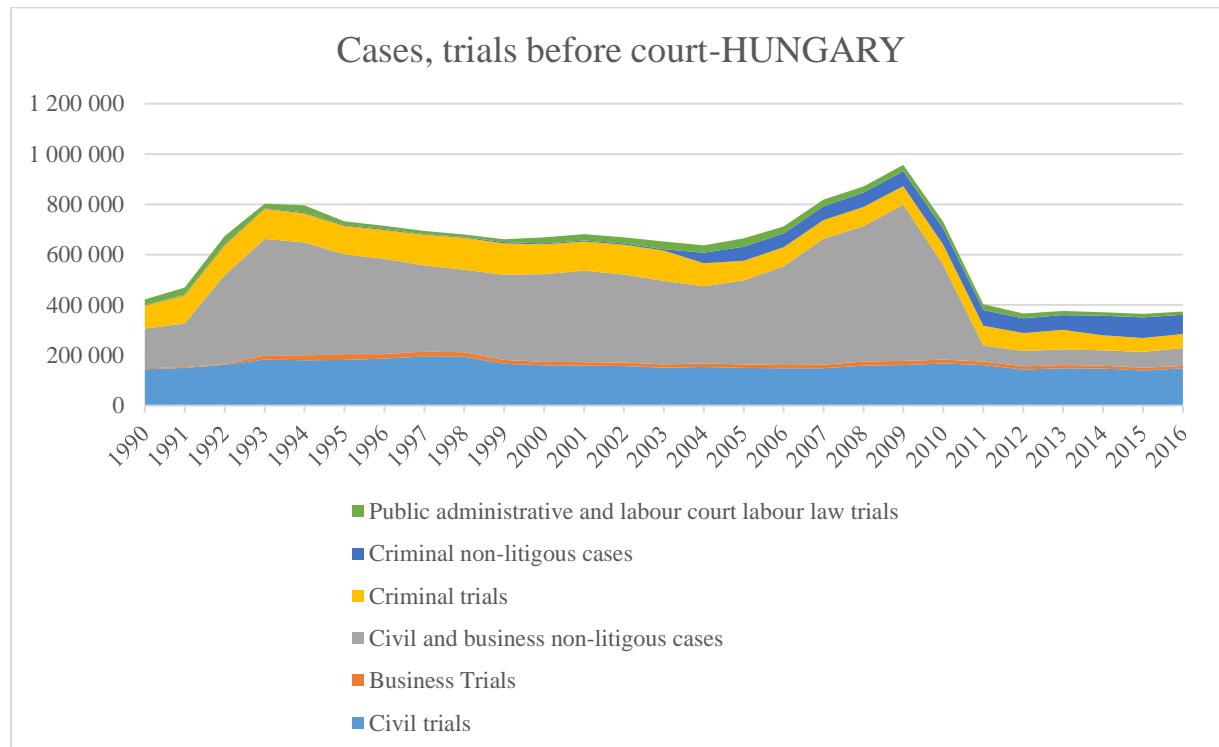
It is stated clearly in Table 2, that from the year 2014 there is a stable increasing in both –successful and unsuccessful ended incoming cases. Starting from the figures in the table, it is hoped that the number of people, firms or even communities that are choosing mediation will grow. Hopefully this is despite the fact that Table 3 and Graph 1 show the development of litigation cases in numbers, and these figures show almost stagnation, growth or only a minor decrease in litigation in all areas, except for one group of cases. This group is civil and business non-litigious cases, which data for 2010 decreased by 39% compared to 2009 figures and then decreased by 83% from 2010 in 2011.

The development of civil lawsuits between 2004 and 2016 can be said that as a result of the fall in the number of non-litigious procedures, the burden of the courts has been reduced from the year 2010 as depicted in Table 3 and Graph 1. Based on data about the cases, trials at hungarian courts provided by the Hungarian Central Statistical Office it is clear that, in 2010, the total number of cases, decreased by 24% from 2009 to 2010. It is most affected by the legislative change that a major group of non-affiliated cases, payment orders are mostly made by notaries.

Tab. 3: Cases, trials at Hungarian courts 2004-2016

| Year | Civil trials | Business trials | Civil and business non-litigious cases | Criminal trials | Criminal non-litigious cases | Trial cases at Public Administration and Labour Courts |
|------|--------------|-----------------|--|-----------------|------------------------------|--|
| 2004 | 154 067 | 13 162 | 306 928 | 91 910 | 41 540 | 28 856 |
| 2005 | 150 268 | 13 502 | 334 956 | 77 932 | 55 125 | 32 818 |
| 2006 | 148 180 | 13 415 | 391 954 | 75 708 | 55 447 | 27 903 |
| 2007 | 148 176 | 15 226 | 500 964 | 73 090 | 54 669 | 26 538 |
| 2008 | 158 558 | 16 764 | 538 364 | 76 589 | 56 446 | 24 086 |
| 2009 | 161 082 | 17 329 | 620 597 | 73 458 | 59 307 | 25 075 |
| 2010 | 168 045 | 15 217 | 375 981 | 80 155 | 64 265 | 26 745 |
| 2011 | 161 335 | 13 881 | 64 328 | 77 980 | 62 186 | 22 844 |
| 2012 | 143 904 | 12 324 | 61 521 | 70 886 | 58 838 | 18 299 |
| 2013 | 148 181 | 12 924 | 62 138 | 77 978 | 59 012 | 16 023 |
| 2014 | 147 428 | 10 900 | 62 019 | 58 944 | 78 074 | 14 186 |
| 2015 | 139 705 | 11 123 | 63 293 | 54 625 | 82 130 | 14 273 |
| 2016 | 148 279 | 9 478 | 71 247 | 55 681 | 76 159 | 13 477 |

Source: KSH, Hungarian Central Statistical Office Hungary www.ksh.hu

Graph 1: Changing of cases, trials at Hungarian courts 1990-2016


Source: Hungarian Central Statistical Office Hungary, www.ksh.hu decreasing number of civil and business non-litigious cases only, civil trials (1), criminal non-litigious cases (2), business trials (3), criminal trials (4), public administrative and labour law trials (5) stagnate from (2)-(5)

Mediation is at varying stages of development in Member States. There are some Member States with comprehensive legislation or procedural rules on mediation. In others, legislative bodies have shown little interest in regulating mediation. However, there are Member States with a solid mediation culture, which rely mostly on self-regulation.

The fundamental idea behind the Visegrad initiative, launched in the early 1990s, was for the four re-emerging CEE democracies (Czech Republic, Hungary, Poland, Slovakia) to coordinate their policies in striving for NATO and European Union membership. Government officials believed that by banding together and speaking with almost one voice in various multi-national formats they were more likely to be heard and no country would fall behind in its aspirations and achievements. (Bugajski, 2017)

Mediation is at varying stages of development in Member States. There are some Member States with comprehensive legislation or procedural rules on mediation. In others, legislative bodies have shown little interest in regulating mediation. However, there are Member States with a solid mediation culture, which rely mostly on self-regulation.

For the purposes of the Directive a cross-border dispute shall be one in which at least one of the parties is domiciled or habitually resident in a Member State other than that of any other party on the date on which:

- (a) the parties agree to use mediation after the dispute has arisen;
- (b) mediation is ordered by a court;
- (c) an obligation to use mediation arises under national law; or
- (d) for the purposes of Article 5 an invitation is made to the parties (The Directive

2008/52/EC of the European Parliament and of the Council of 21 May 2008 on certain aspects of mediation in civil and commercial matters. Article 2. Cross-border disputes).

More and more disputes are being brought to court. As a result, this has meant not only longer waiting periods for disputes to be resolved, but it has also pushed up legal costs to such levels that they can often be disproportionate to the value of the dispute.

Mediation is in most cases faster and, therefore, usually cheaper than ordinary court proceedings. This is especially true in countries where the court system has substantial backlogs and the average court proceeding takes several years.

This work would like to give an insight into the regulation of Visegrad countries (V4) regarding mediation. All Visegrad countries are making efforts in the field of alternative dispute resolution. Following the introduction of Hungary, Czech Republic, Slovakia and Poland is in the mediation position pointed below.

Czech Republic: The Probation and Mediation Service of the Czech Republic is the centralised body responsible for mediation as a means of dealing with the consequences of a criminal offence between the offender and the victim in criminal proceedings. The Ministry of Justice has responsibility for this service.

For mediation in civil law matters, you can contact one of the mediators offering that service. Contacts for mediators working in the Czech Republic may be found on various websites by entering the search term 'mediation'.

A list of mediators may be found, for example, on the websites of the Czech Mediators Association, the Czech Bar Association and the Union for Arbitration and Mediation Procedures of the Czech Republic. Contacts for the Probation and Mediation Service of the Czech Republic, acting within the remit of the relevant district courts, may be found on the Service's website.

Slovakia: Mediation mechanisms are described in Act No 420/2004 on mediation and amending certain laws, as amended, which governs:

- the performance of mediation,
- the basic principles of mediation, and
- the organisation and effects of mediation.

This Act applies to conflicts in relationships governed by civil law, family law, commercial contracts, and labour law.

Poland: In 2010 a section was created within the Ministry of Justice to be responsible for mediation issues, currently functional in the *Division for Victims of Crime and the Promotion of Mediation* within the Department of International Cooperation and Human Rights. Background information on mediation activities can be found on [the website of the Ministry of Justice](#).

In recent years, the Ministry of Justice has been paying particular attention to issues related to the development and popularisation of mediation and other forms of alternative dispute resolution in Poland and increasing the effectiveness of the justice system and its accessibility to citizens. In 2010 a network of mediation coordinators were appointed upon the initiative of the Ministry.

There are currently 120 coordinators (judges, probation officers and mediators), in eight courts of appeal, all the regional courts and in six areas of district courts.

In respect of advice and opinions, the Minister for Justice works with the Social Council on Alternative Dispute and Conflict Resolution ('the ADR Council'), which plays an important role in promoting the idea of mediation and communication between central government, the justice system and the mediation community.

It was appointed for the first time by Order of the Minister of 1 August 2005 as a body to advise the Minister on issues of alternative dispute and conflict resolution in the broad sense. The achievements of the first term of the Council included the following documents:

- Code of Ethics of Polish Mediators (May 2008).
- Standards for the Training of Mediators (October 2007).
- Standards for the Conduct of Mediation and Mediation Proceedings (June 2006).

The Council is currently made up of 23 representatives from the field of science and experienced mediation practitioners, as well as representatives of the following non-governmental organisations, academic institutions and government departments.

The Council's powers consist above all of drafting recommendations for rules on the functioning of the national system of alternative dispute resolution, and also:

- adapting the ADR system to the requirements of EU law,
- developing a uniform model of mediation in the Polish legal system,
- promoting standards for mediation proceedings,
- promoting ADR mechanisms as a conflict resolution method among members of the judiciary and judicial staff, law enforcement services and the public,
- creating an institutional environment in which particular forms of ADR can develop,
- undertaking other ad hoc projects to develop mediation in Poland.

(https://e-justice.europa.eu/content_mediation-62-en.do)

Conclusion

If a conflict is managed, it is solved through an activity, which was conducted by the parties in the case and the procedure was led by the mediator. Conflict-management is an activity and a kind of communication the methods of which can be applied extensively, internationally, regardless of borders. When people are able to understand and communicate their needs clearly, conflict may lead to connection. People have a common sense, that to solve, resolve, to transform a conflict is better than live with or in it. It is a common sense, that nonviolent communication leads to effects, it is productive. This paper would like to show some of the resources, of the living instruments, from which business environment, legal entities can choose. The task, the mission is to know well, how, where and when to make the right step in the space of alternative dispute resolution until we reach the solution, so business mediation is an international tool with an international methodology to help persons (natural and legal) in entrepreneurial activity. This article wanted to present some of the specific characteristics of business mediation, following the insights into the statistics, through the presentation of the cross-border and accurate methodology of mediation, the observation of participants and the transformation steps until reaching the agreement. International business scholars continue to struggle to theorize the relationship between country and cultural group boundaries. (Peterson et al., 2018)

The increase or stagnation of court cases shows a clear representation of society's attitude to conflict. There are several procedures worldwide, business can choose: the communication can be systematically facilitated with the aim of enabling the parties themselves to take responsibility for resolving their dispute. The findings point to a general increase in alternative dispute resolution, while litigation seems to be on the rise as well at a slower pace.

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DIFFERENCES BETWEEN COMPANIES BY SIZE IN ACCESS TO FINANCING

Simona Činčalová – Jaroslav Jánský

Abstract

Purpose: The aim of this paper is to examine whether approaches to financing based on selected indicators differ from various size entities in the Czech construction industry in the different phases of the economic cycle (during economic recession and after).

Design/methodology/approach: The statistical data were drawn from two random years 2010 and crisis 2014 from all construction companies listed in the Albertina database. In 2010, there were 9583 businesses in the construction industry and 6846 businesses in 2014. From the database, different indicators were used for two years in construction companies. The paper deals with indicators working capital and total indebtedness. For all enterprises in the field of Construction in the two years 2010 and 2014, the basic statistical characteristics were processed, and the results are based methodologically on paired t-test.

Findings: Despite the economic recession, there have been no significant changes in the funding structure of construction companies. The results of the paired t-tests have not found any statistically significant differences for the variables Working Capital and Indebtedness through the different companies and in selected years (differences over time). Based on t-tests it was found that micro, small and medium enterprises have similar approaches to financing, while the large companies differ.

Research/practical implications: The paper contributes to the field from the perspective of the Czech construction industry and it explores the differences in financing across the size of the companies operating in the industry. This topic clearly deserves further attention when examining the construction industry and its approaches to financing through other indicators or other statistical testing.

Originality/value: The value of this study is to provide a first step in a detection of different approaches to financing in various size of Czech construction companies.

Keywords: Approaches to Financing, Working Capital, Construction, Czech Republic

JEL Codes: G32, L74, D24

Introduction

Construction is an economic branch, which provides construction, maintenance, reconstruction, modernization and demolition of building structures. The construction industry fulfils several functions for the company:

- social (housing, health, culture, sport, education),
- industrial production,
- agricultural production,
- energy,
- transport.

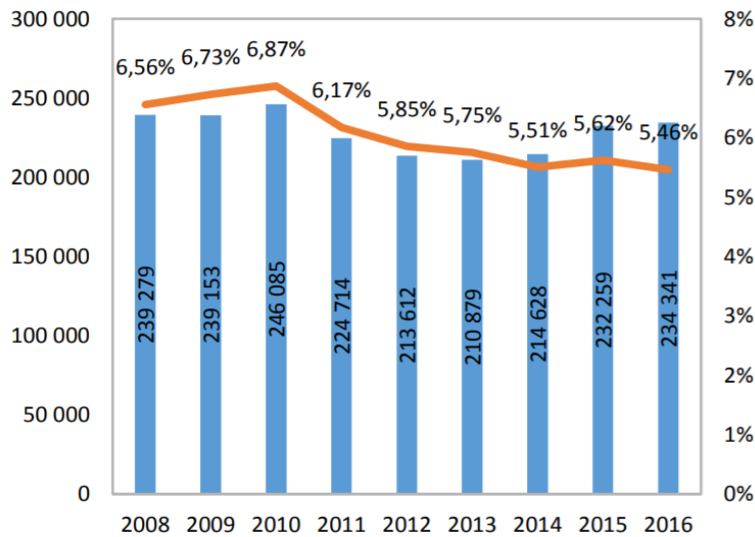
The main and most important objective must be the creation of a suitable work and environment for the existence of people, plants and animals, while at the same time maximizing the preservation of all natural and cultural heritage. Thus, construction is a very complex field of human activity, including not only technical, technological and economic components, but also aesthetic and ecological.

The authors consider the question whether the economic recession in 2007-2010 affected the structure of financing in the construction industry. The business data and statistical t-tests are used for the verification. The value of this study is to provide a first step in a detection of different approaches to financing in various size of Czech construction companies, because this industry has a limited interest.

1 Czech Construction Industry

The construction industry is one of the key indicators of the country's economy in the Czech Republic. As an indicator, which corresponds to its position in the economy and changes in this position over time, the gross value added (GVA) is used, respectively share of it.

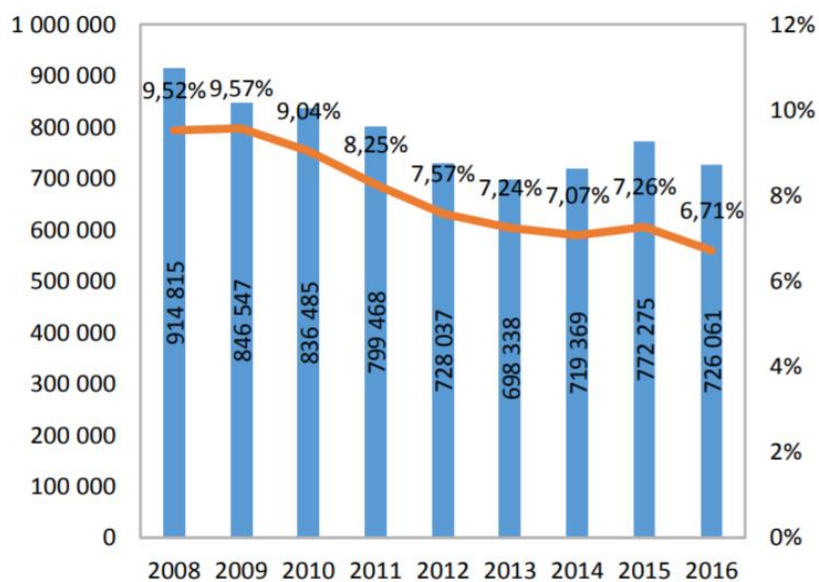
Fig. 1: GVA (CZK mil.) and the share of GVA construction in the whole economy at current prices



Source: Ministry of Industry and Trade (2018)

The first phase of the recession (from 2008 to 2010) is characterized by the fact that the share of construction in GVA has increased, at the expense of other sectors. Since 2010, GVA has been declining (see Figures 1 and 2), except in 2015 when there was a significant year-on-year increase in GVA.

Fig. 2: Production (CZK mil.) and share of construction output to the whole economy at current prices



Source: Ministry of Industry and Trade (2018)

2 Approaches to Working Capital Financing

A financing strategy is very important for each organization. There are different steps of how an enterprise could achieve its financial goals, both short term and long term. The best financing strategy establishes a strategic plan with steps for the staff of an enterprise in everyday financing operations.

There are three main financing strategies for current assets or working capital – matching, conservative and aggressive approaches. According to Khan and Jain (2007) the matching approach is also called as a hedging approach. The term „hedging“ is often used in the content of a risk-reducing investment strategy. In this context, the maturity of the source of funds should match the nature of the assets to be financed. The matching approach suggests that long term funds should be used for financing the fixed portion of current assets.

The second approach is conservative. An enterprise trusts on the long-term funds to gain fixed assets and a part of non-fixed assets. There is less risk of a shortage of instant funds.

And the last-mentioned approach is aggressive. According to this approach, the enterprise finances its non-fixed assets by its short-term funds. This is very risky because the enterprise could have a hard time dealing with short term obligations.

Different empirical studies show different results. Afza and Nazir (2007) and Carpenter and Johnson (1983) found the negative relationship between working capital policies and profitability. These authors also found no significant relationship between the level of current assets and liabilities and risk of the enterprises.

Salawu (2007) and Weinraub and Visscher (1998) found that firms in differing industries have significantly different current asset management policies. Additionally, the relative industry ranking of the conservative or aggressive asset policies show notable stability over time. It is obvious that there is a significant negative correlation between industry asset and liability policies. Relatively aggressive working capital asset management appears balanced by relatively conservative working capital financial management.

Afza and Nazir (2008) came to results that the aggressive investment working capital policies are accompanied by aggressive working capital financing policies. Finally, they found a negative relationship between the profitability measures of firms and degree of aggressiveness of working capital investment and financing policies.

Hedija et al. (2017) examined the link between profitability and economic efficiency and they mentioned the false positivity in indicator return on equity. Blažková and Dvouletý (2019) found a positive relationship between the labour productivity and profitability in the

Czech food industry. Also another factors responsible for performance of the company have been studies (Chandrapala and Knápková, 2013; Tomšík et al., 2016).

3 Methods

The statistical data was drawn for two random years 2010 and crisis 2014 from all construction companies listed in the Albertina database. In 2010, there were 9583 businesses in the construction industry and 6846 businesses in 2014.

From the mentioned Albertina database, the following indicators were used for two years in construction companies: working capital, total indebtedness, debt of equity, ordinary and immediate liquidity. The paper deals with indicators working capital and total indebtedness.

The whole set of enterprises in the two years under review was divided according to the size of the accounting unit (see Amendment to the Act on Accounting) to so called micro, small, medium and large enterprises. Companies can be classified in different categories according to their size. The most common in statistical context is number of employed people – small and medium-sized (less than 250 people) and large companies (250 or more people). Small and medium-sized enterprises are further dividend into micro (1-9 people), small (10-49 people) and medium-sized (50-249 people).

For all enterprises in the field of Construction in the two years 2010 and 2014, the basic statistical characteristics were processed, and the t-test was performed on two sampling averages. T-test is a test of proof of the difference between two medium values of files independent of each other (Minařík, 2008). These characteristics and t-tests were processed in Unistat.

4 Results

Research is focused on enterprises from the construction industry in years 2010 and 2014. We can see large fluctuations in the number of businesses in selected years because of the financial crisis (see Table 1).

Tab. 1: Industry structure with respect to size in selected years

| Size of the company / Year | 2010 | | 2014 | |
|----------------------------|------|--------|------|--------|
| Micro | 6027 | 62.89% | 4752 | 69.41% |
| Small | 3070 | 32.03% | 1806 | 26.38% |
| Medium | 422 | 4.40% | 240 | 3.51% |
| Large | 65 | 0.68% | 48 | 0.70% |
| Total | 9584 | 100% | 6846 | 100% |

Notes: Construction industry companies were divided into five groups – micro, small, medium and large according to the number of employees and turnover. In 2010 there were 9584 companies in total and in 2014 6846 companies in total. The major groups are micro companies with less than 10 employees and the turnover less than 18 million CZK. There were 6027 micro companies in 2010 (that is 62.89% of total) and 4752 in 2014 (69.41% of total).

Source: own processing according to Albertina (2018)

The aim of the paper is to examine whether approaches to financing based on selected indicators differ from various size entities in the different phases of the economic cycle. So we were exploring the approaches to financing according to indicators working capital and indebtedness across each group of companies in years 2010 and crisis 2014 (see Table 2 with medians of each category). Despite the economic recession, there have been no significant changes in the funding structure.

Tab. 2: Indicators of each group of companies in selected years

| Size of the company | 2010 median | | 2014 median | |
|---------------------|-----------------|--------------|-----------------|--------------|
| | Working capital | Indebtedness | Working capital | Indebtedness |
| Micro | 249.24 | 70.09 | 297.38 | 64.84 |
| Small | 3678.06 | 128.23 | 4735.26 | 111.09 |
| Medium | 38763.54 | 126.65 | 46194.73 | 117.29 |
| Large | 288511.76 | 207.19 | 391135.01 | 209.41 |

Source: Own processing according to Albertina (2018)

Then we investigated the significant differences between these enterprises through t-tests. The most interesting results from this research could be seen in the following figures. According to the aim of this paper it was found that there is a high significance between micro and medium-sized companies from the construction industry in year 2010 and 2014 (see Figure 3). In this figure there are p-values and “yes” for the significance or “no” for insignificance. There was also a high significant difference between micro and small companies, but a weak significance between micro and large companies. As for the level of significance we used 1% level of statistical significance.

Based on t-tests it was found that micro, small and medium enterprises have similar approaches to financing, while the large companies differ. There are no big differences between the year 2010 and the crisis year 2014, just in micro companies.

Fig. 3: T-test statistical significance for the indicator Working Capital between different sized companies in 2010 and 2014 (p-value of paired t-test is reported in the table)

| WORKING CAPITAL | micro 2010 | small 2010 | medium 2010 | large 2010 | micro 2014 | small 2014 | medium 2014 | large 2014 |
|------------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|--------------------|-------------------|
| micro 2010 | - | 0.00 yes | 0.00 yes | 0.27 no | 0.60 no | 0.00 yes | 0.00 yes | 0.41 no |
| small 2010 | 0.00 yes | - | 0.00 yes | 0.05 no | 0.00 yes | 0.00 yes | 0.00 yes | 0.28 no |
| medium 2010 | 0.00 yes | 0.00 yes | - | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes |
| large 2010 | 0.27 no | 0.05 no | 0.00 yes | - | 0.12 no | 0.62 no | 0.00 yes | 0.00 yes |
| micro 2014 | 0.60 no | 0.00 yes | 0.00 yes | 0.12 no | - | 0.00 yes | 0.00 yes | 0.24 no |
| small 2014 | 0.00 yes | 0.00 yes | 0.00 yes | 0.62 no | 0.00 yes | - | 0.00 yes | 0.45 no |
| medium 2014 | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes | - | 0.00 yes |
| large 2014 | 0.41 no | 0.28 no | 0.00 yes | 0.00 yes | 0.24 no | 0.45 no | 0.00 yes | - |

Note: Statistically significant differences are evaluated by yes/no according to the p-value of t-test based on 1% level of statistical significance.

Source: own processing

There were also investigated statistical significances through the indicator Indebtedness in years 2010 and 2014. In Figure 4 we can see the same results as for the indicator Working Capital. Only large companies differ from each other, there are no significant differences.

Fig. 4: T-test statistical significance for the indicator Indebtedness between different sized companies in 2010 and 2014 (p-value of paired t-test is reported in the table)

| INDEBTEDNESS | micro 2010 | small 2010 | medium 2010 | large 2010 | micro 2014 | small 2014 | medium 2014 | large 2014 |
|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| micro 2010 | - | 0.00 yes | 0.00 yes | 0.18 no | 0.00 yes | 0.00 yes | 0.00 yes | 0.25 no |
| small 2010 | 0.00 yes | - | 0.00 yes | 0.09 no | 0.00 yes | 0.00 yes | 0.00 yes | 0.11 no |
| medium 2010 | 0.00 yes | 0.00 yes | - | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes |
| large 2010 | 0.18 no | 0.09 no | 0.00 yes | - | 0.27 no | 0.13 no | 0.00 yes | 0.00 yes |
| micro 2014 | 0.00 yes | 0.00 yes | 0.00 yes | 0.27 no | - | 0.00 yes | 0.00 yes | 0.31 no |
| small 2014 | 0.00 yes | 0.00 yes | 0.00 yes | 0.13 no | 0.00 yes | - | 0.00 yes | 0.07 no |
| medium 2014 | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes | 0.00 yes | - | 0.00 yes |
| large 2014 | 0.25 no | 0.11 no | 0.00 yes | 0.00 yes | 0.31 no | 0.07 no | 0.00 yes | - |

Note: Statistically significant differences are evaluated by yes/no according to the p-value of t-test test based on 1% level of statistical significance.

Source: Own processing

Conclusion

Construction is a very specific industry. It is a complex field of human activity, including not only technical, technological and economic components, but also aesthetic and ecological. The authors chose two years for statistical investigating – 2010 and crisis year 2014, where was a big drop.

The aim of the paper was to examine whether approaches to financing based on selected indicators differ from various size entities. The authors chose two years for statistical investigating – 2010 and crisis year 2014, where was a big drop. There were exploring the approaches to financing according to indicators working capital and indebtedness across each group of companies (micro, small, medium and large) in selected years through t-tests.

It was found that micro, small and medium enterprises have similar approaches to financing, while the large companies differ, and the approaches don't change even in the recession. Authors did not find any similar research to compare the results in this industry. This topic clearly deserves further attention. Future research should test, whether the construction industry companies report the same findings about unchanging approaches, when using different indicators like current ration and degree of self-financing.

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INNOVATION, COMPETITION & CONTINGENT WORK

Matthijs den Besten – Issam Laguir

Abstract

Purpose: The benefits of a flexible workforce are widely recognized. Yet, studies of particular workforce arrangements such as reliance on freelancers show that these arrangements are not adopted in equal measure by all firms. This study looks at the use of non-permanent contracts more in general. Its aim is to corroborate the supposition that the need for innovativeness and competitiveness is what creates a demand for flexibility among firms.

Design/methodology/approach: For our analysis, we rely on self-reports with respect to innovation, competition and the use of alternative labour contracts from a cohort of firms over a period of five years. On the basis of logistic regressions, we assess the impact of a firm's outlook at the beginning of the period on its propensity to engage flexible labour later on. Our sample comprises some 50,000 small and medium-sized enterprises that were created in France in 2002.

Findings: The results of our analysis confirm the idea that firms facing challenging environments are more likely to look for alternative workforce arrangements. In addition to the firm's initial assessment of its situation, we found that firms that rely on alternative labour contracts in the creation phase are more likely to employ such contracts later too.

Research/practical implications: Our findings reinforce the association of workforce flexibility with innovation orientation. Considering the impact of early experience and assuming the benefits of flexibility, the findings suggests that instruments should be developed to expose firms in innovative and dynamic environments to alternative work forms right after creation.

Originality/value: This paper establishes innovation and competition outlook as antecedents to the employment of contingent work. Thus, it provides a crucial contribution towards addressing the wider question how contingent work helps transform initial ambitions into actual outcomes with respect to innovation and competitiveness.

Keywords: SMEs, France, Temporary Work, Innovation Perception, Imprinting

JEL Codes: L21, M13, M51

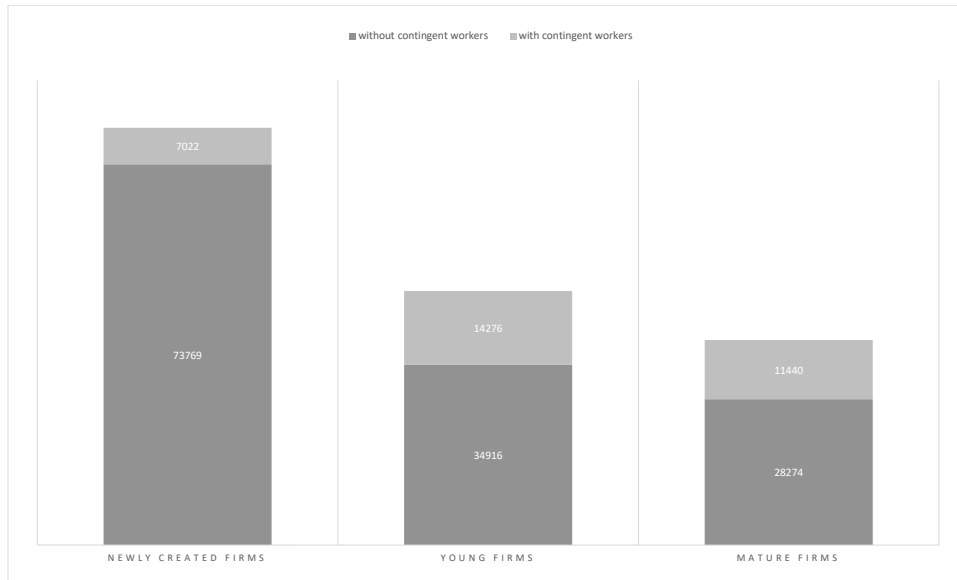
Introduction

The benefits of a flexible workforce are widely recognized. Consequently, many countries have introduced reforms aiming to increase the flexibility of the workforce. For instance, France introduced the *Contrat Nouvelle Embauche* in 2005 and tried to introduce the *Contrat Première Embauche* in 2006 as another alternative work contract that could be terminated relatively easy, but failed after massive protests (Zdrojewski, Grelet, & Vallet, 2008).³ Yet, studies of particular workforce arrangements such as reliance on freelancers show that these arrangements are not adopted in equal measure by all firms. In case of freelancers, it appears that the flexibility they inject into the workforce is mostly sought after by firms operating in innovative and dynamic environments (Burke & Cowling, 2015). Firm objectives matter (Bouncken, Lehmann, & Ratzmann, 2013). Given the link reported in the literature between workforce flexibility and innovation performance (Preenen et al., 2017; Zhou et al., 2011), it is likely that firms whose goals is to develop an innovation orientation are especially eager to pursue such arrangements. As “firms’ perceptions about their competitive environment are important for innovation” (Tang, 2006), it might well be these also affect choices with regards to workforce arrangements. Besides, there is a question of timing: depending on the stage of development the workforce needs with regards to pursuing innovation may change (Børing, Fevolden, & Herstad, 2016). Last, but not least, like other things the choice for particular workforce arrangements might be a question of habits imprinted in the organization right from the start (Laguir, Den Besten, Stekelorum, & Elbaz, 2017; Simsek, Fox, & Heavey, 2015). The purpose of this study is to test these suppositions, which translate into the following hypotheses:

1. Innovation orientation requires workforce flexibility;
2. Competition reinforces the need for workforce flexibility;
3. Workforce arrangements at firm creation pervade in later stages.

The remainder of this paper is organized as follows: Section 1 describes the sample to which we applied our analyses; Section 2 describes the approach we adopted; and Section 3 details our findings. We conclude with implications and suggestions for future research.

³ Both terms refer to templates provided by French labor laws and can be translated as “new-job contract” and “first-job contract” respectively.

Fig. 1: Use of contingent workers among SMEs in France.


Source: Own elaboration based on data from three waves of survey-responses collected for the Information System on New Enterprises (SINE) by the French National Institute of Statistics and Economic Studies (INSEE) starting from 2002.

1 Data

Our sample comprises some 50,000 small and medium-sized enterprises that were created in France in the first half of 2002 and survived for at least three years. The data were collected by the French National Institute of Statistics and Economic Studies (*Institut National de la Statistique et des Etudes Economiques, INSEE*) and curated under the banner SINE (a French acronym for Information System on New Enterprises). The data were collected in three waves: First in 2002, right after firm creation; next in 2005, three years into the firms' development; and last in 2007 as the firms reached maturity.

Among the information firms were asked to provide is whether they had hired anyone on contracts other than a permanent contract (known as *Contrat de Durée Indeterminée* or CDI in France). Figure 1 shows the total number of firms created in the first half of 2002, the number that survived as young firms and mature firms, and the proportions among them that hired at least one person on a non-permanent contract. The sample excludes agricultural firms and firms with more than 250 employees at the creation date. Note that many of the firms in our sample are very small: Some 25,000 firms reported no employees in 2007, five years after creation. Yet, among them nearly one fifth reported that they had employed someone temporarily in the past two years.

2 Methods

For our analysis, we rely on self-reports with respect to innovation and competition at firm creation and with respect to the use of alternative labour contracts three and five years after creation. We use logistic regression to estimate the impact of the former on the latter.

Specifically, our dependent variable contingent work is a dichotomous variable which gets a value of one if the firms indicates that it has engaged anyone on a contract other than CDI in the two years preceding the questionnaire and a value of zero otherwise. We consider innovation perception, competitive environment, and initial experience with contingent work as independent variables and we control for sector of activity. We operationalize innovation perception (Hemert, Masurel, & Nijkamp, 2011) as a dichotomous variable assigning a value one for firms that indicate at firm creation that they consider themselves innovative and zero otherwise. Similarly, competitive environment is a dichotomous variable with value one if firms consider that they are exposed to strong competition and zero otherwise. Initial experience with contingent work is also a dichotomous variable. It has a value of one in case the firm indicates that it had people working on contracts other than CDI either when the firm was registered or at the time the firm responded to the first questionnaire. Finally, in light of stylized facts on the importance of sector differences in the interplay between innovation and competition (Sutton, 2001), we include sector dummies as controls adopting the classification according to the Nomenclature économique de synthèse (NES) proposed by INSEE.

Tab. 1: Descriptive statistics & correlation matrix.

| | Mean | Sd | CW ₁ ⁵ | CW ₁ ³ | CW ₃ ⁵ | CW ₀ | IP | CE |
|------------------------------|--|-----|------------------------------|------------------------------|------------------------------|-----------------|---------|------|
| Dependent variables: | | | | | | | | |
| CW ₁ ⁵ | .39 | .49 | | | | | | |
| CW ₁ ³ | .29 | .45 | .80*** | | | | | |
| CW ₃ ⁵ | .29 | .45 | .76*** | .40*** | | | | |
| Independent variables: | | | | | | | | |
| CW ₀ | .10 | .30 | .21*** | .23*** | .19*** | | | |
| IP | .41 | .49 | .07*** | .07*** | .06*** | .07*** | | |
| CE | .38 | .49 | .04*** | .04*** | .03*** | .04*** | -.08*** | |
| EX | .48 | .50 | -.08*** | -.08*** | -.07*** | -.02*** | .02*** | -.00 |
| Notes: | Sd: Standard deviation; CW _x ^y : Use of contingent work between year <i>x</i> and <i>y</i> after creation; IP: Innovation perception; CE: Competitive environment; EX: Active in services other than commerce and repairation; ***: Pearson's product-moment correlation significant at the 1 percent level. | | | | | | | |

3 Results

Table 1 provides descriptive statistics and a correlation matrix for the main variables in our sample. Due to space concerns we only include the dummy for the largest sector of activity. Other sectors in which the firms in our sample are active concern industry (25%), construction (20%), and commerce and repair (8%).

Table 2 summarizes the results obtained from the application of logit regressions to three distinct models. The models differ from one another with regards to the dependent variable: Model 1 tries to explain the use of alternative labour arrangements over the whole period under consideration; model 2 focuses on the first period while the firms were still relatively young; and model 3 focuses on the second period where firms were relatively mature. All three models consider the effect from the innovation and competition outlook of the firm, the interaction between both, as well as the effect from the imprinting of initial workforce configurations and all three models also include sector activity controls.

We observe the following: In all models, the independent variables have a statistically significant positive effect on the propensity of firms to hire worker on alternative contracts and in all three models the biggest effect stems from initial experience, although the effect is slightly weaker for older firms in model 3 compared to the young firms in model 2. There is no interaction to speak of between innovation and competition, except, perhaps, for model 1.

The results of our analysis confirm the idea that firms facing challenging environments are more likely to look for alternative workforce arrangements. It does not seem to be the case, however, that the expectation of competition reinforces the tendency of innovative firms to consider alternative workforce arrangements. More than the firms' outlook, their existing experience with alternative arrangements appears a crucial factor for future actions. Thus, our results confirm hypotheses 1 and 3 and contradict hypothesis 2.

Tab. 2: The impact of innovation and competition on decision to hire temporary workers.

| | 1-5 years after creation | 1-3 years after creation | 3-5 years after creation |
|---|--|--------------------------|--------------------------|
| | (1) | (2) | (3) |
| Innovation Perception (IP) | 0.308*** | 0.317*** | 0.307*** |
| | (0.025) | (0.027) | (0.030) |
| Competitive Environment (CE) | 0.189*** | 0.204*** | 0.171*** |
| | (0.026) | (0.028) | (0.031) |
| Initial experience with contingent work | 1.439*** | 1.414*** | 1.157*** |
| | (0.034) | (0.032) | (0.035) |
| IP×CE | 0.079* | 0.057 | 0.040 |
| | (0.041) | (0.043) | (0.048) |
| Constant | -1.106*** | -1.562*** | -1.569*** |
| | (0.025) | (0.028) | (0.031) |
| Controls | Yes | Yes | Yes |
| Observations | 49,186 | 49,186 | 39,710 |
| Log Likelihood | -30,849.850 | -27,817.490 | -22,679.200 |
| Akaike Inf. Crit. | 61,715.710 | 55,650.970 | 45,374.390 |
| Notes: | ***Significant at the 1 percent level. | | |
| | *Significant at the 10 percent level. | | |
| | Controlled for sector of activity. | | |

Source: Own elaboration based on data from three waves of survey-responses collected for the Information System on New Enterprises (SINE) by the French National Institute of Statistics and Economic Studies (INSEE) starting from 2002.

Conclusion

In this paper, we have investigated the effect of firm outlook on subsequent behaviour. Specifically, we established that firms that consider themselves innovative and firms that face competition (real or imagined) are more likely to explore the engagement of contingent workers than others.⁴ Our findings reinforce the association of workforce flexibility with innovation orientation made in research, where employee focus has been identified as one of the organizational competencies that affect the capacity of a firm to innovate (Siguaw, Simpson, & Enz, 2006).

⁴ Note that this does not necessarily mean that engagement of temporary workers will lead to higher innovation output (cf. (Cetrulo, Cirillo, & Guarascio, 2018)).

In practice, for providers of flexible work and related services these findings suggest a way to identify potential future clients among newly created firms: it suffices to look at mission statements and initial workforce arrangements to predict future demand. For policy makers, in turn, considering the impact of early experience and assuming the benefits of flexibility, the findings suggests that instruments should be developed to expose firms in innovative and dynamic environments to alternative work forms right after creation. This could be through targeted education or through subsidies.

Like other entrepreneurship research (Nightingale & Coad, 2013), our study has its limitations. These limitations can be addressed, at least in part, through the application of more sophisticated modelling strategies such as panel regression. Future models should also account for the effect of environmental turbulence and consider the effect of the initial outlook on the extent to which firms rely on alternative workforce arrangements. An obvious avenue for further research, finally, is to study the consequences of contingent work. From that perspective, the value of the current study is to provide a building block for investigations into the question whether and how contingent work helps transform initial ambitions into actual outcomes with respect to innovation and competitiveness.

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THE AWARENESS OF DIGITISATION IN STRATEGIC SUSTAINABILITY REPORTING IN BANKING

Florian Diener – Miroslav Špaček

Abstract

Purpose: Today's financial services industry is making a digital transition, especially when it comes to banking. Due to changing market conditions and stricter legal requirements for information duties to stakeholders, this paper focuses on the analysis of mandatory sustainable reporting with a specific focus on strategy. In particular, the perception of a changing market environment through digitisation in the banking sector will be analysed and interpreted. The framework of the Sustainability Code forms the basis of the analysis.

Design/methodology/approach: Firstly, quantitative content analysis of n = 114 sustainability reports and, secondly, regression analysis of a total of 1410 codes related to digitisation were chosen as appropriate research methods. Keyword analysis deals with the analysis of sustainability reports of the German Sustainability Code and its four strategic criteria. These are searched and coded for the keyword 'digital'. Based on this, a regression analysis will be carried out following the respective coded sustainability reports.

Findings: The findings revealed that, within the legally mandated sustainable reporting requirements, banks are partially, and not fully, concerned with reporting on digitisation. It turns out that the focus is on three out of four strategy criteria of the Sustainability Code. Strategical analysis methods are neglected, whereas Materiality, Objectives the Depth of the Value Chain issues receive increased attention.

Research/practical implications: With regards to digitisation, the paper identifies a thematic imbalance within strategic sustainable reporting. It turns out that topics are not fully considered and addressed in a reporting approach prescribed by law, and that there is a high degree of freedom in the information duty to stakeholders.

Originality/value: Since sustainable reporting has only recently become mandatory and it is a comparably new reporting approach, this paper focuses on precisely these and makes a contribution to the analysis and further development of the German Sustainability Code and the associated legal approaches.

Keywords: Bank, Change, Digital, Digitisation, Disruption, Financial Services, Financial Technology, FinTech, Innovation, Strategy, Sustainability, Reporting

JEL Code: G20, G21, O30, O33, Q56

Introduction

Sustainability reporting (on a voluntary basis) has rapidly developed in the banking industry in recent years. In order to meet the demands of stakeholders, banks are dealing with the most diverse issues of a sustainability-oriented economy in several ways. At the same time, discussions about the type and scope of corporate reporting on social, environmental and governance issues have also increased at the European level as well as one of the most important drivers for of today's economy, the megatrend digitisation.

In December 2014, the EU Commission adopted a directive on expanding financial reporting with regard to non-financial and diversity aspects (Directives 2014/95/EU, 2014). On 21 September 2016, the Federal Government adopted the draft of the CSR Directive Implementation Act (CSR-RUG) submitted by the Federal Ministry of Justice and Consumer Protection and introduced it to the German Bundestag. On March 9, 2017, at the second/third reading, the Bundestag decisively counselled and adopted the order, thus converting it into German law, especially the commercial code (HGB) § 289b et seq. The law then essentially comes into force upon its promulgation. Selected capital market-oriented companies and groups, including credit institutions and insurance companies are affected by the reporting requirements, even if these are often not listed. Companies with more than 500 employees are required to report (Directives 2014/95/EU, 2014) – see also § 289b et seq. HGB. If the above-mentioned limit values are exceeded, the companies concerned must report individual services or non-financial aspects, particularly environmental, employee and social matters, employees, as well as their respect for human rights, the fight against corruption and diversity in the governing bodies.

In the course of this development, the Federal Association of German Bankers' Associations (namely: bankenverband) has taken part in the discussion and addressed the issue of sustainability reporting in medium-sized banks as part of its committee and public relations work and conducted discussions with various stakeholders. *The German Council for Sustainable Development (RNE)* is especially worth noting at this point. Its task is to develop contributions to the implementation of the German Sustainability Strategy, to identify specific fields of action and projects, and to make sustainability an important public issue (German Council for Sustainable Development, 2019), with which intensive working contacts have been established in recent years. This resulted in a cooperation agreement between the banking association and the RNE, i.e. The Sustainability Code (DNK). The aim of this cooperation is to provide the SME banks with the DNK prepared by the RNE as an easy-to-use instrument, as

these banks will be obliged to report on non-financial aspects of their actions due to the high number of employees (German Council for Sustainable Development, 2019).

As the whole economy and market environment is changing more and more due to digitisation, also the finance market is affected and stakeholders need to be entirely informed of the transformation issues caused by digitisation and its associated operational reactions. Based on legally-required sustainable reporting, they should be able to take into account previously described market and competitive situation as well as the associated changes for banks, along with the context of responsible and sustainable business management. This leads to the following questions, which should be answered by quantitative keyword analysis and regression analysis:

- (1) What are the awareness levels of banks regarding digitisation and strategy in the context of legally-required non-financial reports?
- (2) With regards to digitisation and strategy, which non-financial reporting criterion are banks focusing most on in their sustainability reports?

The paper is structured as follows: firstly, we are focussing on The Sustainability Code with regard to strategical approaches. Secondly, we thematise digitisation in the finance industry with a detailed viewing on today's changing banking market. After describing the methodology next, we are discussing the results of quantitative keyword analysis and the following regression analysis in terms of sustainability reporting. Finally, we draw conclusions and discuss suggestions for future research in the field of sustainability reporting in banking.

4 The Sustainability Code

A comprehensive approach to sustainable reporting is the DNK, which has been written down and is intended to serve as the standard for transparency on corporate sustainability management. Maximal corporate transparency can only be achieved through comprehensive reporting. The code aims to establish integrated corporate reporting. In its practical form, it incorporates guidelines such as those of the Global Reporting Initiative or European Federation of Financial Analysts Societies. In terms of both content and process, the DNK is a novelty for corporate sustainability reporting and takes it to a new level. Other national and European recommendations, guidelines, and manuals tend to try to avoid too concrete an approach, whereas the DNK sets out concrete criteria for adequate reporting.

The target group for sustainable reporting is not just companies from all sectors; organisations, foundations, NGOs, trade unions, universities, science organisations and media

are also eligible, which can operate in accordance with the code (Bachmann, Siebertz, & Zwick, 2017, p. 9). In principle, the application of the DNK is voluntary and only serves as an aid for comprehensive reporting, but it makes the transparent presentation of corporate responsibility compulsory as soon as companies invoke the application of the code. A company can invoke the DNK by means of a Declaration of Conformity, which can furthermore be certified by independent organisations (Bachmann et al., 2017, p. 19). In addition, companies and organisations have to declare whether and to what extent they meet the criteria of the DNK in accordance with a "comply or explain" principle (Bachmann et al., 2017, p. 19). The code is deemed to be complied with if reporting meets the highest reporting standards of the Global Reporting Initiative (GRI G4) / Sustainability Reporting Standards (SRS)⁵ with its 28 performance indicators, or the European Federation of Financial Analyst Societies (EFFAS) with its 16 indicators (Bachmann et al., 2017, p. 19; Deutscher Sparkassen- und Giroverband, 2017). In terms of content, the DNK is defined by a total of 20 criteria in the report categories *Strategy*, *Process Management*, *Environment*, and *Society*, each of which is further explained or defined with selected non-financial performance indicators of the GRI, SRS or EFFAS. The respective companies are responsible for deciding whether to select the GRI or EFFAS performance indicators for qualified reporting (Bachmann et al., 2017, p. 19). According to Bachmann et al. (2017) and Deutscher Sparkassen- und Giroverband (2017) the four strategy criteria of the 20 DNK criteria are defined in Table 1.

Table 1: Overview of Strategy DNK Sustainability Reporting Criteria

| Sustainability Concept | | |
|------------------------|---------------------------------|--|
| Strategy | | |
| 1. | <i>Strategy</i> | Analysis methods on opportunities and risks with regard to sustainable development. |
| 2. | <i>Materiality</i> | Sustainability strategies (e.g. strategic positioning in competition, climate-friendly/resource-saving business activity). |
| 3. | <i>Objectives</i> | Qualitative and/or quantitative and time-defined sustainability objectives, including the monitoring instruments applied to them. |
| 4. | <i>Depth of the Value Chain</i> | Information on how far down the value chain sustainability criteria are checked, and what role sustainability plays in value creation. |

⁵ Tasks of the GRI: Development of guidelines, quality improvement & standardisation of sustainable reporting. In 2016, the GRI G4 guidelines were further developed into Sustainability Reporting Standards (SRS).

5 Digitisation in the Finance Industry: Change in Banking

Banking is changing: The latest research confirms the growing and prospective influence of modern business models in the finance industry (Dorfleitner et al., 2017). As traditional companies and their industries slowly and ineffectively adapt to the modern changing markets, there is a high risk of disruption caused by new technologies and new competitive business models (Christensen et al., 2018).

According to Walter (2016, p. 17), the business models and day-to-day actions of today's financial intermediaries are determined by four main factors of influence, each with three sub-factors (*Technology*: Product & Solutions, Customer Interaction, Process & Info-management / *Customer*: Convenience, Performance, Price / *Market*: low interest, regulation, lack of consolidation / *Competition*: FinTechs, Banks, Non-Banks). Here, one assumes a pressure for change that is intense and diverse like never before. Furthermore, Walter (2016, p. 29) assumes an unprecedented speed of changes in the environment.

Technology – According to Moore's Law, as pioneered by Gordon Moore in 1965, a consistent doubling of complexity and technological sophistication can be achieved through a continual increase in the volume of information and data, the increase in storage capacity, and the use of microsensors and modern software with learning algorithms (Lanzerotti, 2006). Moore's Law is confirmed by the dynamics of the Internet. By combining technology and service, it is possible to realise the phenomenon of multi-channel distribution. Excluding the effects of the economic crisis of 2007, the number of branch offices has been falling since 1997: between 1997 and 2007, the number of bank branches in Germany fell from 66,764 to 42,110. By 2017, the number dropped by a further 10,161 to 31,949 branches (Deutsche Bundesbank, 2019, p. 104).

Customer – surveys show that the Internet, both stationary and mobile, is playing an increasingly important role to customers. This is reflected, on the one hand, in the rise in the number of general Internet users in Germany and, on the other hand, in the rising forecasts for mobile Internet usage. Furthermore, it can be observed that customers' Internet usage is continuously increasing across all user groups (ARD & ZDF-Onlinestudio, 2016) and the total population is ageing. In 2015, Germans aged 14 and over used the Internet for an average of 108 minutes a day, whereas in 2004 they used it for only 43 minutes per day - everyday user behaviour has more than doubled within a decade (Frees & Koch, 2015; Frees & Koch, 2016).

Market – The current period of low interest rates, fierce competition and ever-increasing regulatory impact e.g. Basel II and III for banks, are putting increasing pressure on financial intermediaries (Walter, 2016, p. 31). Basel II/III refers to the tightening of requirements and compliance with banks' limits, e.g. with regard to liquidity, credit and risk structures (Götzl, 2016, p. 5). Traditional bank business models are coming under pressure, not only as a result of the aforementioned regulations, but also due to the lack of regulation at FinTechs and additionally due to the current low interest rate phase.

Competition – The term "business model" has been established in strategic corporate planning since the 1990s and is now well-known in general. However, although the topic is often brought up, a generally accepted definition or a general structuring approach is missing from scientific and operational practice (Burkhart et al., 2011, p. 6; Bieger & Krysz, 2011, p. 1). Likewise, far from the legal classification of banks and insurers, there are many approaches to financial service definitions, with room for interpretation based on literacy that makes it difficult to write a universally valid, accepted, and comprehensive definition of FinTech business models. Furthermore, despite these first definitional approaches, there is no public registration of FinTechs, which makes a qualitative & quantitative determination of active companies impossible. Dorfleitner, Hornuf, Schmitt, & Weber (2017) first defined the Term FinTech - in general and in particular. Likewise, in an empirical analysis of 120 business models of predominantly German fintech start-ups operating in the business-to-consumer area, Gimpel, Rau & Röglinger (2016) identify eight types of business models for the first time.

It is very obvious that there is still an unknown change in banking, but some banks have already recognised it. Now they are trying to respond to that changing situation by establishing their own units and companies via accelerators and/or incubators to be part of the development of new business models and ideas from the beginning, so that they have a first mover advantage. In this context, accelerators speed up market interactions in order to help nascent startups and young companies to adapt quickly and learn, whereas incubators tend to nurture them by buffering them from the environment to give them room to grow. But so far there is still no straightforward, dominant business model, nor is there even a dominant 'technology, in the banking sector, or at least a strategy that guides banks through today's technological and strategic changes.

6 Methodology

This work is based on the sustainability reports which are freely available online via the DNK database. 140 banks, insurance companies, financial service providers' with >500 employees, and company headquarters across Germany can be identified through the database's selection options of industry, company headquarters, reporting year and number of employees. By further manual selection of banks alone, 135 reports for the years 2012-2017 are identifiable. $n = 114$ sustainability reports are finally considered for analysis purposes by focusing on the reporting period 2017 during which the law for non-financial reporting first became applicable. Because of maximum completeness of sustainability reports the analysis is focusing on the year 2017. Before 2017 only a few reports were available, which explains the rapid development of publications. In accordance with Christensen, McDonald, Altman, & Palmer (2018) and Zhao, Fisher, Lounsbury, & Miller (2017), the process of keyword analysis is methodically applied to search for selected terminologies in the relevant files. Through the work's thematic focus, the term 'digital' is searched for in the respective reports using the data analysis software MAXQDA (version 2018.02), and coded according to the DNK criteria and assigned for further analysis. To ensure the validity of the analysis and coding, the search is not case-sensitive, ensuring that all references to the search term are included in the analysis. In order to facilitate and simplify (future) content analyses, the whole sentence will be 'digitally' coded (as opposed to just the individual word references).

Based on the individual content reporting within the codex, a multiple regression analysis is performed based on the content analysis results, in which the sum of the 'digital' codes of each report is the dependent variable, and the respective individual sum of the 'digital' codes of the respective DNK criteria represents the independent variable. At this, the paper concentrates on strategic variables of the DNK. This quantitative part is performed using SPSS (version 25). In accordance to Shopiya (2018) the calculation formula of the regression function will be applied.

7 Results and Discussion of Findings

The analysis of the sustainability reports show 689 codes related to digitisation with regard to the keyword 'digital'. Due to the content assignment to the respective criteria, an information imbalance can be seen in the reports (see *Table 4*). Due to the methodical approach, the Gaussian distribution cannot be assumed for this model. *Table 4* below illustrates the respective characteristics. In the regression analysis, the results show a high coefficient of determination ($r^2 = 0.961$) and effect size ($r = 0.980$) – see *Table 2*. When taking all valid criteria into account,

the model accounts for a highly significant level of 96.1 percent of the variance of constants and only 3.9 percent of the deviation. All predictors show between high to very high significance levels of 0.01 and 0.05. Only criteria 1. *Strategy*, 15. *Equal Opportunities*, 18. *Corporate Citizenship*, and *General* do not conform to this level.

Table 2: Model Summary^b

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .980 ^a | 0.961 | 0.953 | 0.853 |

Source: Author's research

Table 3: ANOVA^b

| | Sum of Squares | df | Mean Square | F | Sig. |
|------------|----------------|-----|-------------|---------|-------------------|
| Regression | 1683.767 | 18 | 93.543 | 128.503 | .000 ^a |
| Residual | 69.155 | 95 | 0.728 | | |
| Total | 1752.921 | 113 | | | |

Source: Author's research

^a Predictors: (Constant), General, 10. Innovation and Product, 6. Rules and Processes, 3. Objectives, 2. Materiality, 18. Corporate Citizenship, 11. Usage of Natural Resources, 20. Conduct that Complies with the Law and Policy, 15. Equal Opportunities, 4. Depth of the Value Chain, 13. Climate-Relevant Emissions, 1. Strategy, 12. Resource Management, 16. Qualifications, 14. Employee Rights, 9. Stakeholder Engagement, 7. Control, 5. Responsibility.

^b Dependent Variable: Digital.

For verification of the present model using multiple regression analysis, application requirements which have been checked and fulfilled by the ANOVA analysis of variance (see *Table 3*) have to be fulfilled, with a highly significant value between the respective predictors. In addition to these requirements, the model has low multicollinearity (based on suspicion values; Tolerance <0.1 / VIF >10) of the individual variables, (see *Table 5*), which lie mostly between 0.801-0.847 for Tolerance values and 1.180-1.248 for VIF values for all significant strategy variables.

With regard to the previously mentioned research questions (1) and (2):

(1). Within the concept of sustainability, the awareness levels of the respective criteria show that banks are increasingly reporting on the criteria of 2. *Materiality* (172 codes), 3. *Objectives* (53 codes), and 4. *Depth of the Value Chain* (45 codes). However, in terms of digitisation, criteria 1. *Strategy* is neglected in the reports and given little consideration with 17 codings.

Table 4: Quantitative Content Analysis

| Code | Files per Coding | in Percent | in Percent (valid) | Number of Codings |
|-----------------------------|------------------|------------|--------------------|-------------------|
| 1. Strategy | 14 | 12.28 | 12.61 | 17 |
| 2. Materiality | 81 | 71.05 | 72.97 | 172 |
| 3. Objectives | 28 | 24.56 | 25.23 | 53 |
| 4. Depth of the Value Chain | 35 | 30.70 | 31.53 | 45 |
| 5. - 20. | ... | | | |
| Digital | 111 | 97.37 | 100.00 | 689 |
| Reports without Code(s) | 3 | 2.63 | - | |
| Reports with Code(s) | 111 | 97.37 | 100.00 | |
| Analysed Reports | 114 | 100.00 | - | |

Source: Author's research

(2): The Pearson Correlation (PCC) on the 'digital' constant is shown in *Table 5*. There are consistently positive linear relationships, but there are no strong uphill (positive) linear relationships (>0.7). The strongest PCC (0.373 and 0.345) are measurable for the DNK Criteria of 2. *Materiality* and 3. *Objectives*. These are followed by criteria 4. *Depth of the Value Chain* (PCC 0.213) and 1. *Strategy* (PCC 0.133). While the introductory quantitative content analysis illustrates the high dominance of criterion 2. *Materiality*, the results of the regression analysis suggest that its influence is still the highest in comparison to all other strategic criteria, however still not very high with a PCC of 0.373 and a standardized β of 0.328. Second highest β shows 3. *Objectives* (0.232) and third 4. *Depth of the Value Chain* (0.188). 1. *Strategy* is determined with the lowest influence (β 0.132).

Table 5: Regression Analysis

| | Coefficients ^b | | | | | | | | | | | | | |
|-----------------------------|---------------------------|--------------------|--------------------------------|---------------|----------------------------------|--------|-------|------------------------------------|----------------|----------------|-------------|-------|----------------------------|-------|
| | Pearson Correlation | Sig. (1-tailed) | Unstandardized Coefficients | | Standardize d Coefficients | t | Sig. | 95.0% Confidence Interval for B | | Correlations | | | Collinearity Statistics | |
| | | | B | Std. Error | Beta | | | Lower Bound | Upper Bound | Zero- order | Partia l | Part | Toleranc e | VIF |
| (Constant) Digital | 1.000 | | 0.149 | 0.158 | | 0.947 | 0.346 | -0.164 | 0.463 | | | | | |
| 1. Strategy | 0.133 | 0.079 | 1.167 | 0.201 | 0.132 | 5.802 | 0.000 | 0.768 | 1.566 | 0.133 | 0.512 | 0.118 | 0.801 | 1.248 |
| 2. Materiality | 0.373** | 0.000 | 0.835 | 0.056 | 0.328 | 14.823 | 0.000 | 0.723 | 0.947 | 0.373 | 0.836 | 0.302 | 0.847 | 1.180 |
| 3. Objectives | 0.345** | 0.000 | 0.950 | 0.091 | 0.232 | 10.465 | 0.000 | 0.770 | 1.130 | 0.345 | 0.732 | 0.213 | 0.847 | 1.181 |
| 4. Depth of the Value Chain | 0.213* | 0.011 | 1.082 | 0.130 | 0.188 | 8.326 | 0.000 | 0.824 | 1.340 | 0.213 | 0.649 | 0.170 | 0.810 | 1.234 |

** . Correlation is significant at the 0.01 level (1-tailed).

* . Correlation is significant at the 0.05 level (1-tailed).

Source: Author's research

^b Dependent Variable: Digital.

Conclusion

In summary, it can be noted that banks are reporting on digitisation within their reporting; however, not all DNK criteria receive equal amounts of attention. Rather, digitisation is a partial subject of reporting. When it comes to reporting obligations in the digital context, the banks particularly focus on the area of strategy in terms of *Materiality* and *Objectives*, and at the *Depth of the Value Chain*. Particularly noteworthy here is the fact that in comparison criteria *Strategy* is consistently barely taken into account; thus, important analysis methods on opportunities and risk with regard to sustainability development is not taken into account.

Further research should question why this imbalance exists in the context of the ‘digital’ topic and also what precipitates it. Approaches to (further) developing existing reporting standards which make comprehensive reporting of substantive matters mandatory and implementable should also be taken into account and examined. At the moment, only the reporting of content related to the respective criteria is recommended; however, using more detailed specifications, a higher degree of meaningful and comparable reporting could be achieved for stakeholders, and content-related individuality could be reduced. Further, future research should analyse the remaining 16 criteria. It should address why banks report, or do not report, certain content and explore which managerial influences justify this. Furthermore, business structures and geographic delineation of business models could also be taken into account.

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STATISTICAL APPROACH TO THE DETERMINATION OF NUMERICAL VALUES OF RISK-BENEFIT RATIO IN INVESTMENT PROCESSES

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Abstract

Purpose: The purpose of this study was to provide an investor with practical tools to assess probabilities and numerical values of the risk-benefit ratio in the investment process based on a statistical approach.

Design/methodology/approach: Methods of probability theory and mathematical statistics are used to describe the investment process. The components of this mathematical apparatus are adapted to represent the investment project. The developed practical approach to determining probabilities and the risk-benefit ratio based on the analysis of statistical materials reflecting the progress of capital investment projects over a five-year period should be considered as the methodological basis of a project management.

Findings: The main result is the approach to calculating the costs of an investor in the implementation of the investment project, taking into account probabilities of the risk-benefit ratio, which is appropriate to use in determining running costs of investing in projects.

Research/practical implications: The results of the study were piloted and put into practice in a number of organizations. This approach made it possible to assess statistic probabilities of overriding of running project costs over the planned initially by 1, 1.5 and 2 times. It ensures cost savings at all stages of the investment project by eliminating unjustified averaging of the design ratio that does not take into account the risk index depending on the type of objects. It is appropriate to use the described method of determining the risk-benefit ratio of the project in the practice of projects investing.

Originality/value: The study presented uses a unique set of calculated values and contributes to the expertise of investment management in an investor's decision-making. On the basis of the developed methodology an investor is offered a model project management scheme allowing for risk, a successfully operating software package has been developed in the object-oriented programming environment Delphi.

Keywords: Risk-Benefit Ratio, Investment Cycle Management System, Running Costs of an Investor, Planned Costs of an Investor

JEL Codes: B41, C15

Introduction

The purpose of this article is to create tools for investors to determine the statistical probability of exceeding the running costs of the project over the planned 1, 1.5 and 2 times. Hypothesis made: project outputs are analyzed and probabilities for 3 statistical risk-benefit ratio are determined: $C=1$ (running and planned costs are equal); $C=1.5$ (running costs exceed the planned ones by 1.5 times); $C=2$ (running costs exceed the planned ones by 2 times). The research contribution: on the basis of statistical data of projects implementation for over a 5-year period, using the methods of probability theory and grouping of project stages, the probabilities of these stages are calculated. Assumptions made: the entire extension of the project stages is divided into 3 levels of complete groups of events (macro, meta and micro). The corollary of the addition theorem and the multiplication theorem are used as methods.

Purposeful activities of an investor are associated with the solution of extreme problems, development of models for increase of efficiency of managing the investment portfolio (Nazarova, Levicheva 2017). The choice of investment decisions in real situations is made, as a rule, in a context of information asymmetry (Cherkasov, Dunyasheva, 2016), namely in the face of risk (if there are probabilities) or uncertainty (in their absence); in compliance with various restrictions determined by the specific content of the problem. When financing investment projects (Gazman, 2013), an investor always faces the dilemma of the “risk–benefit” ratio (Berzon, Volodin, 2010).

The lack of easy-to-use methods for risk assessment hampers economic activities of enterprises aimed at making a profit which is crucial for the economy development. In the conditions of market economy self-management at the level of economic entities of entrepreneurial activity is a necessary condition for the development of the enterprise economy. This can be achieved through the development and successful implementation of investment programs and projects, and the latter is difficult in the absence of risk management tools.

The issue of the investment risk has become particularly acute in research since 1950s; this trend is noted in Mertens’s paper (1997). In 1952 Markowitz introduced a theoretical concept and an economic-mathematical model of choosing an ideal portfolio structure. The theory of the portfolio was further developed by American scientists J. Tobin and W. Sharpe. This theory determines estimated return of the portfolio on the basis of income calculated per unit of the investment, without taking into account the degree of risk of the external environment.

Models and methods of solving conditional extreme problems, according to the study of the formation of risk science (Shakhnova, 1979), fall into two main directions of knowledge mathematization, namely: determinism and stochasticity.

In the first case, in order to derive a simple pattern of a complex phenomenon, there are several significant factors related by the precedence and sequence, and the rest are considered insignificant. The mathematical apparatus in this field are differential calculus (founders - Newton, Leibniz, etc.); the class of problems includes the problem of organized simplicity.

The stochastic approach is characterized with abstracting from the detailed description of individual manifestations of the phenomenon and the definition of its general trends. Mathematical apparatus here includes the theory of probability and mathematical statistics (the founders - Bernoulli, Laplace, Boltzmann, etc.), that with the help of probabilistic methods solve problems of unorganized complexity.

In accordance with these two directions the methods of estimation of uncertainty or risk of capital investment in the project are also divided into two groups: the first one has the deterministic approach to the analysis; the second one is based on the probabilistic distribution of the data.

The methods of the first group are mainly used by the government to decide on investments in the construction or operation of buildings. All methods give comparable results. They can be successfully applied under little changes in input data and cost indicators. In accordance with the review work of Pulko, Samolinov & Lyashenko (1989) a common disadvantage of these methods is that the best estimates of the input parameters are perceived as reliable, and the results are provided in deterministic indicators, i.e. the randomness of the process is not taken into account which is not acceptable in market conditions.

The second group of methods treats uncertainty and risk referring to the theory of probability only fragmentarily.

The disadvantage of the second group of methods is limited consideration of randomness while choosing investment policy. This can lead to distortion of the result or even to a fundamentally wrong decision.

Finally, the third group of methods makes it possible to estimate uncertainty and risk on the basis of the probability theory.

The probabilistic approach to the analysis of the investment situation is the most promising as it considers it in more detail and contributes to a sufficiently informed decision-making, so it is interesting to conduct a more detailed comparative analysis of the latter group of methods. Each of them has its advantages and disadvantages.

Thus, a comparative analysis of the methods of risk assessment of investment projects showed that none of them solves the problem in the range required by the investor, namely, does not allow calculating the excess cost of the project caused by the risk-benefit ratio. Most of them can be applied to a particular case of risk determination at different stages of an investment project.

1 Statistical approach to risk determination

The study is sequel to consideration of the problem of identifying the risk effects on the phases of the investment cycle. Refer to previous papers by Doroshenko M. (2017a, p. 56), (2017b, p. 35 – 38), (2017d, p. 48 – 52). Earlier the basic principles of developing a mathematical model of the investment cycle were considered, Doroshenko M. (2017c, p. 24 – 28).

Using the basic provisions of the mathematical model, the author proposed a number of formalized definitions, such as:

$$C = S_{run} / S_{pl}, \quad (1)$$

where C is the risk-benefit ratio;

S_{pl} – planned investments of an investor for the entire period of the investment cycle;

S_{run} – real costs of the investor for the entire period of the investment.

$$R = P(C > 1), \quad (2)$$

where R is the investor's risk when investing in the project;

P – probability.

$$C_{pl}^i(R) = S_{pl}^i(R) / S_{pl}, \quad (3)$$

where $C_{pl}^i(R)$ – planned risk-benefit ratio at the time of the investment process t^i

$S_{pl}^i(R)$ – permissible limit of the planned costs of the project at the time of the investment process t^i .

This causes a commonsensical question: “What is the nature of the C risk-benefit ratio?” It lies in the unpredictability of the investment environment. There is a problem: using the theory of random variables determine the distribution series $D(C)$ the intersection or complete stages of the random process $S_{pl}^i(R)$, i.e. C^i to determine (Tab. 1).

Tab. 1: P (C) distribution range at intersections or finished stages of random process

| | | | | | |
|-------|-------|-------|-----|-------|-------|
| C_1 | C_2 | C_3 | ... | C_i | C_P |
| P_1 | P_2 | P_3 | ... | P_i | P_n |

Source: Developed by the author

Or in our case indicated with Roman numbering I – X stages of investment project implementation (Tab. 2).

Tab. 2: A series of P (C) distributions over intersections or completed stages of a random process using Roman numbering

| | | | | | |
|-------|----------|-----------|-----|----------|-------|
| C^I | C^{II} | C^{III} | ... | C^{IX} | C^X |
| P^I | P^{II} | P^{III} | ... | P^{IX} | P^X |

Source: Developed by the author

Considering this problem in terms of practice, it is proposed to use the concept of the planned risk-benefit ratio $C_{pl}^i(R)$.

Statistical determination of the coefficient – through a survey of practicing investors – will make it possible to determine the distribution series mentioned above.

Next, you can define $D(C)$ when $C > 1$, and hence formulate different degrees of risk, for example:

$C > A$ – high risk;

$A \geq C > B$ – average risk;

$C \leq B$ – low risk.

In this way some classification is formulated $D(C)$.

It is desirable to determine the distribution function, that is:

$$F(C) = D(C < c), \tag{4}$$

But this is unlikely for such kind of random process with discrete moments of time, as noted by Wentzel, Ovcharov (2000) and, in practice, in the presence of a distribution series on which it is possible to construct the characteristics of the process, this is not necessary.

2 Determining risk-benefit ratio of the investment project on the basis of the statistical coefficient resulted from the analysis of the statistics of the investment projects' implementation for five years

To study the situation in the investment market data on projects reviewed at the City Planning Council of the Central Architectural and Planning Department (2018) for a 5-year period was analysed. These data allowed revealing the general picture on the phase I of the project cycle considered in this paper, namely the design phase. Also the data on the objects that received a building permit and were under the supervision of the City Architectural and Construction Control Office for a 5 year period were analysed. These data made the basis for the characteristics of phase II of the investment project, i.e. construction.

As noted above, the cost overrun, i.e. the excess of the running costs of the project over the planned ones, is taken as an indicator of the investor's risk. As the upper limit of the so-called reasonable risk the excess of S_{run} over S_{pl} equal to 2 is considered. Of course, in practice any overrun is possible (by three, five, ten times larger), but today in Russia there are very few investors who have enough assets and rational sense to successfully complete the project with a budget more than two times higher than the initial one. Therefore, in the author's opinion, it is not advisable to raise the limit of reasonable risk above 2, particularly as the calculation mechanism is not tied to this figure, and in further studies this point of view can be revised. Ideal for the investor is the case when the running costs are equal to the planned, and the risk-benefit ratio is equal to one. Thus, the boundaries of the study of the statistical risk-benefit ratio is the interval $C = [1,2]$. The collected statistics did not contain any information about the size, degree, and percentage of the dangerous excess of the investor's costs, so the third value of the risk factor had to be taken as the arithmetic mean of the allocated interval 1.5. When collection of more informative statistics and access to it is established in Russia, it will be possible to transform the proposed algorithm into new values.

Each value of the risk-benefit ratio will be set in accordance with a certain result of the progress of the project (protection for the preliminary design, project, working design; commissioning). The approach of fuzzy sets is used here to some extent, when in the absence of complete information about objects, for differentiation they are assigned labels ($C=1, 1.5, 2$) classes.

For each of the three values of the statistical risk-benefit ratio, statistical probabilities of occurrence are determined. In formula 1, the risk-benefit ratio K is a random variable, so its

probability will determine the probability of the total value of running costs (S_{run}). The main objective of the statistical approach is to determine the probability of occurrence (S_{run}), i.e. the excess of running costs over planned costs by 1, 1.5, and 2 times.

Thus, to solve the problem it is necessary to calculate the probabilities P_S^j for the risk-benefit ratio in the stages $C_{(s)(St)}^j$, which can take three values $C_{(s)(St)}^{j,1} = 1$, $C_{(s)(St)}^{j,2} = 1.5$, $C_{(s)(St)}^{j,3} = 2$, for each j^{th} stage.

The investment project is decomposed into 2 phases and 10 stages. Phase I, designing, includes 8 stages and 130 works, phase II, construction, – 2 stages and 40 works.

For phase I (designing) each coefficient value will be adjusted to a certain result of the critical design review at the City Planning Council, namely:

$C_{(s)(St)}^{j,1} = 1$, if the project is accepted at the first attempt as is;

$C_{(s)(St)}^{j,2} = 1.5$ if the project is accepted with comments (additional costs are required to eliminate them) or if the project is not accepted at the first attempt (costs are required to adjust the project and pay for the relevant services);

$C_{(s)(St)}^{j,3} = 2$ if the project is not accepted. Significant revision of the project is required; the investor's costs will be exceeded at least twice. More than twofold overrun is considered by the author as inappropriate for discussion in this paper.

P_S^j – the probability is statistical, determined by relative frequencies, as the number of projects in which the elementary outcome of the review at the City Planning Council (event 1, 2 or 3 of the adoption $C_{(s)(St)}^j$ of a specific value) occurred, related to the total number of projects considered. Taking into account the large number of projects having been analyzed, it can be concluded that the statistical probability, in this case, is close to mathematical. For example: in total, the material on 174 projects of construction of residential facilities was collected. The number of projects with a risk-benefit ratio $C_{(s)(St)}^{j,1} = 1$ is 112. So the desired possibility is $P_S^j = 112/174 = 0.64$.

For the purposes of this task the author considers the systematization of statistics adequate and deliberately does not display the final values of the probabilities P_S^j of the risk-benefit ratio at the stage $C_{(s)(St)}^j$ from I to X. In view of the diversity of specific projects, the software package will include entire probability tables P_S^j and may need to be further refined

for specific projects. Each investment object is unique to some extent. It is impossible to create a package of probabilities for the universal project. What is important is the general method developed here for determining the probabilities, coefficients, and through them the values of investments that can change their values from project to project.

Thus, the author introduces the algorithm for calculating investor's running costs with the respect to the project:

Step 1. The investor should provide calculated values of the planned costs $S_{pl(e)}^j$, for all stages of the project.

Step 2. According to the type of the object under construction (residential, public, industrial) and the size of the total area in square meters, select the probability values P_S^j for each of the three risk-benefit ratios $C_{st}=1, 1.5$ and 2 for all stages of the project.

Step 3. Determine the value of the investor's running costs at the stage $S_{pl(e)}^j$: Therefore investor's running costs at the stage statistics $S_{run(e)(st)}^j$ on the basis of the risk-benefit ratio at the stage $C_{(e)(st)}^j$ obtained with statistical means, according to the formula (5) are equal:

$$S_{run(e)(st)}^j = S_{pl(e)(st)}^j C_{(e)(st)}^j \quad (5)$$

Step 4. Determine the value of the running costs of the investor over a cross section $S_{run(s)}^j$: Therefore investor's running costs on the section statistical $S_{run(s)(st)}^j$ on the basis of the running costs at the stage of statistical $S_{run(e)(st)}^j$ by the formula (6) for three values $C_{(s)(st)}^j = 1, 1.5$ and 2 are equal:

$$S_{run(s)(st)}^j = \sum_{j=1}^m S_{run(e)(st)}^j \quad (6)$$

Step 5. Determine the probability $P_{S(e)(st)}^j$ of occurrence of running costs $S_{run(e)(st)}^j$ at each stage.

Step 6. Estimate the probability $P_{S(e)(st)}^j$ of occurrence of running costs $S_{run(e)(st)}^j$ at each stage.

In the paper there are no formulas for calculating probabilities of occurrence of running costs used at the 6th and 7th steps of the algorithm, due to the awkwardness of their development: Suffice it to say that assessment of probabilities is based on the division of the project components into complete groups of events of three levels. The volume of the paper

does not allow us to give an empirical example of calculating the investor's running costs for all 10 stages of the project.

On the basis of the algorithm described above, a successfully operating software package has been developed in the object-oriented programming environment Delphi. This software product clarifies calculation of the investor's planned costs (by adjusting them to the risk-benefit ratio) and thus the latter can see the most likely ratio of profits and losses on the project as early as the planning stage.

Conclusion

The developed practical approach to determining the risk-benefit ratio based on the analysis of statistical materials reflecting the progress of investment projects over a five-year period should be considered the methodological basis of project management. On the basis of the developed methodology an investor is offered a risk-based project management procedure. Experimental verification and implementation of research results in the practice of individual firms allowed: 1) to ensure cost savings at all stages of the investment project by eliminating the unjustified averaging of the calculated coefficients that do not take into account the risk index depending on the types of objects; 2) to reduce the time and improve the quality of the project; 3) to increase the volume of construction and installation works performed by 18.3%, while reducing their cost by an average of 3.2%. The described method of determining the risk-benefit ratio of the project is advisable to use in the practice of investment design.

An advantage of the approach outlined in the article is as follows: it can help an investor determine the amount of running costs starting from the planning stage on the basis of calculations of probabilities of the risk-benefit ratio, and thus provide for the amount of reserve funds to compensate for the effects of risk on the project, and form a list of preventive and compensatory actions that will be implemented in the event of risk situations. Thus, the proposed approach can reduce the detrimental impact of risk on the project. Disadvantages of the approach include necessity of collecting and keeping a great amount of statistical data essential to calculating statistical probabilities for risk events implementation upon the project

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ENTREPRENEURIAL ACTIVITY IN SLOVAKIA: SELECTED REGIONAL ASPECTS AND THE ROLE OF GOVERNMENTAL ENVIRONMENT

Ondřej Dvouletý – Anna Pilková – Juraj Mikuš – Miroslava Rimská

Abstract

Purpose: The main aim of our study was to contribute to this increasing body of the regional entrepreneurship literature by a better understanding of the regional entrepreneurial activity in Slovakia as an example of post-communist economy.

Design/methodology/approach: We exploit the existing measures of entrepreneurship from Global Entrepreneurship Monitor and Statistical Office of the Slovak Republic, and we explore the inter-regional differences in the levels of entrepreneurial activity among eight Slovak NUTS 3 regions during years 2011-2015. We also employ the multivariate regression models and empirically investigate the relationship between the business environment and entrepreneurial activity in Slovakia.

Findings: The average engagement in entrepreneurship in Slovakia was during the analysed period 16-18% of the economically active population depending on the measure used. The results of multivariate regression models have shown that the overall improvement of the general business environment positively influences the levels of entrepreneurship in Slovakia

Research/practical implications: We believe that such an observation may serve as an encouragement for the further efforts invested in improving business conditions for the established and new Slovak entrepreneurs. We also encourage future researchers to study further other location factors of entrepreneurial activity such as cultural, logistic and socioeconomic variables. Future research might also address the role of entrepreneurial infrastructure and public entrepreneurship and SME policies.

Originality/value: The presented study empirically contributes to the body of knowledge on the regional entrepreneurship and the conducted approach towards quantification of the entrepreneurial activity might serve as an inspiration for other scholars.

Keywords: Regional Entrepreneurship, Business Activity, Barriers of Entrepreneurship, Governmental Environment, Global Entrepreneurship Monitor, Slovakia

JEL Codes: M2, M1, L260

Introduction

The determinants of entrepreneurial activity in a cross-country setting have been previously studied all over again (e. g. Roman et al., 2018). Researchers are thus lowering-down the levels of empirical analysis, and they study location factors of entrepreneurial activity at regional, municipal and city levels (e. g. Wyrwich and Fritsch, 2016; Audretsch et al., 2015; Glaeser et al., 2010). Such a shift is among other reasons important also due to a long-term policy goal to boost the establishment of regional entrepreneurship ecosystems (Dvouletý, 2017a).

Although the literature is slowly growing, there are still many countries and regions that have not been explored yet. One of the regions that have not been studied extensively are the post-communist economies which have experienced the process of economic transformation in the early 90s (Dvouletý, 2019; Dvouletý, 2017a; Holienka et al., 2016). We aim to enrich the body of regional entrepreneurship literature by studying regional entrepreneurial activity in Slovakia as a representative of this group of transition economies located in Central Europe.

To reach our goal, we exploit the existing measures of entrepreneurship from Global Entrepreneurship Monitor (2018) and the Statistical Office of the Slovak Republic (2018) during years 2011-2015 and we explore the inter-regional differences in the levels of entrepreneurial activity among Slovak NUTS 3 regions. After that, we investigate the relationship between governmental institutions and the level of regional entrepreneurial activity with the help of multivariate regression models. We believe that the presented findings might be interesting for both regional entrepreneurship scholars and local policymakers.

The rest of the paper is structured as follows. First, we calculate several measures of regional entrepreneurial activity in Slovakia and discuss the regional differences in the rates of entrepreneurship. Second, we describe the determinants of entrepreneurship and the role of government in shaping entrepreneurship in the context of the collected dataset. In the third section, we use the multivariate regression models and empirically investigate the relationship between the business environment and entrepreneurial activity in Slovakia. Finally, we discuss the main findings, and we offer suggestions for future research.

1 Regional Aspects of Entrepreneurship in Slovakia

To explore the regional entrepreneurial activity in Slovakia, we need to consider the established historical geographic regions - Fritsch and Wyrwich's (2014) long-term persistence in regional development - and the structural differences (disparities) among them. According to the Statistical Office of the Slovak Republic (2018), the country is divided into eight larger –

NUTS 3 - regions and into seventy-nine smaller – LAU 1 – regions. Audretsch et al. (2015) recommend studying entrepreneurial activity at the lowest possible levels to discover the interregional patterns in entrepreneurship.

Nevertheless, we also need to have in our minds that once we lower-down the level of analysis, there are usually many data limitations depending on the approach we choose. Entrepreneurship scholars have been studying various ways and measures of entrepreneurial activity for a long time. Those established in the literature have been recently reviewed by Dvouletý (2018) or earlier by Stenholm et al. (2013) and Iversen et al. (2007). Two most common approaches towards the calculation of entrepreneurial activity include survey-based measures (e. g. from Labour Force Survey or Global Entrepreneurship Monitor) and measures deduced from the national structural business statistics. Each of the approaches towards measuring entrepreneurship has its advantages and disadvantages. Power and reliability of the survey data is given by the initial sample size which is often limiting the extrapolation of the data on the lower administrative units. On the other hand, data from the business registers do not contain the early-stage entrepreneurial activity and they may also contain the businesses which are no longer active. Empirical scholars (e. g. Dvouletý, 2018; Stenholm et al., 2013; Iversen et al., 2007) thus usually recommend using multiple measures of entrepreneurship.

Having this recommendation in our minds, we exploit the survey data from the Global Entrepreneurship Monitor (2018) and the official business statistics from the Statistical Office of the Slovak Republic (2018). We use two most common measures from the Global Entrepreneurship Monitor (GEM) - *Established Business Ownership Rate*⁹ (EBOR) and *Total Early-Stage Entrepreneurial Activity*¹⁰ (TEA). Summing-up the former two indicators might roughly correspond with the overall GEM level of entrepreneurial activity. The third indicator of the regional entrepreneurship rate is calculated from the structural business statistics, and it accounts for the percentage rate of the registered business activity per economically active population. Due to the data availability, we use data from years 2011-2015 and given the sample size of the GEM survey data, we study entrepreneurial activity at the NUTS 3 level as it was also done in the previous studies (e. g. Dvouletý, 2017a; Bosma, 2011).

⁹ Established Business Ownership Rate (EBOR) measures “% of 18–64 population who are currently an owner-manager of an established business, i.e., owning and managing a running business that has paid salaries, wages, or any other payments to the owners for more than 42 months”, Global Entrepreneurship Monitor, 2018.

¹⁰ Total Early-Stage Entrepreneurial Activity (TEA) measures “% of 18–64 population who are either a nascent entrepreneur or owner-manager of a new business”, Global Entrepreneurship Monitor, 2018.

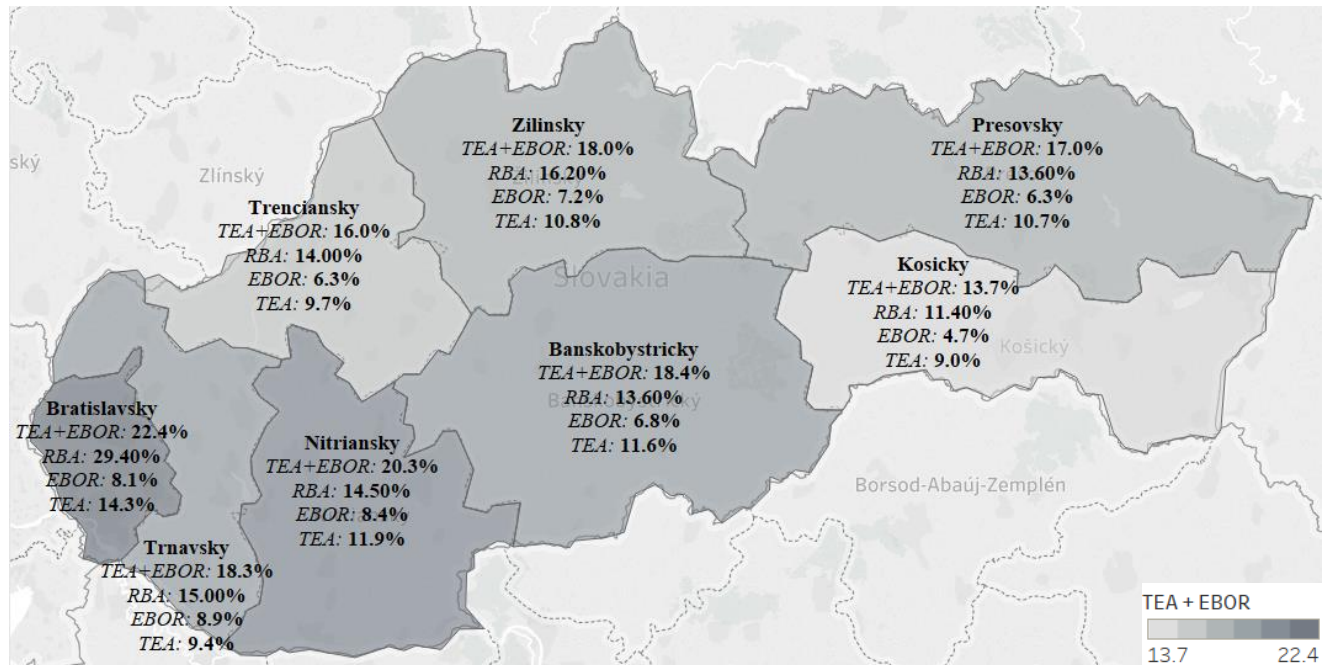
First, we plot all four indicators on the following Figure 1, to show the average entrepreneurial activity in the eight Slovak NUTS 3 regions. If we sum-up both measures of GEM and compare the total with the rate of registered business activity, we may surprisingly find not such high differences between these two measures of entrepreneurship. The average rate of entrepreneurial activity during years 2011-2015 was according to Global Entrepreneurship Monitor (2018) 18%, and according to the structural business statistics (Statistical Office of the Slovak Republic, 2018) 16%. The similarity of measures was also empirically supported by the positive and statistically significant values of the bivariate correlation coefficients (*Sum of TEA+EBOR* and *Rate of Registered Businesses*: 0.5; *TEA* and *EBOR*: 0.6; *TEA* and *Rate of Registered Businesses*: 0.5; *EBOR* and *Rate of Registered Businesses*: 0.3).

Although the presented measures in Figure 1 slightly differ in the order of the regions when it comes to the level of entrepreneurial activity (ANOVA's p-value < 0.05), both indicators representing the overall level of activity (*Sum of TEA+EBOR* and *Rate of Registered Businesses*) reveal, that the highest level of entrepreneurial activity in Slovakia is concentrated in Bratislava region, and the lowest in Kosice region. This information is true also when we compare both GEM indicators separately.

According to Pilková, et al. (2017) in these regions are also interesting findings related to inclusive entrepreneurship which means the engagement of less represented groups of the population in entrepreneurship (women, seniors, youth). Bratislava region together with Trnava and Nitra regions belong to the most economically developed and most urbanised once (in terms of highest GDP per capita, average income, and lowest unemployment rate). These regions are characterized by the highest inclusivity of female entrepreneurship, lowest inclusivity rates of seniors and youth. Thus, it seems that economically sound regional environment encourages and pulls more female to start engagement in business activities. We might also expect that within such context, opportunity motives shall prevail necessity-driven efforts. On the contrary, economic power creates increased employment opportunities (concerning diversity in economic activities and incomes) that might attract more young people to become employees instead of starting their own business, compared to economically less developed regions. Kosice region, together with Banska Bystrica, Zilina and Presov regions have the lowest GDP per capita and highest unemployment rate. Moreover, they are characterised by a pattern where inclusivity of youth is the highest, followed by inclusivity of female populations and seniors. These arguments support an assumption that the economic development of regions influences the overall levels of entrepreneurial activity, and it

determines its overall structure (e. g. shares of necessity, opportunity and inclusive entrepreneurship).

Fig. 1: Indicators of Regional Entrepreneurial Activity in Slovakia over years 2011-2015



Notes: *RBA* - Rate of Registered Business Activity; *EBOR* - Established Business Ownership Rate; *TEA* - Total Early-Stage Entrepreneurial Activity; *TEA+EBOR* - Sum of TEA and EBOR
 Source: Tableau, author's elaboration of the data from Global Entrepreneurship Monitor (2018) and Statistical Office of the Slovak Republic (2018)

2 Empirical Approach and Data

There are many reasons, why some regions may have higher rates of entrepreneurship compared to others. Besides the long-term path-dependence of the entrepreneurship rate (Wyrwich and Fritsch, 2016), there are factors and variables that influence the levels of entrepreneurial activity. Scholars studying determinants of entrepreneurship usually classify them into several categories. According to Roman et al. (2018) and Dvouletý (2017b), location factors of entrepreneurial activity include among others economic variables (e. g. gross domestic product, unemployment rate), institutional and governmental environment (e. g. barriers of entrepreneurship, corruption), R&D and innovation efforts (e. g. intensity of R&D investments, density of institutions), cultural, logistic and socioeconomic variables (e. g. educational structure of the population, status of entrepreneurs, fear of failure, traffic infrastructure) and public entrepreneurship and SME policies (e. g. grants, entrepreneurial infrastructure).

The relationships between location factors of entrepreneurship and the level of activity are usually empirically analysed through the multivariate regression analysis (Roman et al., 2018). We aim to study determinants of entrepreneurial activity in Slovakia following this empirical approach. Given the former socialist history of this transition economy, changing business environment and the long-term negative attitudes of entrepreneurs towards the Slovak entrepreneurship environment (see e. g. Belás et al., 2015, Pilková et al. 2017) we would like to particularly focus on the role of governmental institutions in shaping Slovak entrepreneurial activity.

Inspired by the previous literature (e. g. Roman et al., 2018; Dvouletý, 2017), we assume that improvement of business environment was positively associated with the level of entrepreneurship. We measure development of entrepreneurship environment by the two variables; business freedom index collected from Heritage Foundation (2018) and by the World Bank’s (2018) Doing business statistics measuring the number of procedures needed to establish a new business company.

We also control for the other determinants of entrepreneurial activity, such as unemployment rate and share of economically active population (15-64) which were obtained from the World Bank’s (2018) database. We also include fear of failure rate obtained from the Global Entrepreneurship Monitor (2018) to control for the risk attitudes of those who see good opportunities to start a business in the region where they live.

Our data have been formed into a panel of eight Slovak NUTS 3 regions over years 2011-2015 and summary statistics for all variables are presented in the following Table 1.

Tab. 1: Summary Statistics (Years 2011-2015)

| Variable | Mean | SE | Min | Max | Observations (N) |
|---|-------------|-----------|------------|------------|-------------------------|
| <i>Total Early-Stage Entrepreneurial Activity (TEA)</i> | 10.9 | 2.6 | 6.8 | 16.8 | 40 |
| <i>Established Business Ownership Rate (EBOR)</i> | 7.1 | 2.4 | 3.1 | 12.0 | 40 |
| <i>Rate of Registered Business Activity</i> | 16.0 | 5.4 | 10.1 | 31.4 | 40 |
| <i>Unemployment Rate (%)</i> | 13.1 | 4.4 | 5.6 | 19.7 | 40 |
| <i>Share Population (15-64)</i> | 71.2 | 1.0 | 68.9 | 73.0 | 40 |
| <i>Procedures to Start Business</i> | 7.4 | 0.5 | 7.0 | 8.0 | 40 |
| <i>Fear of Failure (GEM)</i> | 47.2 | 4.1 | 35.5 | 57.0 | 40 |

Source: STATA 14, author’s elaboration of the data from Global Entrepreneurship Monitor (2018) and Statistical Office of the Slovak Republic (2018)

3 Results

We follow the described empirical approach, and we estimate multivariate regression models with the aim to explore the relationship between Slovak governmental environment and the regional levels of entrepreneurial activity. We use the three measures of entrepreneurial activity to increase robustness of our results. Nevertheless, we must honestly admit that our analysis is limited by the number of observations we have (N=40).

We estimated all models in STATA 14 software and all panel regressions were estimated with the robust standard errors to avoid problems of heteroscedasticity and autocorrelation. We also check the level of collinearity with the help of Variance Inflation Factors (VIF) test and we conclude that there is no multicollinearity in the presented models. Finally, we use region and year fixed effects to control for the remaining sources of heterogeneity in our data (Wooldridge, 2010). The estimated models were found to be statistically significant (F-test), and we present them in Table 2.

First, it is worth mentioning that besides the control variable representing share of economically active population, all variables indicate the same direction of impact on all measures of entrepreneurship which can be considered as a good sign. Second, given the number of observations, it is not surprising that there are also insignificant variables in the regression estimates. This was true especially for the control variables. However, we focus in our interpretation on the role of governmental institutions. Both variables representing the governmental environment (*Procedures to Start Business* and *Business Freedom Index*) were found to be statistically significant. The variable measuring the number of procedures needed to start a business indicates that with the decreasing number of procedures, the overall entrepreneurial activity increased. Business Freedom Index corresponds with the former finding and it shows that higher business freedom was also positively associated with the higher levels of entrepreneurial activity.

These results together indicate that efforts invested into the improvement of the general business environment may positively influence the levels of entrepreneurship in Slovakia. Moreover, such an observation is in line with the previous literature on the determinants of entrepreneurial activity (e. g. Roman et al., 2018; Dvouletý, 2017a).

Tab. 2: Regression Results: Determinants of Regional Entrepreneurial Activity in Slovakia over years 2011-2015

| Model Number | (1) | (2) | (3) | (4) | (5) | (6) |
|-------------------------------------|---------------------|---------------------|----------------------|----------------------|--------------------------------------|----------------------|
| Independent / Dependent Variable | <i>EBOR (GEM)</i> | | <i>TEA (GEM)</i> | | <i>Rate of Registered Businesses</i> | |
| <i>Unemployment Rate</i> | -0.286 (0.237) | -0.286 (0.297) | -0.236 (0.508) | -0.236 (0.484) | -0.121 (0.124) | -0.121 (0.0704) |
| <i>Share Population (15-64)</i> | -0.444 (0.534) | -0.444 (1.168) | 0.325 (0.570) | 0.325 (1.189) | -0.303 (0.564) | -0.303 (0.949) |
| <i>Procedures to Start Business</i> | -5.387** (1.776) | | -4.492** (1.557) | | -2.229* (1.080) | |
| <i>Business Freedom Index</i> | | 1.418* (0.691) | | 1.182† (0.638) | | 0.587† (0.337) |
| <i>Fear of Failure (GEM)</i> | -0.149* (0.0718) | -0.149† (0.0848) | -0.00511 (0.0896) | -0.00511 (0.0821) | -0.00317 (0.0296) | -0.00317 (0.0259) |
| <i>Constant</i> | 87.97 (47.90) | -53.81 (41.95) | 27.43 (47.44) | -90.78 (52.32) | 67.60 (47.34) | 8.935 (43.85) |
| Regional Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Year Dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Observations | 40 | 40 | 40 | 40 | 40 | 40 |
| <i>R</i> ² | 0.704 | 0.704 | 0.796 | 0.796 | 0.995 | 0.995 |
| Adjusted <i>R</i> ² | 0.538 | 0.538 | 0.681 | 0.681 | 0.993 | 0.993 |
| <i>AIC</i> | 150.9 | 152.9 | 140.6 | 142.6 | 50.15 | 46.15 |
| <i>BIC</i> | 164.4 | 168.1 | 152.4 | 156.1 | 65.35 | 57.97 |

Notes: Models were estimated with robust standard errors. Estimated models include fixed effects for years and regions. Standard errors are reported in parentheses.

Statistical significance: † $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Source: STATA 14, author's elaboration of the data from Global Entrepreneurship Monitor (2018) and Statistical Office of the Slovak Republic (2018)

Conclusion

The recent trend in the literature aiming to map patterns in the levels of entrepreneurial activity has shifted from cross-country studies towards studies conducted at regional, municipal and city levels. Such a shift brings many empirical challenges, especially when it comes to the availability of the data at the lower administration units. The main aim of our study was to contribute to this increasing body of the literature by a better understanding of the regional entrepreneurial activity in Slovakia during years 2011-2015.

We have exploited the existing measures of entrepreneurship from Global Entrepreneurship Monitor (2018) and the Statistical Office of the Slovak Republic (2018), and we have explored the inter-regional differences in the levels of entrepreneurial activity among Slovak NUTS 3 regions. We show that the highest level of entrepreneurial activity in Slovakia is concentrated in Bratislava region and the lowest in Kosice region. The average engagement in entrepreneurship in Slovakia was during the analysed period 16-18% of economically active population depending on the measure used, which corresponds with the earlier findings of Pilková et al. (2012) who claim that the overall activity in Slovakia is above the European average.

Building on the initial findings, we have further explored the relationship between the Slovak entrepreneurship environment and the level of entrepreneurial activity. The results of multivariate regression models have shown that the overall improvement of the general business environment positively influences the levels of entrepreneurship in Slovakia. We believe that such an observation may serve as an encouragement for the further efforts invested in improving business conditions for the established and new Slovak entrepreneurs.

Although our study has introduced measures and way how to study the regional aspects of entrepreneurship, our empirical analysis is limited by the available data. We would like to encourage future researchers to further study other location factors entrepreneurial activity by including the role of other potential determinants of entrepreneurship, represented by cultural, logistic and socioeconomic variables. Future research might also address the role of entrepreneurial infrastructure (incubators, science parks and accelerators), and public entrepreneurship and SME policies.

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FORECAST OF INVESTMENT FINANCING IN RUSSIA IN TERMS OF FUNDING SOURCES

Valentina Edronova – Daria Maslakova

Abstract

Purpose: the aim of the study is to develop recommendations for assessing the state of investments financing into fixed assets at the regional levels on the basis of differentiation of sources of funds.

Design/methodology/approach: a general scientific system approach to the study of the phenomenon, econometric and statistical methods for leveling time series, their analytical smoothing, as well as an extrapolation method were used as the methodological base of the study. The empirical base of the study was the official statistics and calculated data obtained by the authors. Taken together, these research methods ensured the reliability of economic analysis and the validity of the conclusions formulated in the paper.

Findings: the proposed methods for analyzing trends and forecasting the volume of investments based on structured approach to investment financing sources allow analyzing the role of each source in the dynamics of investment financing, identifying sources with growth potential and negative dynamics, and evaluating the role of a particular source. Analysis of the quality of forecasts for the federal districts indicates sufficient forecast accuracy and the possibility of its use in strategic planning of the socio-economic development of the region.

Research/practical implications: the authors proposed a new approach to forecasting investment financing, based on differentiating sources of funds.

Originality/value: in contrast to the approaches adopted in the Russian practice of forecasting, focused on the integrated forecasting of investments by types of financing (own, state, loan), the author's approach ensures the formation of the forecast in the context of sources of different types of financing for each region. The results can be used by experts and specialists in investment strategic planning, in the development of strategic and current investment plans in the region.

Keywords: Investment Financing, Finance Sources, Analysis of Tendencies, Forecasting

JEL Codes: E22, P33, R58

Introduction

Growth of investments is a major component of national and regional social and economic development. Increase in the volume of investment financing means the extension of the resource component of the national, regional and municipal development programs (Petrov, 2012).

The amounts of investment financing, must be given with regard to a number of principles, the most important of which are the following: integration of principles and methods (; succession and continuity of planning; balance; transparency; objectivity and feasibility (Nývltová, 2007); veracity; flexibility and adaptation to changes; compatibility and structuring of the initial data, their legal relevance.

1 The approaches to the investment forecasting

There are different approaches to the amounts of investment finance. investment forecast are in practice, offer the method , based on calculating analytical and average time series figures (chain growth rate, build-up rate, absolute value of 1% increment, average series level, average absolute increment, average rate of growth and increment). The limits of the approach in question is that forecasts are given for a year in advance only, and it is based on a small volume of retrospective data of two previous years (Turygin, 2016).

The method of exponential smoothing, when the levels of the initial time series are weighed by a moving average with exponential character of the weight changes. Retrospective data are taken on a quarterly basis for the period of 7 years, which is done to show up the investment seasonality. In this case, the forecast is made in accordance with the total investment volume without regard to the contribution of this or that source of fund. Unfortunately, there is no assessment of the forecast accuracy either (Dantas & Cyrino, 2018).

A more complex multifactor model for the investment forecast is used at the Ministry of Economic Development and Trade. The investments in fixed capital are calculated as a sum of four components, the major of which is oil price. At the Institute of National Economy of the Russian Academy of Sciences the investment volume is calculated with regard to inter-industry models. In forecasts the investments are divided into productive and non-productive and with regard to the kinds of activity but in accordance with the sources of fund (Salehi, Dashtbayaz, Bahrami and Mosallapour, 2015).

Analysis of the available approaches to the investment forecasting enables to conclude that there is actually lack of study of trends in individual fund sources (Kislingerová, 2010).

Hence, there is a need to create the methods giving the possibility to implement a structured in terms of fund sources approach to studying the appearing trends in the amount of financing and to their forecasting (Berezinskaya and Vedev, 2014).

2 Methods of analyzing the trends and forecasting the finance amount

Methods of analyzing the trends and forecasting the finance amount of the regional investments based on the structured approach must include the following stages:

- selecting and preparing the initial database and time span during which time series of actual levels are studied;
- selecting the method of equalizing initial time series and the function of theoretical curves;
- giving the equations of theoretical curves of the investment behavior with regard to the sources of investment financing;
- calculating approximation errors;
- forecasting the application of theoretical levels and updating empirical data.

To make a table of the initial data, it is necessary to perform the following calculations: calculation of the investment volumes in value terms on the basis of the index “total investments” and “share of the source in the total investment volume” and in accordance with own funds, bank credits, public fund. Other sources are calculated as the difference between the total investment volume and the sum of own funds, bank credits and public funds (Ivleva, and Komarevtseva, 2014)

The selection of a time span for building theoretical curves is conditioned by the availability of the relevant official information: 2010-2016.

Table 1 gives the results of preparing the initial data on the example of the official statistic information in federal districts.

Tab. 1: Initial data for constructing the equations of theoretical levels in federal districts, bln.rub.

| Federal districts and sources of fund | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Central | | | | | | | |
| Total investments | 2099.8 | 2458.3 | 2961.6 | 3331.6 | 3570.4 | 3578.2 | 3795.4 |
| Own funds | 827.3 | 1032.5 | 1389.0 | 1469.2 | 1592.4 | 1710.4 | 1867.3 |
| Bank credits | 218.4 | 243.4 | 313.9 | 366.5 | 382.0 | 361.4 | 375.7 |
| Public funds | 491.3 | 594.9 | 610.1 | 866.2 | 899.7 | 833.7 | 891.9 |
| Other funds | 562.8 | 617.5 | 648.6 | 629.7 | 696.3 | 672.7 | 660.5 |
| North-West | | | | | | | |
| Total investments | 1134.4 | 1330.0 | 1485.4 | 1416.1 | 1406.4 | 1437.5 | 1742.4 |
| Own funds | 327.8 | 401.7 | 481.3 | 574.9 | 613.2 | 892.9 | 902.6 |
| Bank credits | 128.2 | 118.4 | 89.1 | 144.4 | 101.3 | 69.0 | 62.7 |
| Public funds | 228.0 | 227.4 | 227.3 | 260.6 | 298.2 | 330.6 | 322.3 |
| Other funds | 450.4 | 582.5 | 687.7 | 436.2 | 393.7 | 345.0 | 454.8 |
| South | | | | | | | |
| Total investments | 908.0 | 1079.3 | 1255.0 | 1506.0 | 1383.7 | 1296.2 | 1152.8 |
| Own funds | 304.2 | 480.3 | 550.9 | 522.6 | 449.7 | 451.1 | 442.7 |
| Bank credits | 77.2 | 107.9 | 94.1 | 135.5 | 236.6 | 106.3 | 88.8 |
| Public funds | 170.2 | 210.5 | 254.8 | 314.8 | 156.4 | 204.8 | 317.0 |
| Other funds | 350.4 | 280.6 | 355.2 | 533.1 | 541.0 | 534.0 | 304.3 |
| North-Caucasus | | | | | | | |
| Total investments | 313.4 | 347.5 | 402.8 | 445.9 | 494.3 | 475.9 | 486.0 |
| Own funds | 90.3 | 95.2 | 105.1 | 128.0 | 152.2 | 180.8 | 173.5 |
| Bank credits | 36.0 | 30.9 | 23.0 | 52.2 | 48.4 | 23.3 | 35.5 |
| Public funds | 129.4 | 164.0 | 195.0 | 182.8 | 183.9 | 195.1 | 188.6 |
| Other funds | 57.7 | 57.4 | 79.7 | 82.9 | 109.8 | 76.6 | 88.4 |
| Volga Region | | | | | | | |
| Total investments | 1437.5 | 1702.5 | 2012.9 | 2301.3 | 2338.3 | 2463.3 | 2438.1 |
| Own funds | 665.6 | 813.8 | 978.3 | 1159.9 | 1237.0 | 1421.3 | 1216.6 |
| Bank credits | 172.5 | 154.9 | 221.4 | 296.9 | 313.3 | 295.6 | 217.0 |
| Public funds | 264.5 | 311.6 | 376.4 | 368.2 | 301.6 | 307.9 | 497.4 |
| Other funds | 334.9 | 422.2 | 436.8 | 476.3 | 486.4 | 438.5 | 507.1 |
| Urals | | | | | | | |
| Total investments | 1490.8 | 1838.3 | 2037.6 | 2167.8 | 2368.5 | 2357.9 | 2688.0 |
| Own funds | 803.5 | 979.8 | 1067.7 | 1146.8 | 1234.0 | 1367.6 | 1486.5 |
| Bank credits | 95.4 | 139.7 | 126.3 | 179.9 | 196.6 | 139.1 | 129.0 |
| Public funds | 175.8 | 205.9 | 218.0 | 199.4 | 191.9 | 320.7 | 430.1 |
| Other funds | 416.1 | 512.9 | 625.6 | 641.7 | 746.0 | 530.5 | 642.9 |

| | | | | | | | |
|-------------------|-------|--------|--------|--------|--------|--------|--------|
| Siberia | | | | | | | |
| Total investments | 980.5 | 1219.3 | 1459.5 | 1439.0 | 1484.4 | 1383.1 | 1445.3 |
| Own funds | 510.8 | 596.2 | 753.1 | 751.2 | 690.2 | 723.3 | 799.2 |
| Bank credits | 66.7 | 106.1 | 157.6 | 131.0 | 124.7 | 88.5 | 153.2 |
| Public funds | 174.5 | 215.8 | 229.1 | 221.6 | 198.9 | 221.3 | 224.0 |
| Other funds | 228.4 | 301.2 | 319.7 | 335.2 | 470.6 | 350.0 | 268.9 |
| Far East | | | | | | | |
| Total investments | 787.7 | 1060.5 | 971.4 | 842.4 | 810.6 | 905.1 | 1000.8 |
| Own funds | 221.3 | 244.9 | 289.5 | 301.6 | 329.1 | 394.6 | 243.2 |
| Bank credits | 44.9 | 58.3 | 54.4 | 53.9 | 77.8 | 65.2 | 28.0 |
| Public funds | 181.2 | 249.2 | 212.7 | 213.1 | 203.5 | 190.1 | 147.1 |
| Other funds | 340.3 | 508.1 | 414.8 | 273.8 | 200.2 | 255.2 | 582.5 |

Note: The figures given are based on the official statistic data.

3 Selection of the method of equalizing the initial time series and of the form of theoretical curves function

3.1 Selection of the method

Methods of equalizing time series are widely described in study materials and special literature in economics and theory of statistics. The most popular method used in economic investigations is a method of analytical smoothing under which there are constructed the equations of curves reflecting fluctuations of the series levels. The method of analytical equalization enables to construct the model of the existing tendencies and to forecast the phenomenon evolution in the future.

Methods of selecting the form of analytical curve must rely on the informative analysis of the essence of the evolution of the phenomenon in question, on the results of the previous research, on the analysis of the initial series graphical presentation; the most frequent being the series of previously smoothed levels, e.g., by extending the span or moving mean. Aimed at the growth of investments by the use of every source of fund, analysis of the existing investigations in the area of investment finance forecast, and actual retrospective data (Tab. 1), one can expect (as a hypothesis) a linear growth of the investment finance volumes in all sources: own funds, bank credits, and other sources. According to the above hypothesis it would be reasonable to choose the equation of line with two parameters as a theoretical function:

$$y_{ij} = a_{0j} + a_{1j}t, \quad (1)$$

where y_{ij} - theoretical series levels under j - source of investment finance; a_{0j} и a_{1j} - equation of line parameters under j - source of investment finance; t – time provisional figures (for $n = 7$ years: -3, -2, -1, 0, 1, 2, 3).

$$a_{0j} = \bar{y}_j = \frac{\sum y_j}{n}; \quad a_{1j} = \frac{\sum y_j t}{\sum t^2}, \quad (2, 3)$$

where y_j - actual amounts of Investment finance under j - source; \bar{y}_j - mean level of actual amounts of investment financing under j - source in retrospective time scan (Markhaichuk, 2018).

Tab. 2: Theoretical line equations for the investment sources of fund in federal districts

| Federal districts and sources of fund | Equations of line | Average absolute error of approximation MARE, % |
|---------------------------------------|-----------------------|---|
| Central | | |
| Total investments | $y = 3113.6 + 283.4t$ | 6.6 |
| Own funds | $y = 1411.6 + 167.1t$ | 4.8 |
| Bank credits | $y = 323 + 27.7t$ | 8.4 |
| Public funds | $y = 741.1 + 70.3t$ | 7.2 |
| Other funds | $y = 641.2 + 16.1t$ | 3.2 |
| North-West | | |
| Total investments | $y = 1421.7 + 70t$ | 4.6 |
| Own funds | $y = 570.6 + 87.1t$ | 4.2 |
| Bank credits | $y = 149.8 - 10.1t$ | 40.3 |
| Public funds | $y = 270.6 + 20t$ | |
| Other funds | $y = 478.6 - 27t$ | 15.9 |
| South | | |
| Total investments | $y = 1225.9 + 169.8t$ | 20.8 |
| Own funds | $y = 457.4 + 9.1t$ | 14.2 |
| Bank credits | $y = 120.9 + 6.2t$ | 27.8 |
| Public funds | $y = 233.5 + 11.2t$ | 32.5 |
| Other funds | $y = 411.1 + 19.8t$ | 31.0 |
| North-Caucasus | | |
| Total investments | $y = 423.8 + 30.9t$ | 16.9 |
| Own funds | $y = 132.2 + 16.8t$ | 6.3 |
| Bank credits | $y = 35.6 + 0.3t$ | 23.0 |
| Public funds | $y = 42.1 - 1.1t$ | 6.1 |
| Other funds | $y = 78.9 + 5.7t$ | 12.5 |
| Volga Region | | |
| Total investments | $y = 2099.1 + 173.2t$ | 5.3 |
| Own funds | $y = 1070.3 + 65.5t$ | 12.1 |
| Bank credits | $y = 238.8 + 18.1t$ | 13.4 |
| Public funds | $y = 346.8 + 22t$ | 41.2 |
| Other funds | $y = 443.2 + 21.4t$ | 16.0 |

| | | |
|-------------------|-----------------------|------|
| Urals | | |
| Total investments | $y = 2135.6 + 177.2t$ | 3.5 |
| Own funds | $y = 1155.1 + 106.8t$ | 5.5 |
| Bank credits | $y = 143.7 + 6.1t$ | 18.3 |
| Public funds | $y = 248.8 + 34.5t$ | 17.5 |
| Other funds | $y = 587.9 + 29.8t$ | 12.4 |
| Siberia | | |
| Total investments | $y = 1344.4 + 62.3t$ | 7.7 |
| Own funds | $y = 689.1 + 59.2t$ | 8.2 |
| Bank credits | $y = 118.3 + 6.8t$ | 20.8 |
| Public funds | $y = 212.2 + 4.6t$ | 6.1 |
| Other funds | $y = 324.9 + 13.2t$ | 14.4 |
| Far East | | |
| Total investments | $y = 911.2 + 6t$ | 43.2 |
| Own funds | $y = 289.2 + 14.4t$ | 12.9 |
| Bank credits | $y = 54.6 - 0.5t$ | 24.3 |
| Public funds | $y = 199.6 - 8.2t$ | 10.1 |
| Other funds | $y = 367.8 + 0.2t$ | 35.0 |

Note: The table is formed with the use of the data from Table 1

Development of the interest rate on credits in 2014-2016 resulted in the change of the trend in the given source of fund from the ascending to the descending one in the North-West and Far East federal districts. There was a similar situation on the budget source in the North-Caucasus and Far East districts and on other sources in the North-West district.

3.2 Calculation of the approximation errors.

An important problem having to do with the forecast of some phenomenon development is approximation quality rating. The summarized assessment of the forecast method in question, it would be reasonable to calculate average forecast errors- mean percentage error and mean absolute percentage error (Alberto, 2018). Various approximation errors are in use in economic studies for the assessment of the degree of proximity of theoretical levels and actual trends. (Fornari & Mele, 2001). But, in practice, both in foreign countries, and in Russia mean absolute percentage error (MARE) is used more often for evaluating the models, especially if they have great numerical values of series levels.

$$MARE = \frac{1}{n} \sum \frac{|y_j - y_{tj}|}{y_j} \times 100\% \quad (5)$$

where y_j - actual series levels under j - investment source of fund; y_{tj} - theoretical series levels under j - source of fund; n – number of series levels.

Some authors suppose that a mean absolute error denotes a high accuracy of the model under the magnitude, which does not exceed 10%, a good accuracy – from 10% to 20%, a satisfactory accuracy – from 20% to 50 %, and unsatisfactory – more than 50%. Other sources for some good model quality set error parameters 8-10% or consider the value *MARE* 10-15% as an acceptable one (Svetunkov, 2011).

For a comparative assessment and analysis of the quality of the equations given in table 2, the calculated mean approximation errors are presented in the form of a matrix (Tab. 3).

Tab. 3: Mean approximation errors for federal districts in terms of sources of investment fund, %

| Federal districts | Sources of Fund | | | | |
|-------------------|-----------------|------|---------|--------|-------|
| | Total | Own | Credits | Public | Other |
| Central | 6.6 | 4.8 | 8.4 | 7.2 | 3.2 |
| North-West | 4.6 | 4.2 | 40.3 | 14.0 | 15.9 |
| South | 20.8 | 14.2 | 27.8 | 21.3 | 31.0 |
| North-Caucasus | 16.9 | 6.3 | 23.0 | 6.1 | 12.0 |
| Volga Region | 5.3 | 12.1 | 13.4 | 13.1 | 16.0 |
| Urals | 3.5 | 5.5 | 18.3 | 17.5 | 12.4 |
| Siberia | 7.7 | 8.2 | 20.8 | 6.1 | 14.4 |
| Far East | 43.2 | 12.9 | 24.3 | 10.1 | 35.0 |

Note: Information from Table 2 was used in Table 3

Conclusion

In conclusion, we note the following: approbation of the model on retrospective data of the federal districts showed that the trends of developing different sources of investment financing, especially under economic crisis, vary greatly, and the tendency of the own sources growth is the most stable. Bank lending as a funding source depends on the current economic situation, budget financing is restricted by the frames of targeted programs and has quite a subjective character. As for the other sources, such as investment bond financing and issue of shares, they are not developed enough, and, consequently, the main element of the other financing is the funds received from superior organizations including holdings and stock companies, industrial and financial groups at no cost. Relying on the analysis of the trends, emerged before the prediction, and of the conditions of the trends preservation, one can have quite an accurate forecast and make strategic management decisions on every source of the investment financing. Proposed methods of predicting the volumes of investment funding can be implemented not only at the level of federal districts, but also for separate RF subjects and for the Russian Federation as a whole.

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SOCIAL INNOVATIONS IN THE CULTURAL FIELD:

AN ESSAY

Daniel Ericsson

Abstract

Purpose: This study seeks to shed light on how social innovations are constructed in the cultural field by probing the phenomenon in relation to the enactment of an opera company in the Småland region in southern Sweden.

Design/methodology/approach: The study is based on an ethnographically inspired study, and is written in the form of an essay to capitalize on the genre's tentative and reflective epistemology.

Findings: The study illustrates how a specific social innovation in the cultural field is both a product and producer of social innovations, and how social innovation processes could be understood as assemblages of social innovations enacted using organizing contexts and idealistic infrastructures. In opposition to the idea that social innovations are solutions to social problems, it is proposed that solutions to social problems might represent the unintended consequence of deploying various social innovations. It is also suggested that social innovation processes in the cultural field is non-linear and irrational in character.

Research/practical implications: The discourse on social innovation is largely based on a calculative engineering logic. This logic stands in sharp contrast to creative and artistic logics, and could hamper social innovation initiatives in the cultural sector. There is therefore a need for a differentiated understanding of social innovation in both theory and practice – an understanding that acknowledges social innovation as a construction dependent on specific contexts, processes, and people.

Originality/value: The essay allows the reader to reflect on how social innovations are constructed in different contexts.

Keywords: Social Innovation, Cultural Field, Entrepreneurship, Organizing Context, Idealistic Infrastructure

JEL Codes: M13, L30, 035

Introduction

Social innovation is a tricky concept, or rather the discourse on social innovation is a tricky one. On one hand, debates on social innovation tend to be lively, particularly in politics where social innovation is seen as extremely important and worth supporting and promoting. For example, at the EU level, the European Commission tries to facilitate social innovation through its Innovation Union Initiative (2010) and Social Investment Package (2013), seeing it as a “source of growth and jobs”, by “supporting innovative entrepreneurs and mobilising investors and public organisations”, while in Sweden social innovation plays a prominent role in the National Innovation Council’s Innovation Strategy (2014). A number of Swedish authorities have been assigned by the government to coordinate their social innovation efforts with Sweden’s Innovation Agency, and the Swedish Agency for Economic and Regional Growth.

On the other hand, despite the widespread notion that social innovation provides solutions to contemporary social problems, few seem to have a well-developed understanding of what social innovation means. Defining what social innovation “is” is therefore high on the research agenda, and many researchers engage in seemingly endless attempts to authoritatively define the true nature – and meaning – of social innovation.

Chief among these researchers is Geoff Mulgan who, together with colleagues at the Young Foundation (cf. Mulgan, Tucker, Ali, & Saunders, 2007), has defined social innovation as ‘innovative activities and services that are motivated by the goal of meeting a social need and that are predominantly developed and diffused through organizations whose primary purposes are social’ (Mulgan et al., 2007, p. 8). According to Mulgan et al. (2007), social innovations arise wherever there is a gap between “what is” and “what should be”, but they appear to be particularly frequent as solutions to problems related to areas such as decreased life expectancy, increasing gaps and inequalities between social groups, behavioural disorders and stagnant well-being and welfare (Mulgan et al., 2007, p. 9). As examples of social innovations, Mulgan et al. (2007., pp. 4 and 8) adduce cognitive behavioral therapy, Wikipedia, gay marriage, SMS and feminism.

Defining social innovation in this broad and generic sense, however, might paradoxically rob the concept of meaning. If practically everything in life can be conceptualized as belonging to the sphere of social innovation, then the concept risks becoming yet another buzzword, such as “creativity” or “social entrepreneurship” which seem to be used by their proponents primarily to acquire symbolic legitimacy (cf. Ericsson, 2001; Ericsson, 2016). This is however not the only problem with attempts to define social innovation; these attempts are

most often accompanied by ideas on how to organize, control and stimulate the processes leading to social innovations, and such ideas most often stem from the business world with its simplistic tools, models and recipes.

Mulgan et al.'s (2007) ideas on how to foster social innovation are no exception to this, describing social innovation processes in terms of a four-step linear model: (1) the identification of unsatisfied needs and possible solutions; (2) the development of prototypes to test different solutions; (3) evaluation, scaling up, and dissemination of the best solution; and (4) evaluation of the process. This model is intended to describe the processes, but also to prescribe them in a normative fashion: This is how to do it.

In the case of Mulgan et al. (2007), the normative ambitions are also coupled with an interest not only in creating more social innovations by standardizing the processes, but also in making the processes go faster. The title of their work – “Social Innovation” What it is, why it matters and how it can be accelerated” – is in this sense telling. By referring to acceleration, the ambition becomes a matter of increasing positive velocity, and a matter of mechanics. Social innovation is thus treated as some sort of physical matter, instead of a social phenomenon.

This engineering take on social innovation seems a bit misplaced when directed towards phenomena such as the aforementioned cognitive behavioural therapy, Wikipedia, gay marriage, SMS, and feminism; it is certainly misplaced when directed towards social innovations in creative and/or cultural settings. This calculative engineering logic stands in sharp conflict to logics such as the creative one (cf. Ericsson, 2001) or artistic one (Austin & Devin, 2003). Creative or artistic processes are not simply characterized by planning and straightforwardness; rather they are unpredictable and unplanned. Artists play, they improvise and try things out, taking one incremental step forward in their creation processes and perhaps two steps back, and they usually have no other aspiration than expressing themselves for the sheer fun of it. And they are certainly not in a hurry. The artistic process unfolds gradually – and it takes the time it takes.

It would probably also be strange for an artist to let his/her creativity be driven by demand. Nervously trying to meet the market's expectations of social innovations, or to satisfy people's unsatisfied social needs, would most likely put an end to the artist's sense of freedom and creativity (cf. Austin & Devin, 2003, p. 165ff). Social needs do not exist out there for the artist, ready to be discovered and satisfied; instead, they are created in artistic processes.

1 Some kind of purpose

One way of shedding light on how social innovations are construed in creative and cultural fields is to probe the phenomenon in relation to the enactment of an opera company in the Småland region in southern Sweden. The initiative to found an opera company was made public in the early fall of 2013 when *Smålandsposten*, the local newspaper, reported that an opera company recently had recently been founded, and that it was to stage Mozart's *The Magic Flute* the following summer. To emphasize the regional connection, the name of the opera company is announced as *Smålandsoperan*, and behind the initiative are two cultural entrepreneurs presented as being driven by a desire to “bring opera to the people”, on one hand, and to establish a cultural institution bringing together all the region's opera competences and interests, on the other. “One should not have to go to the big cities to experience opera”, one of them is quoted in the paper, highlighting the democratic aspects of cultural production and consumption (cf. Ericsson, 2018).

One year later Smålandsoperan is considered to be a huge success, the performances have been sold out, and the opera company has been taken to heart by the critics. The success has continued. By 2018, the opera has firmly established itself as an actor to be relied on, with five consecutive years of sold-out performances and critically positive reviews. This success has not come easy, however. Run as a corporate business, the opera company has not been eligible to receive financial support from public authorities, and is solely dependent on ticket revenues and sponsorship. This has put pressure on Smålandsoperan's board to balance the company's artistic ambitions against harsh economic realities, and to do so in an innovative manner.

Based on empirical field work at Smålandsoperan in its first year (for a thick description see Ericsson, 2018), the board's innovative actions during the opera company's first year is in the following interpreted and problematized from two angles. On one hand, it is proposed that social innovations at the opera are construed in relation to an *organizing context*, an all-encompassing and situated form of life in which people not only live very closely to each other but also have developed a shared perception of the world (Johannisson, 2005), constituted by a loosely coupled network of cultural entrepreneurs who most often are related to another by kinship and/or friendship. On the other hand, it is argued that these social innovations are construed in relation to an *idealistic infrastructure* comprising non-profit associations and movements knitted together by shared artistic ideals and values (cf. Ericsson, 2018).

2 A year at the Opera – in brief

Smålandsoperan is the brainchild of two of Växjö's leading cultural personalities, Björn Elmgren and Christina Gutiérrez Malmbom. Björn is primarily known to the public as an opera singer, but has wide-ranging artistic talents. Among other things, he is an actor, theatre director, and musician. Christina is also well known in the local cultural scene as actor in various musicals as well as the leading force behind cultural projects such as Teater Respekt, a social initiative to create meaningful employment for young people outside the labour market. Björn and Christina "ran into each other by accident" – as they put it – and realized that they complemented each other. Together, they decided to make a long-standing dream come true: to start an opera company in Småland.

Their dream is multifaceted. They want to bring opera to the people and get more people to embrace the fantastic world of opera; they want to create jobs for cultural workers in Småland, as well as give disadvantaged youth meaningful work. There are “a lot of resources” that are untapped in and around Växjö, and Björn and Christina simply want to put these to use. Most of all, however, their dream is nourished by their love of opera. “There is nothing more fun than to sing opera!” they exclaim. “Opera simply adds to the quality of life.”

Smålandsoperan thus sees the light of day, and when the opera company is announced for the first time publicly, they have under ten months to get everything in place before the curtain goes up. It is a race against the clock.

Björn and Christina have deliberately chosen to run the opera in the form of a limited company, even though this makes the opera ineligible for public funding, and thus entirely dependent on ticket revenues and sponsorship. It is not a matter of wanting to make money from their opera company; rather, their idea is to reinvest any surplus into the business and, in the end, create a freestanding cultural institution. Setting up the opera as a limited company simply makes it “real”, which also is their guiding principle for the opera experience itself. The opera company is to be based on professional and artistic values: it shall have a reputation for high quality of both ensemble and repertoire, and it must have all the attributes of an opera institution such as a choir and an orchestra. And audience members should of course be offered champagne at intermission, if they so wish.

Being both artistically legitimate and commercially viable is easier said than done. The values of fine art starkly contradict economic ones, and trying to strike a balance between the two is risky. Too much focus on money issues risks jeopardizing the artists' confidence in the opera, while too much focus on artistic issues might affect willingness to invest in the business.

At worst, the company risks being seen as illegitimate in both camps by failing to follow sufficiently distinct “either/or” strategies. For example, the producer Christina has difficulty obtaining board approval for the business plan required by the bank, whereas the artistic director Björn, while working on the marketing plan, has to struggle to persuade the board to accept that Smålandsoperan’s brand stands for “high artistic quality”.

Life at Smålandsoperan is thus imbued with a “both and”-approach. In principle, everything that happens at the opera – from the choice of repertoire, through the membership of the ensemble and the choir, to marketing and finance decisions – entails balancing business with art. Ability to master this balancing act becomes a kind of existential prerequisite for the board members: They simply have to master living in both worlds.

3 Trampolines and safety nets

A crucial part of this mastery is downplaying the importance of economic capital, and trying to replace it with social capital. In a sense, this is typical of entrepreneurs who most often, for lack of financial resources, must turn to alternative resources such as friends and families to get support for their ideas and aspirations. Johannisson (2005), in this regard, has likened social capital to a combined trampoline and safety net. On one hand, social capital functions as a trampoline from which entrepreneurial people and ideas get impetus and can fly; on the other hand, social capital functions as a safety net that cushions the impact if one falls. It is faith in the safety net, argues Johannisson (2005), that makes entrepreneurs willing to take leaps into the unknown, and to do so repeatedly even if they fail. The more entrepreneurs test the carrying capacity of the safety net, the stronger the rebound off the trampoline – and the stronger the safety net. Unlike economic capital, Johannisson (2005) concludes, social capital is accumulated and propagated by being used.

Entrepreneurial safety nets and trampolines are, according to Johannisson (2005), bounded in time and place. They arise and function in specific organizing contexts, i.e. locally defined regions where people live close to one another and have developed long-term trust. In thriving organizing contexts, the collective is valued more highly than the individual is, and genuine relations are prioritized over calculative ones. One such context, the famous Gnosjö region in Sweden (cf. Wigren, 2003), thrives on deeply anchored and stable personal networks.

From the perspective of this research on entrepreneurship, one could say that many of the opera board’s activities are directed towards mobilizing the organizing context. One example of this is the ample use of friends and families both behind the scenes and on stage,

with only some being salaried and paid according to contractual wages. Another example is the use of informal ties to strike favourable deals with suppliers.

To make ends meet at the opera, the board also mobilizes the organizing context in ways that are more formal. One such formal effort is the creation of the non-profit association Smålandsoperans Vänner (Friends of Smålandsoperan) in November 2013. The idea behind this association is that it shall function as the producer of the events, thus being eligible for public funding, whereas Smålandsoperan, the company, shall function as the content supplier to the non-profit. People interested in opera can join the association as members, paying an annual fee of SEK 100, and as members they are encouraged to get involved in producing the events in exchange for discounts and invitations to exclusive shows. The goal is to recruit one thousand members, and the purpose of the association is “to support and market Smålandsoperan’s performances. It’s about helping out with applications and contributing to marketing activities in for example newspapers and networks. Practical services are also part of the association’s responsibility, for example, building stages and hosting concerts” (taken from the organization’s mission statement, see Ericsson, 2018).

Smålandsoperans Vänner is, however, not an entirely independent association. It was closely tied to the opera company at its inception, as one of the board members (Christina) was also elected secretary of the association. When one of the opera company’s founding owners resigned from the board and gave his shares in the company to Smålandsoperans Vänner, the ties between the company and the association became even stronger. Suddenly, the chair of Smålandsoperans Vänner not only found herself working for the opera company as musician and project manager, but also serving as a member of the company’s board, representing the new owner.

Another example of more formal mobilization of the organizing context was a crowdfunding drive via crowdculture.se – a cultural project created to democratize the distribution of public funds to the cultural sector. For every krona Smålandsoperan received from private sponsors, the regional authority Regionförbundet Kronoberg donated an equal amount. On the project’s website, Smålandsoperan presents its case in a cheerful manner: “Help us to get the Queen of the Night to sing! We need to raise money to be able to pay the salary of SEK 30,000 to our opera singer Anna-Karin Ranelf – otherwise there will be no Magic Flute at Huseby Bruk [the venue] this summer.” The plea was accompanied by a video starring Björn Elmgren, the opera director, begging on his knees in front of a very reserved Anna-Karin Ranelf. The video is self-reflexive and ironic, but the message conveyed is also serious,

highlighting the social and economic values and benefits of having an opera in the countryside. The project is a success and one month before the deadline, the goal is reached.

4 Paradoxes

The board of the opera company is guided not only by the goals of raising money, producing first-class opera, and capitalizing on social capital. It is also governed by specific ideas, such as contributing to society by creating jobs, helping disadvantaged youth, and improving the quality of life of Småland residents. These ideas are political in character, one could even say existential, and they reflect idealistic rationalities at work.

Whenever ideals are discussed in scholarly discourses on entrepreneurship, researchers tend to problematize and deconstruct taken for granted notions of entrepreneurship that govern and reproduce who and what is to be regarded as “entrepreneurial” (cf. Ogbor, 2000; Jones & Spicer, 2005; Perren & Jennings, 2005). Specifically, notions of entrepreneurship based on a calculative rationality are questioned here, and so is the *Horatio Alger* ideal, the American dream of the self-made man. According to these deconstructions, the discourse on entrepreneurship is gendered, ethnocentric, and socio-economically biased; it is a macho-driven discourse capturing the entrepreneur in an eternal loop of economic subjugation (Perren & Jennings, pp. 178-179).

Given this ideological critique, many attempts have been made to rewrite (Hjorth, 2001), reclaim (Steyaert & Katz, 2004), and destabilize (Jones & Spicer, 2005) the discourse on entrepreneurship. These attempts have, for example, led to a broadened empirical basis for entrepreneurship, highlighting the importance of social movements (Gawell, 2006) and civil society (Lundgaard Andersen, Gawell & Spear, 2016), and to the introduction of the concept social entrepreneurship (cf. Light, 2008), thereby directing attention towards alternative ideals such as democracy, justice, and empowerment.

From the perspective of these scholarly discussions, Smålandsoperan could be conceptualized as both the product and (re)producer of rather paradoxical ideals. For example, the operatic art form, biases organizations towards a hierarchy of ideals and values associated with a bourgeois economic and cultural (dis)position; at the same time Smålandsoperan’s board is deliberately trying to rewrite the meaning of opera, bringing it “to the people” almost in the form of a movement. Another paradox concerns Smålandsoperan as a firm: on one hand, the firm presupposes a calculative ethos, but on the other, this ethos stands in sharp contrast to the bourgeois notion of “art for art’s sake” or, rather, “opera for opera’s sake”. Not for nothing is

there heated debate among the board members on the meaning of the brand and its core values, when trying to put the strategy down on paper. Finally, they agree on defining the strategy in terms of: “A Smålandian opera company that combines high artistic quality with creativity, ingenuity, and cost efficiency. Smålandsoperan’s core values are cost efficiency, entrepreneurship, competence and creativity.” From the perspective of multiple rationalities and ideals, the words here seem to be at odds with one another.

These paradoxical ideals force the board members to position themselves ideologically. The idealistic rationality, however, seems to come second to the overarching strategy of trying to convert idealistic capital to economic capital. Such conversion processes are found in the cases of Smålandsoperans Vänner and crowdfunding, but above all in the forming of the opera choir, to which members are recruited solely based on their idealistic motives, but that is explicitly used as a producer of economic value.

The need for an opera choir is obvious to the board and its members: “An opera without a choir *is* simply not an opera”, as they put it. Setting up a choir, however, is easier said than done. In a region of Småland’s size, the supply of the right voices is small, and there is fierce competition from existing choirs. Using their networks, Björn and Christina, however, succeed in gathering a small but very dedicated group of singers into a choir. The choir members are, however, not only enrolled to the choir to sing. They are also expected to contribute to the company, working with promotion and marketing activities “pro bono”.

This creates confusion among the choir members, and a clash of interest. Is the choir to be regarded as part of the company, or as an independent non-profit association? Regardless of the answer to this question, the board arguably, in order to compensate for the lack of economic resources, make use of an idealistic infrastructure consisting of actors that are ready and willing to contribute with their time and efforts to spread the ideas of the opera.

5 Tentative propositions

The predicament of Smålandsoperan and its board can be summarized in one sentence: Requirements to be both symbolically and economically legitimate pressure the board to mobilize and utilize organizing contexts and idealistic infrastructures. From a social innovation perspective, if one were to acknowledge Mulgan et al.’s (2007) definition of social innovation as a solution to an experienced troublesome gap between “what is” and “what ought to be”, this sentence, however, could be developed into (at least) three tentative propositions about social innovation in creative or cultural fields.

First, seen as a social innovation per se, Smålandsoperan seems to depend on other social innovations such as crowdfunding, and new non-profit organizations, each of which exists to meet some sort of social need. That is, the enactment of this specific social innovation requires the mobilization and utilization of other social innovations to balance conflicting normative expectations. Social innovation is thus both the product and producer of social innovation, and social innovation processes represent an assemblage of different social innovations.

Second, the process of establishing Smålandsoperan as a legitimate opera company has very few resemblances to the normative ideas of Mulgan et al. (2007) when it comes to social innovation as the answer to unsatisfied needs. The opera company is not primarily a response to an empirically grounded identification of unsatisfied social needs, but rather the consequence of a chance meeting of two cultural entrepreneurs who happened to have a dream in common. That Smålandsoperan might very well satisfy specific needs – for example, young people’s need for meaningful work, opera singers’ and musicians’ need for jobs, and people’s need for aesthetic experiences or self-fulfillment – seems more or less a fortunate by-product of the enactment of the opera company. Without Smålandsoperans Vänner, the choir, and crowdfunding, many needs would simply remain unmet. One could thus conclude that social innovations do not necessarily represent solutions to social problems; rather, the solutions to social problems might rather represent the unintended consequence of the deployment of various social innovations.

Third, the enactment of the opera company is far from the rational process of planning, testing, and evaluation that Mulgan et al. (2007) depicted. The two entrepreneurs in the board just did it, and in quite an irrational manner. For example, the opera is run as a limited company despite the many financial problems that follow from that strategic decision, and even at the company’s inception, a full-scale opera was already envisioned – with the opening night date set – even though practically nothing was in place. Prototypes, scaling-up activities, and dissemination of a best solution, which, according to Mulgan et al. (2007) describe and prescribe social innovation processes were all lacking. At the opera, everything is “full scale” and “for real” from day one, and there is simply no time to try things out. If one were to describe the board’s social innovation process in a stepwise manner it would be something like this: 1) formulate a vision; 2) set a deadline for the vision to be realized; and 3) go ahead. Perhaps a fourth step could also be added, in view of Smålandsoperan’s five consecutive years of success: 4) if success is achieved, do it all over again.

Between the mobilization and utilization of organizing contexts and idealistic infrastructures, social innovation in the creative or cultural field seems to be construed in

a slightly paradoxical way. On one hand, social innovation emerges as some kind of Russian nesting doll phenomenon: social innovations are within social innovations, which in turn are within social innovations, and so on. On the other hand, the processes constituting this phenomenon appear to contradict the scientific rationality often attributed to social innovation processes.

This paradox is more or less impossible to resolve, as long as the assumption of a univocal and coherent definition of social innovation is upheld. If this assumption is relaxed or abandoned, however, the paradox is no longer a paradox – and social innovation is revealed as coming in many shapes and colours. Tentatively, it might then be safe to suggest that social innovation in the creative and cultural fields is something different from social innovation in other fields.

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DIGITAL PAYMENTS – HOW NEW TECHNOLOGIES DISRUPT MONEY TRANSFER SYSTEMS IN AFRICA

Kenzie K. Ferguson – Michael Neubert

Abstract

Purpose: The purpose of this qualitative exploratory multiple case study research is to explore subject-matter experts' (SMEs) perceptions of how technology and framework conditions influence and impact the success of digital payment business models in sub-Saharan Africa. To address this purpose, and to be consistent with the qualitative paradigm, a multiple case study methodology is used to collect data from multiple sources of evidence.

Design/methodology/approach: This study uses an open-ended survey to collect data on SMEs perceptions. Data collection happened through semi-structured, qualitative, in-depth interviews with senior managers and entrepreneurs / owners in the financial technology sector. Data collection took place in Paris in November 2018. The interviews took between 32-46 minutes. The answers of the SMEs were imported, coded, and analyzed using NVivo for Mac.

Findings: The findings suggest that growth of digital payment systems in sub-Saharan Africa might be driven by network effects and incentives, and a reduction Gourville's endowment effect or status quo bias. The results of this study suggest that infrastructure might key to the success of digital payment services and supportive regulation might be necessary to allow for entrepreneurs to drive innovation and to protect their customers against fraud.

Research/practical implications: The FinTech environment is changing rapidly and requires review of the changes within the ecosystem of financial technology innovations. This study will help FinTech innovators, academics, and policymakers to understand how technology and framework conditions impact payment business models in sub-Saharan Africa.

Originality/value: This paper builds on FinTech research and takes a more in-depth look at digital payment systems in sub-Saharan Africa using Gourville's (2006) theoretical framework on the psychology of new-product adoption. The added value of this study might be suggestions for quantitative research and recommendations for providers of digital payment systems in sub-Saharan Africa.

Keywords: Digital Payments, FinTech, Africa, Innovation, Finance

JEL Codes: E42, F6, G20

Introduction

FinTech innovators, academics, and policymakers need to understand the impact of new technologies on payment systems in Africa to create sustainable economic growth. There are two main movements at play: the explosion of innovation in the financial services sector, often referred to as FinTech or financial technology, and the growing appetite for new, innovative financial services in developing countries (EY Global, 2017). According to the EY FinTech Adoption Index, they are seeing new FinTech firms, business and pricing models (Neubert, 2017), and customer solutions entering the market and realizing increasing valuations (AbdulJabbar & Neubert, 2019). They attribute this explosion of FinTech to a few converging technologies more readily available, such as data sharing, open APIs (application protocol interface), biometrics, artificial intelligence (AI), and robotics. These technological trends can seem like science fiction and one may wonder how these futuristic technologies translate to the population in Africa. In actuality, technology implementation in sub-Saharan African countries is leapfrogging outdated, inferior systems and are at the forefront of FinTech innovations (EY Global, 2017). The adoption of the mobile phone is a classic leapfrogging example. By adopting mobile phones in sub-Saharan Africa, the countries have bypassed the need for outdated landline infrastructure. The adoption of mobile phones and mobile networks throughout sub-Saharan Africa have set the stage for the next wave of FinTech innovation.

The purpose of this multiple case study is to understand how subject-matter experts (SMEs) perceive the impact of new technologies on the success of digital payment business models in sub-Saharan Africa using Gourville's (2006) theoretical framework on the psychology of new-product adoption. We found a gap in the literature regarding the payment and money transfer segment of FinTech innovations in sub-Saharan Africa including mobile money, peer-to-peer payments, and digital currency (Gomber, Koch, & Siering, 2017; GSMA, 2017).

The article is structured as follows: first, we review the literature about the current research status of payment and money transfer innovations in sub-Saharan Africa and present the psychology of behavior change theoretical framework (Gourville, 2006); second, we present the research methodology, including the sampling strategy and the research question; third, we discuss the findings about technology and framework conditions; and, we conclude with a list of key findings, an analysis of the impact of the research results for academics, policymakers, and practitioners, and recommendations for further research.

1 Literature review and theoretical framework

We summarized the selected research on money transfer or payment business models and included information on financial technology in sub-Saharan Africa. This literature review is far from exhaustive, but it structures the information by technology and framework conditions related to digital payments and transfers in sub-Saharan Africa.

1.1 Literature review

Researchers and experts recognize the introduction of M-Pesa in 2007 by the British telecom company Vodacom Group as the start of the FinTech frontier in Africa (Burns, 2018). M-Pesa offers a mobile payment system that does not require a bank account. This allows individuals who previously had little access to financial systems to conduct digital transactions via their phones and become part of the broader financial ecosystem.

Various studies and industry report data prove that mobile phone use improves the livelihood of individuals residing in remote areas because it offers access to financial services which are otherwise not available (EY Global, 2017; Mothobi & Grzybowski, 2017; Munyegera & Matsumoto, 2016; Nair & Emozozo, 2018). Individuals with access to financial services fare better because they can spend money on health, education, and semi-durable items that can help them emerge from poverty. They can make contributions toward social, cultural and religious functions—including contributions toward local savings and credit associations (Munyegera & Matsumoto, 2016).

According to GSMA (Groupe Speciale Mobile Association), mobile money services are money transfers and payments made over a mobile phone that do not require a formal account at a financial institution, and offer a means for users to collect money. These services may include storage of value; domestic or international transfer; mobile payment, including bill payment, bulk disbursement; and merchant payment. GSMA (2017) makes an essential differentiation and does not include payment services linked to a traditional banking product or credit cards, such as Apple Pay and Google Wallet.

Sub-Saharan Africa is understandably the global leader in mobile money because mobile money fills the pressing need of access to financial services for people who otherwise wouldn't have access. According to GSMA's 2017 report on mobile money, Africa has nearly 50% of the number of live mobile money services worldwide, with 135 services in Africa, out of 276 worldwide (GSMA, 2017). The number of services in Africa dwarfs the next largest regions, South Asia (41 services) and East Asia and Pacific (40 services) (GSMA, 2017).

The dramatic growth in mobile money has set the groundwork for expansion into other FinTech areas in Africa. The number of startups in the FinTech space is growing and has expanded beyond mobile money. According to Disrupt Africa, an online journal focusing on the startup and investment ecosystem in Africa, African tech startups are seeing a boom in investment in-flow, investor networks, and the number of startups registered. In 2017, African startups raised funding of over US\$195 million, a 51 percent increase over 2016. Furthermore, FinTech proved to be the most sought-after sector for foreign investors—FinTech startups raised one-third of the total funding going to African tech ventures in 2017 (Jackson, 2018).

Peer-to-peer payments, person-to-person payments, private-to-private, or P2P payments are another sub-category of digital payments (Gomber et al, 2017; Munyegera & Matsumoto, 2016). Mobile money and P2P payments offer a convenient means for family members and friends to send money to remote areas with limited or no access to formal financial institutions, and this includes remittances from foreign countries. Recipients are more likely to receive funds if they use mobile phone-based financial transactions because digital money transfers have fewer transaction costs, do not require travel, and are faster (Munyegera & Matsumoto, 2016). The benefits to recipients that have access to P2P are very positive. Findings in a study done by Munyegera & Matsumoto (2016), show evidence that households using mobile experience a significant increase in per capita consumption (Munyegera & Matsumoto, 2016).

Digital currency, sometimes referred to as cryptocurrency or virtual currency, is a digital representation of value that can be traded and functions as a medium of exchange, but does not have legal tender status (FATF, 2014). Digital currency, which is based on blockchain technology, is an attractive new technology in some parts of Africa because of unstable local currencies, crime, and lack of trust in banks. Blockchain technology offers a secure means to efficiently manage and transfer digital currency. In countries where the currency is unstable, and crime is prevalent, cash incurs risk, creating a demand for alternative forms of payment (Nair & Emozozo, 2018). The demand for a secure means to transfer money virtually is essential in regions where it is not advisable to carry large amounts of cash. For example, in Ghana, it is risky to carry large amounts of cash because of armed robbers (Elliot et al, Ngugi, & Malgwi, 2018). The risk of carrying cash compounded with the lack of trust in banking organizations makes it difficult to include many individuals in the financial ecosystem (Elliot et al, 2018).

Hands-off regulation by the government will spur entrepreneurship and experimentation in the financial technology sector (Burns, 2018). In a study done by Burns in 2018, he found that the nations seeing the best results are not necessarily the nations who devote the most resources to financial inclusion. "Instead, the greatest success stories have occurred in nations

where government has restricted itself to merely creating an 'enabling' environment for entrepreneurs" (Burns, 2018, p. 417). Governments and other regulatory entities worry the use of digital currency will enable money laundering, terrorist financing, and unwanted outflows of capital. Besides small-scale drug trafficking and fraud, the link between virtual currencies/crypto-assets and other predicate crimes appears to be growing (FATF, 2014). For now, regulators in Africa are taking a "wait and see" approach to digital currency (EBI SA Groupe Ecobank, 2018).

Unlike traditional banking services, FinTech services do not rely on traditional physical infrastructures like banking facilities, ATMs, or even landline phones. Instead, FinTech services require only a smartphone and access to wireless internet infrastructure, including local cell towers and high-speed internet capability such as 3G 4G wireless technologies (Mothobi & Grzybowski, 2017; Weichert, 2017).

1.2 Theoretical framework

To understand why the consumer adopts innovations, we used Gourville's (2006) behavioral framework that is based on the endowment effect and the status quo bias.

"Consumers overvalue the existing benefits of an entrenched product by a factor of three, while developers overvalue the new benefits of their innovation by a factor of three. The result is a mismatch of nine to one between what innovators think consumers desire and what consumers want." (Gourville, 2006, p. 102).

The tremendous growth of digital payment systems all over Africa shows evidence that there is a low psychological cost associated with the behavior change of switching from using cash to digital money (Elliot et al, 2018; GSMA, 2017).

2 Research methodology

Based on the purpose of this study, a qualitative multiple case study research design is used to answer the exploratory research questions (Yin, 2017). This research design allows for more flexibility using different sources of evidence, offers the possibility of a cross-case analysis, goes deeper and in more detail than any quantitative assessment (Yin, 2017). This research methodology is aligned with the purpose of this study, because we want to explore the perceptions of SMEs based on their experience in the sub-Saharan digital payment system sector including all the complexities and subtleties of innovative technologies in developing markets.

This paper used a purposive sampling strategy of twelve SMEs with strong theoretical, entrepreneurial, and financial backgrounds in sub-Saharan African markets (Yin, 2017). The sample includes SMEs with expert knowledge about digital payment systems in sub-Saharan Africa. They all hold master’s degrees or higher with multiple years of experience as senior managers and entrepreneurs/ owners in the financial and/ or technology sector. These twelve SME interviews were sufficient to reach data saturation (Yin, 2017). This study uses a higher than required sample size (12 instead of 6-10) (Yin, 2017) due to the differences in the development of digital payment systems between the different sub-Saharan African countries.

Table 1: Professional Experience of SMEs in the African Financial Service Industry

| SME number | Education | Professional Level | Professional Experience in Africa | Professional Experience in Finance or Technology |
|------------|-----------|----------------------|-----------------------------------|--|
| 1 | Master | Entrepreneur / Owner | Direct | Yes |
| 2 | Master | Entrepreneur / Owner | Direct | Yes |
| 3 | Master | Senior Manager | Direct | Yes |
| 4 | Master | Senior Manager | Direct | Yes |
| 5 | Doctorate | Entrepreneur / Owner | Direct | Yes |
| 6 | Master | Senior Manager | Direct | Yes |
| 7 | Master | Senior Manager | Direct | Yes |
| 8 | Master | Senior Manager | Direct | Yes |
| 9 | Master | Entrepreneur / Owner | Direct | Yes |
| 10 | Master | Entrepreneur / Owner | Direct | Yes |
| 11 | Doctorate | Senior Manager | Direct | Yes |
| 12 | Master | Entrepreneur / Owner | Direct | Yes |

Source: Authors

This qualitative multiple case study uses semi-structured, qualitative, in-depth interviews to collect the perceptions of SMEs about the users of digital currencies in sub-Saharan Africa using Gourville’s behavioral framework (Gourville, 2006). The questionnaire contains socio-demographic questions about each SMEs and several open questions to answer each of the following two research questions. Data collection took place in Paris in November 2018 using an online questionnaire. The interviews took between 32-46 minutes. The answers of the SMEs were imported, coded, and analyzed using NVivo for Mac.

1. Q1) What are the perceptions of subject-matter experts about the main technologies to develop new business models for digital payment systems in sub-Saharan Africa?
2. Q2) What are the perceptions of subject-matter experts about the required framework conditions and success factors to develop new business models for digital payment systems successfully in sub-Saharan Africa?

The data analysis used a standardized process starting from the analysis of industry and market reports, followed by the analysis of each individual SME interview, a cross-case analysis to compare the similarities and differences, and a triangulation with other sources of evidence to develop themes (Yin, 2017). This complex data collection and analysis method has the goal to produce robust and qualitative research results, which might be transferred to another setting, but findings cannot be spread to larger populations due to the limitation of qualitative research designs.

Ethical concerns of qualitative studies were taken into consideration during all phases of this study like for example anonymity of the collected data, confidentiality of the stored data, and informed consent of the SMEs according to the principle of “no harm” to study participants. The interviewer informed the SMEs before the interview which data will be collected, how this data is processed and analyzed. All participants signed an informed consent form before the interview and were informed about the possibility to exit the interview whenever they want (Yin, 2017). All participants will receive the published findings of this study.

3 Findings and results

Q1) What are the perceptions of subject-matter experts about the main technologies to develop new business models for digital payment systems in sub-Saharan Africa?

The literature and other sources of evidence like industry and market reports show that innovative technologies are driving the development of new business models for digital payment systems in sub-Saharan Africa (Burns, 2018; EY Global, 2017; GSMA, 2017).

Theme 1: FinTech technologies are the main technologies to support the development of new business models for digital payment systems in sub-Saharan Africa.

The majority of the SMEs indicate that a reliable and fast broadband infrastructure, a reasonably priced connectivity, low cost or free hard- and software (e.g. email) are the main basic technologies to support the development of new business models for digital payment systems in sub-Saharan Africa. SME 2 mentioned mobile money and digital payment technologies as most important driver, because it facilitates fast adoption rates of new business models and the inclusion of the majority of consumers living in sub-Saharan African countries due to “network effects such as government payments, employer payments, many points of acceptance, and network incentives such as discounts or loyalty programs and low cost digital payment systems”. SME 12 added “encryption technology including insurance protection against cyberpiracy”. SME 4, 5, and 8 called it “biometric authentication technology”. Most

SMEs explain that these technologies and especially the ability of digital payment providers like e.g. M-Pesa, Venmo, PayPal, Google Wallet, Apple Pay, AliPay, or WeChat to use them to reduce the endowment effect or status quo bias according to Gourville (2006) is crucial.

Theme 2: Blockchain-based cryptocurrencies have a high market potential for supporting the development of new business models for digital payment systems in sub-Saharan Africa.

The majority of SMEs point out that “cryptocurrency has a very high potential, even disruptive due to lower cost, more security, and higher transaction speed,” other SMEs are still more critical underlining the unsolved problems of scalability and price volatility. One SME acknowledge that “blockchain-based cryptocurrencies might be considered as a creative destruction and disruptive innovation destroying the existing payment platforms with a new technology”. Two SMEs mentioned the case study “Bit-Pesa” as a successful example for a blockchain-based cryptocurrency, because “it entered the market focusing on the niche “remittance payments” as a competitive alternative against existing providers like PayPal or Western Union”. It was very interesting that most SMEs stated that blockchain-based cryptocurrencies are an important technology to develop new business models for digital payment systems in sub-Saharan Africa, but as we dug deeper, they also mentioned their disadvantages and limitations confirming that they are not really sure about the real potential.

The answer to the question “what are the perceptions of subject-matter experts about the main technologies to develop new business models for digital payment systems in sub-Saharan Africa?” show that mobile money is an important technology to develop new business models for digital payment systems in sub-Saharan Africa. The literature and other source of evidence support this finding demonstrating the success of mobile money in this region (Burns, 2018; EY Global, 2017; GSMA, 2017). New technology gives prior non-users access to financial services. Thus, there is relatively low endowment effect or status quo bias (Gourville, 2006). For existing bank clients, new payment systems have a far higher impact than the losses of the traditional bank account due to easier handling, faster transactions, and lower cost (Gourville, 2006) leading to higher and faster growth, adoption, and inclusion rates of digital payment systems according to the SMEs. The SMEs expect that the current growth of digital payment systems in sub-Saharan Africa will facilitate the success of innovative technologies. Specifically, blockchain-based cryptocurrency will be an essential technology in developing new business models for money transfer or payment systems in sub-Saharan Africa, as some SMEs stated, but not all SME’s are convinced that it will replace traditional digital payment systems.

Q2) What are the perceptions of subject-matter experts about the required framework conditions and success factors to develop new business models for digital payment systems successfully in sub-Saharan Africa?

Technology infrastructure and supportive regulation are the two most mentioned framework conditions needed to develop new business models for digital payment systems in sub-Saharan Africa. In fact, ten out of the twelve SMEs mentioned technology infrastructure as an essential framework condition. The adoption of new digital payment systems in sub-Saharan Africa "can only be driven by an appropriate technological infrastructure in the mobile and internet usage." The literature agrees that the adoption of mobile technology has been a driving force behind its success (Mothobi & Grzybowski, 2017; Weichert, 2017).

Seven out of the ten SMEs expressed that supportive regulation is a necessary framework condition, but they stressed the importance that regulation needs to be "flexible and support entrepreneurship." One SME spoke to the need for "smart regulation" to create a sandbox for startups and focuses on consumer protection, privacy, and guarantee payments. The SMEs spoke to the need for regulations to "secure customer rights" and "protection against fraud and identity theft or other cybercrimes." Both quoted SMEs point to concern about safety for consumers as a necessary condition for the digital payment business models to be successful.

Table 2: Categories and quotes

| Number | Category | Quotes (examples) |
|--------|----------------|--|
| 1 | Infrastructure | <ul style="list-style-type: none"> • The adoption of ... "can only be driven by an appropriate technological infrastructure in the mobile and internet usage." • "Infrastructure is another main factor because it may limit interested parties in introducing micro-financial services in rural areas of Africa." • ... "sophisticated technological infrastructure with high-speed internet access to allow instant peer-to-peer payments". |
| 2 | Regulation | <ul style="list-style-type: none"> • Regulation needs to be "flexible and support entrepreneurship." • Need for "smart regulation" to create a sandbox • Regulations to "secure customer rights" and "protection against fraud and identity theft or other cybercrimes." |

Source: Authors

The answer to the question "What are the perceptions of subject-matter experts about the required framework conditions and success factors to develop new business models for digital payment systems successfully in sub-Saharan Africa?" is that infrastructure is a technological key success factor and that supportive regulation is necessary to allow for

entrepreneurs to drive innovation, to protect consumers against fraud and to reduce their psychological bias (Gourville, 2016). This conclusion supports the findings in the literature regarding technology infrastructure (Mothobi & Grzybowski, 2017; Weichert, 2017) and regulation (Burns, 2018; FATF, 2014).

Conclusion

This paper contributes to the body of research on FinTech services by taking a more in-depth look into digital payment systems in sub-Saharan Africa using Gourville's (2006) theoretical framework on the psychology of new-product adoption. The findings provide suggestions for quantitative research about how providers of digital payment systems in sub-Saharan Africa are able to overcome psychological biases of potential users with easy-to-use, fast, and low cost products. This paper also provides a benefit to FinTech innovators and policymakers by providing valuable perceptions on technologies, consumer psychology, and framework conditions essential to the successful adoption of digital payment systems in sub-Saharan Africa and new suggestions for further research.

The rapid adoption of digital payment systems in sub-Saharan Africa shows that there is a low cost of behavior change associated with the incumbent product-cash (Burns, 2018; EY Global, 2017; Gourville, 2006; GSMA, 2017). The previous growth of digital payment systems in sub-Saharan Africa will facilitate the success of other digital payment technologies (Elliot et al, 2018), especially when they support network effects and incentives. According to our suggestions for further research, blockchain-based cryptocurrencies might be an essential technology in developing new business models for digital payment systems in Africa, if they can overcome their current limitations like e.g. scaling cost and price volatility.

This study shines a light on the need for technology infrastructure, 'enabling' government regulation, and technology adaptation for the sub-Saharan African market. It will be important for government regulation to create an enabling environment for entrepreneurs to adapt the technology for the sub-Saharan African market as well as create protections for consumers to reduce psychological bias as they delve into the world of FinTech services (Burns, 2018).

The findings suggest that technology infrastructure is key to the success of digital payment systems and regulation is necessary to both allow for entrepreneurs to drive innovation and to protect consumers against fraud. This conclusion supports the findings in the literature

regarding technology infrastructure (Mothobi & Grzybowski, 2017; Weichert, 2017) and regulation (Burns, 2018; FATF, 2014).

The FinTech environment is changing rapidly and requires consistent review of the changes within the ecosystem of financial technology innovations. The limitations of the study findings are the high diversity and the highly dynamic development of sub-Saharan countries in Africa and the qualitative research methodology. The outcomes of this survey might be transferred to another setting, but are not generalizable or replicable to the general population. This paper identified two specific areas for further research: how unstable local currencies makes non-traditional payments and digital currencies more attractive; and what are the psychological costs associated with changing to cryptocurrency using quantitative research methodologies and a focus on individual countries.

It is evident by the converging literature that FinTech is an important, yet fast moving topic for policymakers, FinTech innovators, and researchers. Indeed, sub-Saharan Africa is at an exciting moment where the environment is fertile for FinTech growth (EY Group, 2017).

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GENDER PAY GAP IN THE STATE ADMINISTRATION OF THE CZECH REPUBLIC

Michael Forman

Abstract

Purpose: The most common phenomenon in labour market is inequality of remuneration according to gender, also called Gender pay gap. This disproportion in pay has varying degrees all around the world, affecting the global labour market. The firmness of the business sphere and the state administration is quite obvious in this issue. Employee remuneration is very closely related to the issue of ethical leadership and human resources management for the future.

Design/methodology/approach: This article focuses on the analysis of unequal remuneration in the specific environment of state administration in the Czech Republic. Author compared the data obtained from the Czech ministries from the year 2018 in order to find out gender pay gap in the Czech Republic and then carried out regression analysis on these data.

Findings: On the basis of the statistical analysis, it was found that even within the state administration of the Czech Republic there are unequal rewarded men and women, which is to the detriment of the female sex.

Research/practical implications: These findings should outline the current state of remuneration within the state administration of the Czech Republic. Based on these findings, the system could be corrected and adjusted.

Originality/value: The present study analyzes the differences in male and female reward within the state administration of the Czech Republic. Similar comprehensive information in the present form is currently not published anywhere else.

Keywords: Gender Pay Gap, State Administration, Czech Republic

JEL Codes: M50, M52, M54

Introduction

In recent years, human resources management has been a very dynamic and rapidly evolving industry within the comprehensive management and management of companies in all sectors of human activity. Company owners and senior managers have, over time, come to the stage of seeing their employees as the key source of their business and seeing the potential for further growth.

Nevertheless, even in this highly competitive area, disparities in the form of unequal access to employees still occur very abundantly. This unequal approach can be seen in a number of dimensions, for example in the allocation of work tasks, holiday leave, benefits, and, of course, even the most basic, in terms of pay alone. The principle of equal pay within the Czech Republic stems from the Charter of Fundamental Rights and Freedoms, the Labour Code and other statutory standards. According to the present literature it is more than less an ethical problem which can be solved primarily by the managers.

The main benefit of this article is to update Eurostat information from 2016 and establish its validity for 2018, including confirmation of Eurostat's own findings on the level of gender pay gap for the state administration of the Czech Republic. These results will be further supplemented by a statistical view and the determination of the dependence of some variables within the labour relations.

1 Remuneration of state administration employees within the Czech Republic

In general, it can be stated that the remuneration of employees in the Czech Republic is relatively well regulated. Personalists can simply refer to the basic sources of law, such as the Labour Code or the State Service Act for civil employees. Legislators also seek to reflect on equal access to employees and apply it to remuneration. The support can be found already in the Constitution of the Czech Republic, specifically Article 28 of the Charter of Fundamental Rights and Freedoms, which provides that employees are entitled to fair remuneration for work and satisfactory working conditions. This issue is also addressed in the framework of the Labour Code, which states in several paragraphs that one of the principles of labour relations is equal treatment and nondiscrimination. In addition, it is mentioned, *inter alia*, that employers are obliged to ensure equal treatment of all employees as regards their working conditions and remuneration. The Czech Republic also has the so called Anti-Discrimination Act (Act No. 198/2009 Coll.). At the same time, it is necessary to mention that the reward itself varies

according to the environment. In a simplified way, we can divide it into the remuneration of salaried private sector employees and salaried state employees.

1.1 Remuneration within the state administration of the Czech Republic

Employee remuneration within the state administration of the Czech Republic is specific to remuneration in the private sector and is governed by several basic documents, which are crucial for determining the final salary of a civil servant. At the same time, there are certain mechanisms in place to ensure equal access to remuneration.

According to the Labour Code, state employees are paid by a salary, which is multicomponent. Basically, this salary has a tariff part of salary based on government-nominated salary scales. The specific amount of the salary is determined on the basis of the most demanding work (grade) and work experience, or the possible redeemable praxis (salary grade). A personal surcharge can be granted to this part of the salary, and a management fee is also available for senior management. In rare cases, additional bonuses, such as extra surcharge, risky, and so on, may be granted. But most often the salary in the state administration is two-component, or three-fold in the case of senior employees.

This table setting should ensure that for a work of similar intensity, employees should be rewarded by analogy, whereby this salary should also reflect their work experience in the form of a salary. Minor nuances in work performance should then differentiate the personal surcharge. Responsibility and difficulty in the form of leadership leads the management fee. For compliance with this system and equal access to all employees, the HR should be responsible in particular for the staffing department in cooperation with the relevant senior manager.

1.2 Gender pay gap

As a fundamental violation of equal access to employees in labour law or other relationships, it is possible to see precisely the unequal approach to remuneration. This unequal approach is reflected, in particular, in a differentiated approach to the remuneration of men and women who perform identical or comparable work. An unequal remuneration approach is described in the professional literature as the so-called gender pay gap (GPG).

The gender pay gap survey is calculated as the relative difference of median of men and women pay (expressed as a median of the wages of men) and expressed in % (Eurostat, 2018). Higher GPG in one of the categories do not necessarily mean discrimination. For the most part,

the difference can be explained by other factors with a different structure in men and women (except for education, for example, industry, employment, hours worked, etc.) as reported by the Czech Statistical Office.

In the GPG calculation, the median wage versus the wage average is used. Median represents the middle value of the ascending row of wages. Median ensures that there is no (unlike the average) distortion at extremely high or low values. Within the European Union (EU28), the average gender pay gap was 16.2 % in 2016.

For a wider context, it can be noted that, based on the AAUW study, the GPG value in the United States of America was around 20 % in 2016. Which, in comparison with the EU states, would rank among the worst Member States. Another study conducted by PayScale did not make any significant shifts in the United States for 2018, and the GPG remains at the same level. However, the overall trend over the last few decades has seen a significant shift towards greater gender equality (Blau and Kahn, 2000) and the convergence of wage conditions (Mandel and Semyonov, 2014). Territorial closer to us could be a study from Austria describing the increasing GPG trend by 2007. Follow up policy measures to reconcile work and family life, division of employment patterns and increased transparency of company remuneration have led to a stabilization of the remuneration system and gradual wage settlements (WIFO, 2017). One possible tool for reducing GPGs is the formal structuring of job positions and jobs (Goldin, 2014). In some studies, for example, it is stated that the GPG can be understood in part as natural, especially in purely male jobs (Berninger and Schröder, 2017) same (Miller, 2018), but this does not concern employees in the state administration, and there are individual positions of gender very well balanced. Other studies indicate that GPG is a natural part of the system and it is necessary to distinguish between what is natural and what is already discriminatory (Lips, 2013). Within the EU, these pay differentials are perceived very individually according to the country's traditional focus (Hofacker, Stoilova, & Riebling, 2011). It is also worth mentioning that in most cases, women's disproportion in men's and women's pay at work is not solved, and do not admit that they are entitled to higher wages (Davinson, 2014). The pay gap is largely an ethical issue to be addressed by line managers in particular (Granato, 2017).

The Statistical Office of the European Union Eurostat monitors the development and gender pay gap within the European Union every year, analyses the current situation and predicts further developments in this area. The latest findings for 2016 show that the average gender pay gap in the EU28 was 16.2 %. In terms of interpretation, this means that women earned an average of 16.2 % less than men in similar positions. The Czech Republic accounted

for 21.8 % and is therefore the second worst ranked country in the European Union, where the problem of unequal male and female remuneration is clearly analysed. It is also possible to divide the information thus obtained into private and public employees. Within these areas, there are often significant differences. For the purposes of this study, it is appropriate to focus on data in the Czech Republic. They show that gender pay gap in the private and public sector was 2.3 % for 2016. Specifically, the GPG was 20.5 % in government and 22.8 % in the private sector. An interesting finding is that the state administration achieves GPG of lower values than the private sphere, which could partly explain the legislative regulation of remuneration in the state administration.

2 Analysis of the approach of remuneration of employees of the state administration of the Czech Republic

In this study, author decided to verify the results published by Eurostat for the state administration in 2016, respectively to offer update and interpretation for 2018. For this purpose, data from three ministries of the Czech Republic was collected. These data were subjected to the same calculation as the Eurostat data and the development of the gender pay gap in the state administration of the Czech Republic for 2018 was identified. The analysis also describes the GPG shift in the author's findings and data measured by Eurostat. Furthermore, these data were subjected to a correlation analysis in order to find out the linear dependence of the wage level, respectively the amount of the personal supplement with the other compared variables. Overall, this is a survey on a sample of 2226 Czech state employees classified in one of three Czech ministries.

As mentioned above, in the part of the remuneration of civil employees, the salaries of state employees in the Czech Republic are multicomponent. For the purpose of this study, we will simplify the survey sample only for employees in nonleading positions (thus we abstain from the management fee) and we will not take into account the tariff part of the salary (this is determined on the basis of a deductible practice) in the study, so it is allocated to employees regardless of sex. This counts, moreover, for taking into account maternity and parental leave, so that the wage bill is not discriminatory for women. In comparing the available data from Eurostat, author will only come from comparing the amount of personal allowances for men and women in all grades. In the framework of the salary system of employees in the state administration, these employees are classified into grades based on the demandingness of the

work performed. For simplification, the grade will not be considered in this study and it will also be abstracted from any additional surcharges.

In the subsequent correlation analysis, the dependency between the variables that will be the salary (meaning personal surcharge), age and gender will be compared.

2.1 Eurostat findings for 2016 versus current Czech data for 2018

In the results of the European Statistical Office survey, it was found that for the year 2016 the gender pay gap in the Czech Republic averaged 21.8 %. Specifically, in the state sphere, the GPG was 20.5 %. Based on the data obtained by 2226 employees from three ministries, 69.14 % of women (1557 out of 2226) and 30.05 % of men (a total of 669 out of 2226) work in the Czech Republic's examined ministries.

On the basis of the above data, it is possible to further assess that this value has decreased for 2018. Specifically, this is 16.2 % within the sample under study. Thus, it can be said that Eurostat's 2016 conclusions can not be confirmed at this point without any further examination. Rather, it is possible to conclude that there is a gradual convergence of salary levels among employees of both sexes within the state administration of the Czech Republic.

Of course, Eurostat, in its study, took into account the wider sample than the study author. And just the size of the sample can cause some distortion. Other reasons for distortion may be that the ministries surveyed may have a different employee remuneration policy, headquarters in Prague, or the very fact that they are central administrative authorities.

2.2 Statistical analysis of variables in the remuneration of state employees in the Czech Republic

As part of the statistical testing of the obtained data, we used the correlation analysis to verify the existence or absence of linear dependence between the selected variables. Everything was especially taken into account for testing the amount of personal bonuses and other variables, which can very well reveal the dependence of the amount of the personal surcharge on other variables, and at the same time it can help to predict the expected amount of personal allowance for future employees. It can also say whether there is a certain link between the sex and the age of the employee and the amount of his personal surcharge. This information should, in the case of confirmation, be a warning signal for the investigated departments.

By regression analysis, it is possible to predict what values a random variable will acquire when we know the value of the second variable (Hindls, 2007). Since Y is a random

variable, it may not always get the value $E(Y|x)$ at the given value x of the random variable X but it will get the values scattered around it. Regression analysis determines the shape of stochastic dependence and regression function parameters, and can be graphically represented by a regression curve.

For the purposes of this study, the relationship between the salary (personal surcharge) and the age of the employee, and between the salary (personal allowance) and the gender of the employee, was examined. The use of the correlation analysis for these variables was chosen mainly because these two variables are the most common area of unequal access to employee remuneration. The author wanted to confirm or refute whether GPG findings are verifiable even within the correlation analysis.

2.3 Correlation analysis of salary dependency on the employee's age

The first correlation analysis was to determine the dependence of the salary on the age of the civil servant. In other words, the goal was to verify whether state employees are rewarded by seniority and working / life experience. This fact is primarily reflected in the salary scale, but the personal rating should not be projected. Based on the information from the theoretical part of the study, it is possible to determine the first hypothesis, that this should not be the case. Hypothesis $H_{1.0}$ - the amount of personal salary of the civil servant is not dependent on the employee's age. Alternative hypothesis $H_{1.1}$ - amount of personal salary of the civil servant is dependent on the employee's age.

As can be seen from Table 2, the correlation coefficient is 0.124 and is therefore very low and close to zero. From this value it can be deduced that there is very little dependence between the studied variables, or it can be stated that the amount of personal salary of the civil servant is not dependent on the employee's age. For further testing, a regression analysis was performed to determine a determinant, which is negligible. This result confirms the established hypothesis $H_{1.0}$.

Tab. 2: Correlation analysis for the salary / age relationship, including regression verification

| | Personal surcharge | Age of employee |
|--------------------|--------------------|-----------------|
| Personal surcharge | 1 | |
| Age of employee | 0,124355011 | 1 |

| Regression Statistics | |
|------------------------------|-------------|
| Correlation coefficient | 0,12435501 |
| Coefficient of determination | 0,015464169 |
| Adjusted R Square | 0,015202148 |
| Standard Error | 5120,31796 |
| Observations | 2226 |

Source: Author`s calculation

2.4 Analysis of salary dependence on employee gender

Another analysis was to determine the dependence of the salary on the gender of the civil employee. It was therefore examined whether the gender of the employee plays a role in determining the amount of the personal allowance. If we look again at the theoretical part, we should also conclude that this should not be the case. A personal surcharge is granted on the basis of the quality of the work done by the employee, regardless of gender. Thus, it is possible to set a second hypothesis, i.e. $H_{2.0}$ - employee's personal allowance will not be dependent on the gender of the employee and on the other hand $H_{2.1}$ - employee's personal allowance will be dependent on the gender of the employee. The amount of personal allowances should be divided according to the Gaussian curve, i.e. completely independent of the gender of the employee.

To determine the dependence of the personal bonus and gender, it is advisable to use the T-test for two independent variables where the average values for both men and women will be tested. The gender will be coded as 0 and 1. Before applying the T-test, it is necessary to verify that this test is carried out with equal or uneven diffusion. For this purpose, a two-choice F-test is used to determine whether the two selections (men and women) show approximately the same scattering of a given quantity within the specified significance level. Approximately identical scattering is a prerequisite for using some other tests, for example T-test with equal scattering. Alternatively, test with scattering inequality can be applied.

Table 3 shows us the results of gender scans and personal surcharge testing thanks to the F-test. From the test result, it is clear that further testing will be done with respect to the scattering inequality.

Tab. 3: Two-choice F-test to determine gender scatter / personal surcharge

| | <i>Personal surcharge</i> | <i>man/woman</i> |
|--------------|---------------------------|------------------|
| Mean | 8164,539084 | 0,300539084 |
| Dispersion | 26617490,16 | 0,210309822 |
| Observations | 2226 | 2226 |
| Difference | 2225 | 2225 |
| F | 126563229,2 | |
| P(F<=f) (1) | 0 | |
| F krit (1) | 1,072247121 | |

Source: Author`s calculation

Based on the findings from the two-choice F-test, it is possible to carry out further T-test testing with scattering inequality. The result of this test is shown in Table 4. This test does not confirm the established hypothesis $H_{2.0}$ on the basis of the same p-value, that is, the amount of the personal surcharge for a civil servant should not be dependent on his gender. The result of the T-test is also confirmed by the Gender Pay gap and Eurostat statistics that it plays a key role in gender pay within the Czech government.

Tab. 4: Two-choice T-test with gender variance / personal surcharge

| | <i>Personal surcharge</i> | <i>man/woman</i> |
|--------------------|---------------------------|------------------|
| Mean | 8164,539084 | 0,300539084 |
| Dispersion | 26617490,16 | 0,210309822 |
| Observations | 2226 | 2226 |
| Hyp. | | |
| Difference of mean | 0 | |
| Difference | 2225 | |
| t Stat | 74,66115648 | |
| P(T<=t) (1) | 0 | |
| t krit (1) | 1,645538754 | |
| P(T<=t) (2) | 0 | |
| t krit (2) | 1,961030744 | |

Source: Author`s calculation

Conclusion

This study focuses on the issue of Gender pay gap within the state administration of the Czech Republic, i.e. the issue of unequal access to compensation of employees by sex. The issue was also extended to age discrimination.

At the beginning of the study, the issue of GPG in the Czech Republic and the European Union and the survey of the European Statistical Office for 2016 are presented in general. Subsequently, on the basis of the study of current data from the state administration, these data are updated for 2018. Based on the current findings, it is stated, that there is an unequal approach in the state administration of the Czech Republic in the compensation of employees to the detriment of female employees. In addition, it is possible to identify a positive trend over the last two years, i.e. this difference is decreasing. Of course, it is not possible to make comprehensive conclusions as the analysed data covered about 3 % of the sample of state administration compared to the Eurostat study. This sample may also be distorted by the fact that it is an employee with a job in the capital and, moreover, employees of the central administrative authorities.

In addition, a statistical analysis was performed on these data to determine the relationship between salary and employee age and pay and gender by the employee. Both hypotheses $H_{1.0}$ and $H_{2.0}$ were based on the theoretical part. The first hypothesis $H_{1.0}$ stated that the salary of civil servants should not be dependent on the age of the employee. This hypothesis has been confirmed. The second hypothesis $H_{2.0}$ assumed the independence of the salary of a civil servant on sex. This hypothesis has not been confirmed. The result of the T-test showed that the salary of a civil servant in the Czech Republic is also affected by gender. This conclusion is in line with the findings of the Gender Pay gap and Eurostat statistics.

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VALUE CREATION THROUGH DIGITAL TECHNOLOGIES IN PRODUCT DEVELOPMENT ON RUSSIAN TELECOMMUNICATIONS MARKETS

Valentina Gerasimenko

Abstract

Purpose: The purpose of the study is to analyze new trends in the development of telecommunication markets and possible improvements in competitiveness as a result of the introduction of new digital technologies in management using the example of Russian telecommunications companies.

Design/methodology/approach: The objectives are achieved by studying the modern characteristics of the development of the telecommunications market. The sample for studying is one of the leading companies on the Russian telecommunication market. The main research methods are statistics analysis and survey to show new trends in the use of digital technologies in product development.

Findings: The analysis undertaken in the course of research has shown that the use of digital technologies in management has good prospects in value creation but there are big problems in the involvement of company managers in the process of digitalization

Research/practical implications: The research outcomes and their implications can be used for objective assessment of staff performance and quality of e-services. The suggestions for future research may include the development of a transparent system of remuneration using digital technologies in quality management.

Originality/value: The value is to evaluate the results of empirical testing of digital methods that can increase the lifetime value of the customer on the telecommunication markets and to assess the involvement of managers in the process of digitalization based on the survey.

Keywords: Value Creation, Predictive Testing, Resource Mining, Lifetime Value

JEL Codes: M11, M15, M31

Introduction

Economies of the world are entering the era of digital transformation. Today, digitalisation is relevant for all countries, Russia included. According to the World Economic Forum (2018) which publishes regularly Global Competitiveness Index, in 2016-2017 Russia ranks 38 in terms of global competitiveness. Telecommunications account for 47 % of the gross added value generated in the sector of computer and information technologies, the sphere of fast-developing new technologies in both production and management. Most telecommunication services (79%) have high consumer value and competitive advantages (Abdrakhmanova et al., 2018). This branch can be a driver of digitalization. That is why the Paper analyzes telecommunications markets in terms of digitalisation and the influence of digital technologies on competitiveness. There are still many issues of discussion in the area. What technologies can be effectively introduced in management now? Will they improve the competitiveness of the business? The paper examines these issues using the experience of introducing some digital technologies on the Russian market for telecommunications.

1 Methodology

Waller and Fawcett (2013) say that “data science, predictive analytics and big data is increasing in importance for academics as well as practitioners” (Waller and Fawcett, 2013). Martens et al. (2016) argue that one of the key drivers of modern marketing development should be fine-grained data on consumer behavior to improve predictive models for targeted marketing (Martens et al., 2016). According to Bradlow et al. (2017) “simply and heuristically put, these data sources will be adding “columns” to our databases (and a lot of columns!) that provide an increased ability to predict customer behavior and the implications of marketing on it” (Bradlow et al., 2017). Mortenson et al. (2015) argue that analytics is outpacing Operational Research and Management Science. They “does not exist entirely in isolation; the community must embrace and engage with the wider concerns of the ecosystem and paradigm or risk declining into obscurity” (Mortenson, 2015).

In the context of technological trends on telecommunications market, customer experience management can be represented as a unity of three components:

- digital product competitiveness management,
- evaluation of individual consumer experience of interaction with a digital product,
- establishing a channel of instant digital communication between the company and its customers (Gerasimenko and Tsvilin, 2017).

The implementation of this approach will facilitate introduction of digital technologies into management practice. „The popularity of big data and business analytics has increased tremendously in the last decade and a key challenge for organizations is in understanding how to leverage them to create business value“ (Vidgena et al., 2017). A digital product or service, in terms of quality, is provided to all clients equally, excluding periods of technological failures. This means that in the use of digital control technologies, the interaction "customer – service provider" can be supplemented with a digital system "customer - robot as a service provider", which will allow managers to take regular and continuous measurements and make objective technological assessment according to established criteria.

An important digital method of implementing the concept of customer experience management is predictive automated testing and control of all points of contact with the consumer. The key objective of the proposed method of predictive testing of contact points is to identify the facts and causes of degradation of the e-service quality before the problem affects consumers, which can be achieved by reducing or speeding up the cycle of service consumption.

Since the quality of services is a prerequisite for customer satisfaction, and the number of links between quality of service, satisfaction, loyalty, value and behavioural intentions is large, the measurement of the quality of digital services should be treated very carefully. It has been shown that e-quality service has a positive impact on satisfaction and has a positive impact on loyalty (e.g. Fuentes-Blasco et al., 2010, Pearson et al., 2012).

It is necessary to create a sustainable testing model involving relevant requirements for integrity, availability, and duration for each contact point. In this case, the urgent task is to determine a methodological approach to assessing the quality of contact points used by consumer of digital products; it will allow early identification of problem areas that might reduce consumer value of the product and lead to the loss of competitive position of the company.

We can say that the new automated approach to collecting information about the quality of contact points will help to create a representative database for assessing the competitiveness of services. It is important to note the advantages of the automated method of quality control of digital services for customer experience management:

- Formation of a representative sample on the quality of contact points in 24/7 mode;
- Absence of human factor influence on the assessment of the chain of contact quality, ability to compare the quality of services between the regions of business presence;
- Ability to have information about the quality of service in real time;

- Linking the flow of relevant information to the system of motivation of the people involved in the provision of services;
- Along with the use of modern technologies, it is important to consider the compliance of the applied technologies with the general vector of development of consumer preferences.
- Basic points of contact for automatic predictive testing can be used in service management, payment for services and provision of bonuses.
- What characteristics should a high-tech company have in order to create a product with maximum consumer utility, to form a positive customer experience and successfully manage it? First of all, the following parameters can be identified:

A) High **quality requirements**, the ability to ensure that the electronic quality service meets customer expectations and provides high customer value.

B) The ability to perceive and explore **relevant changes** in the vector of technological development and timely implement new technological achievements.

C) **Customization**, the ability of enterprises to segment the market and create a unique product focused on the individual consumer rather than on the mass segment.

D) Development of **network interaction with the customer**, management of customer experience at a high technological level. It was the rapid penetration of mobile applications in the everyday life of consumers that allowed companies to solve consumer problems quickly.

The development of telecommunications industry both in Russia and in the world has contributed to an even higher rate of growth of the ecosystem of mobile products and services based on data networks. The best-selling product and the object of relationship with clients is now the Internet content and electronic access facilities, to be exact – the right to provide the customer with an opportunity for self-expression and communication with other members of society.

To exploit these opportunities, managers need to take into account the new object of management – customer experience. The key competitive advantage of a modern digital service provider is the ability to deliver electronic services of the highest level, creating maximum consumer value of the product and service.

2 Empirical research and results

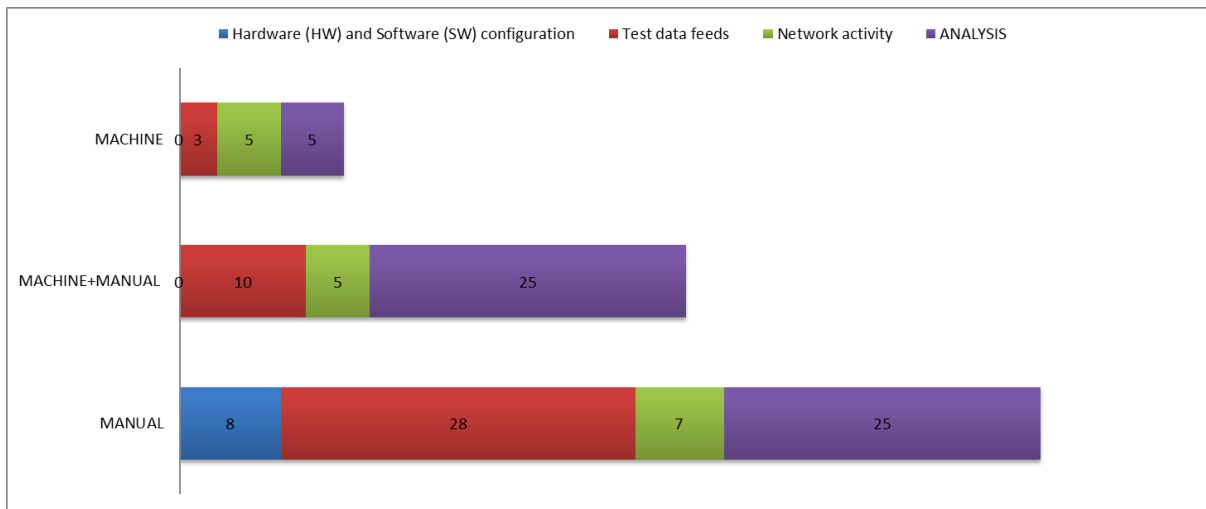
The aim of the study was to analyze some experience of using digital technologies and conclusions about the economic results and prospects of implementation. Then a survey of managers of Russian companies was conducted. The survey was to show the involvement of managers in the processes of digitalization and the complexity in this area.

In the course of the experiment a test was conducted in the one of the three largest leading companies on the Russian telecommunications market involving robotic predictive regional testing of customer experience using automation tools. Prior to the introduction of new methods, there were problems with sending sms notifications to consumers in macro-regions (North-West: Kaliningrad, St. Petersburg; South: Sochi and Stavropol), as well as degradation of quality metrics in a number of other regions. 4 indicators of a point of contact in 16 cities of Russia at different times of the day were assessed. 64 evaluations were received. In 8 cases, the availability of authorization services was at the level of 0-6%, in 6 cases – 50-60%, in 11 cases – 80-90%, the rest – 90-100%, which indicates a very low availability of the point of contact between consumer and the company's product. The data were obtained using indirect analytical methods for assessing the availability of contact points. After the introduction of the method of predictive automatic quality control of digital services from the consumer's point of view, the indicators of successful redirection of subscribers to the testing page have increased. Since 2017, all indicators have become higher than 90%. The implementation of the active testing method made it possible to make the key performance indicators manageable in the near real time regime.

According to the active testing systems, the quality of data transmission and consumer contact services has been improved: the availability of consumer web-authorization module has been improved, consumer profile recognition has been successful, and the recommended option has been displayed. The e-service of processing consumer requests for the transition to a more expensive data-service was also assessed. The availability of the authorization module by time of day and compliance of the variables "availability" and "conversion" (the ratio of the average daily availability of the authorization module and the average daily conversion of subscribers) has improved. The increase in the percentage of availability of the authorization module from 95.9% to 98.9% led to a corresponding increase in conversion from 13.5% to 19.5% on a daily basis. This made it possible to establish the level for affordability of the point of contact authorization at 98% and to identify the target standard of 99.5%.

Now the company carries out this and similar projects within the internal digital automatization framework (IDA). The research is concerned with methods of experimental tariff testing and introducing changes in the tariff plans before the tariff is offered to customers. There is a special method of testing a tariff or service. A diagram presents man-hour expenditures on doing all the tests using this method in 2018. The experiment in replacing people’s work with machine analysis has been effective for all types of operations (see Fig. 1).

Fig. 1: Comparison of testing tools (in man - hours)



Source: Compiled from: according to the experiment in the company, 2018. author’s elaboration.

From the methodological point of view, our study is based on the paired t-test, and compares company-level data for the periods before digitalization (June 2018) with those for the period after the testing of the machine analytics methods (august 2018).

For 76 degrees of freedom, the critical value for t-test is 1.992 at confidence $p=0.05$. The calculated value $t=86.615$. This means that the hypothesis of statistical significance in differences is correct.

If the calculated value for the t-test is equal to or greater than the critical value found in the table, we conclude that there is the statistical significance in the differences between the compared values.

Regarding the limitations of the study, it should be noted that these methods can be effectively used in large high-tech companies, as they require significant investment and skills of workers in the field of digital technologies, i.e. the limitations of research are related to technological capabilities, financial efficiency and qualification of personnel. Since application

of the technology can make business processes less labour intensive and thus lead to redundancies, The firm's social responsibility for its employees is another important limitation.

The described methods of predictive automatic quality control and internal digital automatization can be seen as an element of process mining (PM) systems. These systems automatically digitalize business processes; they show mistakes and bottlenecks. Both of the described experiment was analyzed and shown to be effective in customized marketing. They provide increased consumer value and rapid assessment of market conditions through big data.

Best practices should be actively implemented in companies. In the first two months of 2019, as the head of MBA programs at Lomonosov Moscow State University, I conducted a survey of MBA graduates in order to find out to what extent they are involved in management digitalization processes and identify major obstacles to using digital technologies in management in general and marketing in particular. The survey included 90 managers, 32% of whom work in production and the others in the services sector (trade, IT, finance, consulting and other services). Directors and CEOs make up 40% of the participants, 27% are department heads and 23% are managers in different areas. According to their responses, digital technologies are used mainly in marketing and business analysis (mobile marketing technologies -38%, social media in marketing - 42%, big data and business analysis – 49%). At the same time, 65% said they did not have sufficient information about the prospects of implementing up-to-date digital technologies in management and marketing. More than half of the respondents pointed to incompetence (25%) and lack of experience in digital technologies (38%) as the major obstacles to their use in business processes.

Conclusion

It is important to note that the survey involved the most active and highly qualified managers (graduates of the leading university MBA school). This suggests that managers of Russian companies feel the need for further research into digitalization of management and marketing, including the study of staff motivation. Universities should develop programmes of further education for managers with particular emphasis on digitalization practices.

This may be a direction for further research.

The analysis of experiments indicates the prospects of digital methods in management in the field of electronic services. Application of digital testing methods can bring about increases in the lifetime value (average monthly recurring revenue per user multiplied by average lifetime of a customer) of the customer (Farris & Neil, 2010). The task of maximizing

consumer utility requires an active analytical interaction of a company with its customers and creation of individual customer profile.

Creating a channel of targeted communication with the client is a difficult task. Such a channel should correspond to the preferences of consumers in terms of communication speed and motivate consumers to report problems with the quality of electronic services. At the same time, communication channel should deliver information directly "into the hands" of consumer, in accordance with the growth in consumption of mobile media content (Overview and Key Findings of the 2017 Report, 2017). Such a channel could be a mobile application, as the most compact format, easy to use and understand. It can be expected that thanks to modern digital technologies, company management will soon be able to create perceived value using the new customized model of relationships between the company and consumer based on the quality of information and e-service.

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TRANSFORMATION OF BUSINESS MODEL OF GENERATING COMPANIES IN RUSSIAN ENERGY SECTOR

Maria Gorgisheli – Irina Volkova – Anna Yakovleva

Abstract

Purpose: The paper aims at creation of an effective business model of global generating companies performing on Russian market and to develop a transformation plan of business for one of these companies.

Design/methodology/approach: The face-to-face interviews with Russian senior management of foreign generating companies were conducted to define the strategic development directions and the key characteristics of target business model. The literature review enables to systematize knowledge about the challenges of both global and Russian energy market and of the energy companies' strategic initiatives. The analysis assisted to incorporate innovative elements into new business model of generating companies and to determine the stages of its transformation, taking one of these companies as an example.

Findings: Generating companies' performance is influenced by Russian energy market institutional features. The key directions for companies' development are to increase the share of generating capacity working on RES and to diversify activities. According to these findings, the target business model was created and the scalable plan of refined business model adaptation in a particular generating company was suggested.

Research/practical implications: The findings of the paper appear in elaboration of the methodological approach towards the transformation of foreign generating companies' business models on Russian market. Strategic vision of market evolution and key characteristics of business activities will let managers create state-of-the-art business model. Adoption of the model in diverse foreign generating companies accumulates the data about the challenges of this process. This fact might give the ground for future research in this field.

Originality/value: Review of the differences between foreign generating companies' business model in both global and Russian energy sectors. New business model including renewed elements of Russian generating companies and a plan for business model adaptation.

Keywords: Business Model, Energy Sector, Generating Company

JEL Codes: M10, O30, Q42

Introduction

Global trends in power sector development evoke companies to be on the cutting edge of emerging technologies, new business models (further - BM) and approaches to the energy sphere enhancement. Consequently, companies operating both globally and locally have to transform their managerial practices to meet the contemporary requirements. One of the core tools – a subject to change – is a BM of the power industry company. Specifically, BM defines the way of company performance and of interaction with market. That is why compliance of energy companies' BM to current world trends may become essential for studying. On the assumption of mentioned above, the authors consider innovative BM creation as a prospective field of the research. Hence, the purpose of the paper is to elaborate a renewed BM corresponding to contemporary trends and to propose the scalable plan of the one of the Russian energy companies' BM transformation. The aim of the research might be accomplished through the fulfillment of the following tasks: 1) energy market analysis; 2) academic papers review and deep interviews with representatives of Russian energy generating companies; 3) creation of renewed BM 4) suggestion of a mechanism which might assist to adapt an innovative BM in the case of Enel Russia.

1 Influence of Russian Power Industry Imperfections on the Strategy of Foreign Generating Companies

The global energy market is characterised by an active transformation and an established liaison change between its participants (Ellabban, 2014). Advanced technologies influence necessary background for new environment creation where participants play new roles. All told evoke formation of renewed power sector paradigm (see Table 1).

Tab. 1: Characteristics of Dominated and Forming Paradigms of Power Sector Development.

| | Dominated paradigm | Forming paradigm |
|--|--|--|
| Sources of energy production | Fossil fuels are the base of power sector | Green energy. Decentralization of energy generation |
| Energy companies | Vertically integrated companies, which have high installed capacity and own deposits | Decentralized market, private investments. Predominance of private companies, which have diversified structure and partnership network with IT companies |
| Network infrastructure | Centralized system of electric grid management | Digitalization and intellectualization of energy system. Development of smart grids |
| Customer role | Unidirectional power flow (from generating company to consumer). Passive role of consumer | Proactive behaviour of consumers. Forming trends by consumers |
| Efficiency of energy use | Simultaneity of electric power production and consumption | Development of systems of energy storage. Increase in efficiency of energy using |
| Distribution of electrification | Use fossil fuels in different industries | Active process of electrification in different industries |

Source: Kniahinin&Kholkin (2017)

Due to institutional flexibility of European markets and of BM relevant to new dynamic environment, the global energy companies can sustain current competitiveness level and respond to the market challenges in time. Such companies diversify businesses, implement new technological decisions and develop strategic partnerships with IT companies, equipment suppliers etc.

Russian power industry imperfections are characterized by lack of wholesale and retail market competition, by ineffective industry support programmes (including development of renewable energy sources - further RES), by infrastructure obsolescence influencing the energy companies' performance (Gitelman, 2014). These Russian electricity market particular features force companies - parts of global groups - to develop renewed BM. A few examples of international companies' new BM adaptation are presented below.

"E.On" is one of the leading global companies performing on Russian market. It was a pioneer in transformation of its BM towards RES. "E.On" delegated fuel resource extraction; traditional resources energy generation and energy delivery to its subsidiary "Uniper". A shift to the model "Internet of energy" was done by "E.On" properly (Kniahinin&Kholkin, 2017). Similar approach to transformation was implemented by particular case of German company "RWE". Unlike "E.On" kept traditional production and its subsidiary "Innogy" involved in

innovation activities. An illustrative example of “Enel Group“: in 2017 “Enel“ and “E.On“ were the first companies which sold energy using blockchain technology.

Detailed analysis of these companies’ annual reports and another available information helps to discover company’s limited growth, despite the efforts to „nurture“ innovation. To prove this fact we compared the strategic responses of aforementioned companies to global challenges on both world and Russian market. for each challenge the possible responses are applied by different international companies were determined. The results are shown in Table 2.

Tab. 2: Energy Companies Responses to Global Challenges.

| Type of Challenge | Global Companies Response | Enel | | EDF | | E.On | | Fortum | |
|--|---|------|---|-----|---|------|---|--------|---|
| | | W | R | W | R | W | R | W | R |
| Decrease of traditional energy sector efficiency | - Internationalization | + | | + | | + | | + | |
| | - Diversification (electromobility) | + | + | + | | + | | + | |
| Downsize of CO2 emissions. | - Nuclear energy projects | | | + | + | | | + | |
| | - RES projects | + | + | + | | + | | + | + |
| Rise of renewable energy | - Solar energy development | + | | + | | + | | + | + |
| | - Wind energy development | + | + | + | | + | | + | + |
| | - Geothermal energy development | + | | + | | | | + | |
| Digitalization of energy system (on the base of Internet of energy) | - Strategic partnerships with IT companies | + | | + | + | + | + | + | + |
| | - Use blockchain technology | + | | + | | + | | | |
| | - Demand management services, smart grid | + | + | + | + | | | + | |
| Decentralized energy development | - Construction of efficient power plants of different capacity for industrial consumers | | | + | + | | | | |
| | - Solar panels for households | + | | | | + | | + | |

Source: Authors’ contribution * W - World, R – Russia

2 The Theoretical and Methodological Background

Due to transformation of Russian energy market maintaining of foreign generating companies’ competitive market position supported by appropriate BM becomes crucial. Despite the wide diffusion of the term “BM” in business and academic spheres, it is still interpreted in very different ways (Zott et al., 2011). In this paper we will use definition of Osterwalder and Pigneur because it reflects the main idea of BM: “the rationale of how an organization creates, delivers and captures value” (Osterwalder & Pigneur, 2010). There is plenty of other “BM” interpretations, however “the BM canvas” of A. Osterwalder is the most appropriate for generating company (Meier, 2014) and for purpose of our analysis.

Innovations in energy companies’ BM are in focus of the researchers. New energy paradigm destroys the old market structure and creates a lot of value propositions that majority of companies miss (Hall & Roelich, 2016). Renewed BM assists to respond the new market

challenges. However, the conditions for BM adaptation in developed and developing countries are different: significant barriers and restrictions in deve

loping countries adversely affect the development of generating companies' business (Engelken et al., 2016).

In order to identify the most vulnerable areas of BM of international energy groups Russian subsidiaries and the directions of companies' strategic development, the authors conducted a comprehensive study, including:

1. Analysis of theoretical and empirical works concerning the Russian electricity market, its problems and trends.

2. Studying of companies' freely available statements and reports, investors information.

3. Conducting a series of face-to-face interviews with the senior management of Enel Russia, EDF, Fortum, UniPro (Feb-Apr., 2018). The respondents were responsible for strategic and innovation management decisions, for transformation of internal business processes; in charge with industry regulation and communication with public authorities. The topics of interviews covered the following areas: retention of companies from the developing trends in Russian electricity market; priority areas of development; characteristics of the target BM, fundamental structural changes for the transition to the target BM.

4. Elaboration of target BM based on the data obtained during interviews with representatives of energy companies and on the literature analysis.

5. Development of a transformation plan of existing BM into new one in case of Enel Russia.

3 Description of Key Characteristics of Target BM

According to Russian power market development forecasts (Proskuryakova & Ermolenko, 2017) and interviewees' statements, foreign energy companies have two potential ways of growth strategy development in Russia. The first one that corresponds with the global decarbonization trend is to increase the share of generating capacity working on RES. As in other developing countries (Engelken et al., 2016) in Russia solar and wind energy are the most relevant and affordable types of RES. Some of the surveyed companies have already begun to transform their business to this direction.

For example, in 2017 the “Fortum” acquired 3 solar plants, manufactured by “Hevel” (MOEX Report, 2017). “Hevel” is a company manufacturing solar modules, build solar plants, provides the ready decision for households. Speaking about wind energy production, recently some tenders were held for construction of wind parks. In 2017 “Fortum” together with state corporation “Rusnano” acquired permission of wind plant construction. “Enel Russia” PJSC won tender for two wind parks construction in Rostov and Murmansk area (Official website of company).

The second strategy, according to respondents, is to diversify the activities of the generating company. It contains development of intelligent solutions for the market: demand management programs and energy storage systems, in particular (Kniahinin & Kholkin, 2017). In case of the diversifying strategy implementation the key factor of the strategy success might be formation of strategic partnerships with leading energy companies or with IT firms; development of companies’ own unit responsible for technology developments as well.

From the perspective of the mentioned above and considering necessity to create BM with new value propositions (Hall & Roelich, 2016), we suggest the following elements of renewed target BM of generating companies (see Table 4).

Tab. 3: Key Characteristics of Target BM of Generating Companies.

| Element of a BM | Key features |
|-------------------------------|--|
| Key Partners | <ul style="list-style-type: none"> - Strategic alliances with IT companies - Wide network of fuel suppliers. - Partnership networks with research centers and universities |
| Key Activities | <ul style="list-style-type: none"> - Main activity is the electricity generation with using of RES. - Additional - programs of demand management and systems of energy storage |
| Key Resources | <ul style="list-style-type: none"> - Power plants which operate on different types of fuel. - High-qualified employees (especially IT specialists). |
| Value Propositions | <ul style="list-style-type: none"> - High level of quality and safety - Client orientation (the fast reaction to demand changes) |
| Customer Relationships | <ul style="list-style-type: none"> - Adaptation to customer needs and wide range of provided services - Customer satisfaction control system |
| Channels | <ul style="list-style-type: none"> - Wholesale Electricity Market, thermal energy is sold on regional markets - Official website - Technological segment of Russian power market |
| Customer Segments | <ul style="list-style-type: none"> - Participants of Wholesale Electricity Market - Consumers of thermal energy - Consumers of technological solutions are participants of Russian power market segments |
| Cost Structure | <ul style="list-style-type: none"> - Rise in development costs and R&D costs - Lower fuel costs - Optimization program of various departments |
| Revenue Streams | <ul style="list-style-type: none"> - Sale of electricity and capacity on the Wholesale Electricity Market - Subsidizing the generation of electricity based on RES via the "green" tariff - Income from sale of technological solutions for energy market |

Source: authors' contribution

It is worth to mention that characteristics presented in the table are rather aggregative and optional. Target BM by its nature is the general guidelines, which need to be corrected according to generating company request. All in all, we determine the following differences between current and target BM:

- Key resources will be delivered by natural gas and RES plants. This mechanism will give the opportunity to manufacture green energy and to balance the costs of fuel.
- Companies' R&D departments and mutual partnerships may present new technological decisions on the energy market. This leads to coverage of a new consumer segment and to customer-oriented approach development.
- Despite the increased costs and investments in new activities, cash flow might grow as well.

4 Application of the Targeted BM in the Case of Enel Russia

One of the generating companies appropriate for the proposed BM application - JPSC Enel Russia might be considered as an example of the case study. This company represents part of the international Enel Group and therefore is most committed to taking advantage of new market opportunities. According to the global vector of development, the basis of its activities should be creation of affordable energy and new technological solutions for energy sector.

The announced Mission 2025 demonstrates certain areas of the company's development: Opening up access to energy, Opening up new technologies for energy, Opening up new technologies in household energy management and Openness to new partnerships, achieving sustainability through innovation (Official website of the company).

The company has already launched transformation of its BM to the renewable one by the following steps:

- planned sale of Reftinskaya GRES, which operates on coal and has a high percentage of depreciation of production assets,
- construction of two wind parks in Russia after participation in the state competition.

Besides the positive trends, the company has a number of problems that have sufficient impact on its competitiveness. The authors of the paper analyzed existing problems under the lens of the proposed elements of new BM (Table 5).

Tab. 4: The Inconsistency Between Enel Russia’s Current BM and the Future Conditions of Russian Electricity Market.

| Element of a BM | Gaps with the Future Conditions of the Russian Power Market |
|-------------------------------|---|
| Key Partners | - Weak partnership networks with IT companies, research centers |
| Key Activities | - Business is not diversified - Low level of R&D |
| Key Resources | - Power plants use natural gas and coal - Lack of IT specialists |
| Value Propositions | - No additional customer services and technologies - Weak response to the decarbonization trend |
| Customer Relationships | - Low client orientation - No customer satisfaction control system |
| Channels | - The site of the company is uninformative - Not present on the market of related services and energy technologies |
| Customer Segments | - Needs of consumers of intelligent energy solutions are not met |
| Cost Structure | - No decisive actions to reduce fuel costs - Low R&D costs |
| Revenue Streams | - Cash flows are not diversified |

Source: authors’ contribution

5 Mechanism for Enel Russia’s BM Transformation

Transition of Enel Russia companies from the traditional BM to the target one includes two areas identified earlier: power generation based on wind energy and development of intelligent solutions for the market.

Considering the first strategic direction of development, the company has already implemented some of BM elements. It is crucial to note that in spring 2018 (the period when the research was conducted), the company only won the tender for the construction of wind parks and carried out preliminary organizational actions. By the moment of current paper preparation of one of the wind parks of Enel Russia is already under construction. In future the company needs to reorganize many of its business processes so the integration of new generating capacity was completed successfully. We present a detailed transition plan (based on research motives, we consider only an example of one Park construction). We marked the stages that have already been implemented, as well (see Table 7).

Another direction of transition is associated with the activities of energy storage systems and of technologies in smart energy systems development. Such companies’ strategic vector is

merely a plan, supposed to be implemented in the cooperation with PJSC Rosseti and other foreign partners. The transition plan is shown in the Table 8. Sophisticated R&D Department and a large technology companies partner network will make companies to develop and to implement demand management programs and energy storage systems. This, in turn, will provide an opportunity to increase customer focus and get a new consumer segment.

Tab. 5: Adaptation Plan of Enel Russia’s BM in Transition to Wind Power Electricity Generation Performance

| Main steps | Changing Elements of BM | Status |
|--|--|--|
| Stage 1 (2016-2018) | | |
| <ul style="list-style-type: none"> • Working Group Formation • Solving of legal issues regarding building of a wind park • Partnership building with equipment supplier (Siemens Gamesa) • Taking part in the tender of wind park building | <ul style="list-style-type: none"> • Key Partners • Cost Structure • Value Propositions | All steps are completed |
| Stage 2 (2018-2021) | | |
| <ul style="list-style-type: none"> • Creation of Department of Renewable Energy • Partnership building with subjects of a WEM • Completion of wind park building | <ul style="list-style-type: none"> • Key Resources • Key Partners • Revenue Streams • Customer Relationships • Cost Structure • Value Propositions | <ul style="list-style-type: none"> • In planning • In progress • In progress (preparatory phase is completed) |
| Stage 3 (2021-2023) | | |
| <ul style="list-style-type: none"> • Creation of communication channels between RE Department and R&D Department • Development of cooperation with the authorities • Development of energy market players partnerships | <ul style="list-style-type: none"> • Key Partners • Cost Structure • Value Propositions | All steps are in planning |

Source: Authors’ contribution

Tab. 6: Adaptation Plan of Enel Russia’s BM in Transition to Intellectual Energy Market Performance

| Main steps | Changing Elements of BM | Status |
|--|---|--|
| Stage 1 (2019-2020) | | |
| <ul style="list-style-type: none"> Transformation of IT Department Searching of highly qualified staff by HR Department Increase in R&D investments | <ul style="list-style-type: none"> Key Resources Cost Structure Value Propositions | <ul style="list-style-type: none"> In progress In progress (company has collaboration programmes with universities) In progress (new development programme) |
| Stage 2 (2021-2022) | | |
| <ul style="list-style-type: none"> Integration with Enel Group R&D Department Partnership building with IT companies Development of own projects in intellectual energy | All BM elements will be changed | All steps are recommended |
| Stage 3 (2022-2024) | | |
| <ul style="list-style-type: none"> Creation of new R&D department based on the previous one Development of partnerships with IT-companies and energy market players Taking part in the programs of energy market digitalization | <ul style="list-style-type: none"> Key Partners Key Resources Cost Structure Value Propositions | All steps are recommended |

Source: Authors’ contribution

Conclusion

Russian energy sector imperfections impede development of foreign generating companies. Their business model in Russian market has a lot of weaknesses, including fossil fuel power stations, weak partnership networks with IT companies and low client orientation, which will be crucial in the nearest perspective. Impart with the literature analysis and with the results of interviews the authors systematized the key characteristics of renewed target BM. Such new features as the expanding of partnerships with other market participants, customer approach development and business diversification were added to the renewed BM. Use of RES, start of generating companies own R&D department and partnerships for making innovative technological decisions were revealed as valuable managerial practices as well.

The target BM possible implementation was shown using the example of Enel Russia. Today company has made significant progress towards using the wind energy. The author’s adaptation plans can be scalable and be used by other companies. But it is important to say that our target BM has some limitations for implementation. First of all, the applicability of this BM

is limited to the context of Russian market and its institutional landscape. Also it does not appropriate for vertically integrated companies with diversified business because of their organizational features and wide range of activities. Additionally, the suggested BM cannot be used by energy companies which operate in specific technological areas of energy sectors as that BM suppose the availability of traditional energy generating business.

Future research could focus on adaptation of global energy trends on Russian market and their influence on generating companies' BM. It is important to define new directions of energy companies' strategic development and key characteristics of a new target BM.

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NASCENT ENTREPRENEURS' BUSINESS PROPOSALS QUALITIES AND THEIR RELATIONSHIP TO FINANCIAL INDICATORS WHEN APPLYING FOR ANGEL INVESTMENT

Robert Hanák

Abstract

Purpose: In our paper we investigate angels investors' decision outcomes about selection processes when evaluating business proposals. Specifically, we examined the relationship between previous entrepreneurial performance measured by financial indicators and: a) ability to write sound business proposal, b) acceptance by group of business angels investors.

Design/methodology/approach: 322 nascent entrepreneurs asked Slovak Business Angels Network for investment by sending their business proposals, 102 of them already had past financial performance. By correlation design we tested if the quality of the business proposal (measured by Canvas business model and human capital) is in the relationship with specific financial indicators (profit, sales, ROA, liabilities to assets, growth indicators) and acceptance.

Findings: Entrepreneurial competence and professionalism measured by previous financial performance such as sales, profit, debt, liabilities of assets were not related with the quality of the business model (measured by Canvas total score) described in the business proposal. Gatekeeper's decision to accept or reject a business proposal in the first round of evaluation was also not related to financial performance indicators.

Research/practical implications: Gatekeeper, his team and investors should change their decision process. Entrepreneurial competence in generating positive requested financial indicators is different from competence in writing and describing sound business proposal.

Originality/value: Entrepreneurial performance and competence measured by summary financial indicators does not leads to the ability to write a high-quality business proposal with well-crafted business model. Investors' decision process is suboptimal in the first round.

Keywords: Angel Investor, Business Proposal, Financial Performance

JEL Codes: L26, L25, G41

Introduction

Nascent entrepreneurs face lack of capital needed for growth of their companies. Therefore they are de facto “forced” to rely on the capital from external resources. Besides “family, friends and fools”, business angels investors are the first external capital providers whom nascent entrepreneurs come to contact. For business angels investing into new enterprise it is a very risky process with very high probability of losing some part or even all invested money. Investors are aware of this and they are trying to improve the decision model and selection process of business proposal itself. In the last decade as one of the improvements they introduced group organization of activities and group decision making (Hsu, Haynie, Simmons & McKelvie, 2014). In some cases they employ a gatekeeper who with his team organizes the decision process and helps with evaluation of business proposals especially in the first step of evaluation. Gatekeeper is a professional manager and usually one of the investors. Decision process about investing money into a new venture consists of several levels of decision (Carpentier & Suret, 2015). In the first step investors or gatekeeper evaluate the business proposals which are sent by nascent entrepreneurs in the standardized form. In this first step most of business proposals are rejected and ratio of rejection is the highest from all evaluation steps. Carpentier, Suret, (2015) found that only 29.6% business proposals pass to the next rounds. Mitteness et al. (2012, p. 243) found that 40% were rejected in the first round which is identical with number 40% found by Petty and Gruber (2011). For Slovakia we have data for investment fund named Neulogy where only 27.6% passed from first round of evaluation to the next round.

There are many factors which investors take into account when deciding about investment into a new starting company (Maxwell, Jeffrey & Lévesque, 2011). Describing various decision criteria such as relevant experience, product status and others, only few dealt with finance, mostly cash flow, profitability. Literature search brings little results how previous financial performance affects the business angels’ decision making in the first round of evaluation. The most probable reason for this is fact that ventures are in the very early level of development and do not generate financial outcomes yet. On the other side minority of them do generate incomes and need investment for growth. Question is: how are performing those who are already are generating incomes? Therefore in our paper we are in broader terms investigating the role of financial performance measured by financial indicators in the process of business angels’ decision making.

It is difficult to select which financial indicators should be considered as most important but in our approach we relied on empirical studies, which investigated performance. Unger, Rauch, Frese & Rosenbusch (2011) in their meta-analysis investigated how human capital is related to performance found in empirical literature tens of indicators how success was measured. They created of them three summing groups: i) indicators measuring size (sales), ii) growth (growth in sales) and iii) profitability (ROA). Therefore first part of our investigation is to test relationship between gatekeeper's decision to accept or reject business proposal and financial indicators. We expect that acceptance of business proposal by gatekeeper is positively related with levels and scores of return on assets (ROA), sales, and profit and negatively related with liabilities to assets. We also expected that acceptance is positively related with growth indicators.

Almost all investigation of investors' decision making found, that a very highly valued criteria for acceptance is a well elaborated business model (Maxwell et. al., 2011; Carpentier, Suret, 2015; Petty and Gruber, 2011, Landström, 1998, Hsu et al., 2014). The quality of business proposal could be measured by the quality of business model described in it, so we can claim that if a business model is clear, sound and well elaborated, than the business proposal is also good. Therefore the second part of our research is dealing with quality of business proposal related to previous achievements measured by financial indicators. To write and elaborate high quality business model, experiences are needed (Toft-Kehler, Wennberg, Kim, 2014). In our sample managers and owners = entrepreneurs of the companies were the same people. Our sample is consisting of small companies which are managed by entrepreneurs themselves. Therefore for this specific manuscript entrepreneur is equivalent of manager. For entrepreneurs and owners having valid and relevant experience means that they are able to manage their companies, which could be measured by financial indicators. Competent, qualified, professional and experienced entrepreneurs could be identified by output of their work, which in general is measured by performance of their companies (Toft-Kehler et. al. 2014). These entrepreneurs could labelled as experts and for measuring expertise by performance is most reliable and best methodology available (Ericsson, Perez, Eccles, Lang, et al., 2009). We are expecting that if nascent entrepreneurs are able to manage their companies well, which means that their financial indicators are good, than they are able to write sound, well-written business proposals for their companies. Therefore we are expecting that good financial performance of the venture should be related with high quality of business proposal.

Methodology

1 Sample

This paper is based on data from longitudinal study of business angels organized into network named Slovak Business Angels Network and nascent entrepreneurs who are applying for investment from this group of investors. To fully cover this complex topic, multidisciplinary methodology was applied and also scientists with different background (management, psychology, sociology) were working with data. For this specific paper we applied financial/managerial methodology. From March 2015 till June 2017, 332 nascent entrepreneurs applied their business proposal to Slovak Business Angels Network. They filled a standardized form describing their product/service, customers etc. From those 332 business proposals we excluded 22 from following analysis because they were in so poor quality, few of those 22 were asking for private loan and some were illegal. We finally worked with 310 business proposals. From those 310 business proposals we have financial data only for 102 companies. Concept of business failure and re-starting individual entrepreneurial path with a new project was not considered in the study, because we worked only with static data and have no information about individual entrepreneurial activity more than 5 years ago.

2 Measures

Financial indicators: To measure financial performance we selected these financial indicators: *Sales*, *Profit*, *Return of Assets* measured in % and *Liabilities to Assets* measured in %. To measure growth indicators we used: *Average growth in sales* measured in %, *Compound annual growth rate in sales (CAGR)*, *Average growth of Liabilities to Assets* measured in % and *Total Profit/Loss*. *Average growth in sales* was measured as a mean of difference between every two years calculated in percentage. *Average growth of Liabilities* was also measured as mean of difference between every two years calculated in percentage. *Total Profit/Loss* was calculated as sum of all profits minus sum of all losses between years 2012 to 2016. We are aware that some financial indicators such as value added will be better suited for our sample but these were not available for our research and therefore we worked only with those financial indicators, which are reported above.

Because nascent entrepreneurs did not reported their financial data in business proposal only names of theirs companies and a statutory person, we searched for their financial data in private database of all registered Slovak ventures - FINSAT (<https://www.finstat.sk/>).

Financial history was used only for those business proposals which were described in standardized form, therefore financial performance is always related to specific business proposal. All financial data were collected for last five years from 2012 to 2016 included. We deliberately used raw scores of financial indicators not adjusted to industry standards, because from our data we were not been able in many cases to identify exactly from which industry majority of sales were generated. Therefore to avoid mismatch we relied on raw scores.

Business model: Entrepreneurs filled a standardized form and because it was in the verbal form, to evaluate quality of each business model described in the proposals, we had recoded data from verbal form to numerical form. We used Canvas business model methodology (Osterwalder, Pigneur, 2010), which is the most cited methodology used for business model description (Hartmann, Zaki, Feldmann, Neely, 2016). This methodology consists of 9 categories (Table 3). In the original book the authors used *channels* as single categories with 3 subcategories (*selling, distribution and communication channels*). We consider this single as very rough measure for channels which causes losing information, therefore in our case we used each of the subcategories as a full category. Therefore we had 11 categories instead of 9 original ones. Author of this manuscript and independent researcher conducted a blind quantitative content analysis of all submitted business proposals and scored each proposal into numeric form into above mentioned 11 categories. The score for every category was rated by 11 points Likert scale. From 0 (not present, very poorly described category) to 10 (perfectly, clearly, sufficiently and competently described category). To test reliability between evaluators we used intraclass correlation coefficient (ICC), $r = .94$ and Krippendorff's alpha coefficient $\alpha = .88$. These high numbers prove very high level of the reliability. Measuring quality of business proposal by quality of business model (Carpentier & Suret, 2015) is one from several valid and available methods (Petty & Gruber, 2011) and we selected in our study this one. In our research we were interested mostly at quality of business proposal in terms how well is business model elaborated and not at other available methods such as potential prospects of the business because the first could be measured with our data in more exact way that the second.

Human capital, team: From the business proposal we were able to collect following data related to team and we used 3 variables. *I. Number of people.* We counted how many people are in the team. *II. Specific people.* Nascent entrepreneurs in their business proposal could report specific names (coded 1) of their team members or not (coded 0). *III Specific job post.* Some of nascent entrepreneurs reported which specific job post (for example java programmer) will be

needed (coded 1). In other case many did not, writing just “we will need 5 people”, not describing what work they will be doing (coded 0).

Competition. If nascent entrepreneurs reported that they have no competition or they are not aware of it, we coded it 0. Describing competitors or reporting their qualities we coded as 1.

Acceptance/rejection: We used gatekeeper’s decision to accept (coded as 1) or reject (0) the business proposal for next round of evaluation.

Results and discussion

Firstly, we report relationship between acceptance (nominal variable) and total canvas score (interval variable) to make external validity check of our work. Eta coefficient for acceptance as dependent variable was .722, which is very high and we can conclude that good business model is strongly related with acceptance. Secondly to measure relationships between financial indicators and other variables we rely on the correlation design (using mostly Kendall’s tau statistics) because our data are not normally distributed. Nominal variables, extreme and influential cases violates rules for applying regression as suitable statistical method.

Next we describe the relationships between financial indicators and acceptance (Table 1). Because data were not normally distributed, we calculated relationship between variables by Kendall’s tau b method. As we can see in the last column in the Table 1, there is in fact no existing relationship between *average sales*, *profits* or *ROA* and being *accepted* for further evaluation. Only for *liabilities to assets* there is, as expected, negative relationship with acceptance. In the Table 1 we also report mean values for financial indicators. It is worthy to point out that mean values are for profit and ROA negative, also liabilities to assets were at very high values. These negative mean values indicate that in average most of the companies were in poor financial health when asking for investment from Angel investors.

Tab. 1: Relationship matrix between acceptance, business model and financial indicators, Kendall's tau b τ

| Financial indicators, Mean 2012 to 2016 | Descriptive statistics for Financial indicators in Euros or % | Business model score (Canvas total score) | Sales, n=98 | Profit | Return of Assets | Acceptance |
|---|---|---|---------------|-------------------------|------------------|----------------|
| Sales n = 98 | M = 98 920 , SD = 509 993 | .086, p = .21, | 1 | | | .001, p = .99 |
| Profit n = 102 | M = -3958 , SD = 23 769 | -.034, p = .62 | .12, p = .07 | 1 | | -.012, p = .88 |
| Return of Assets n = 101 | M = -793% , SD = 6446 | .11, p = .87, | .13, p = .051 | .503, p < .001, n = 101 | 1 | .042, p = .612 |
| Liabilities to Assets n = 101 | M = 394% , SD = 1704% | -.091, p = .18 | .13, p = .065 | -.294, p < .001 | -.35, p < .001 | -.139, p = .09 |

Comparing growth indicators with business model show similar pattern of weak relationships.

In the Table 2 we can see that Average growth in sales and also Compound annual growth (CAGR) in sales are related with business model score. Average growth in liabilities to assets is also related with acceptance but in unexpected way, which means the more new venture is in indebtedness, the higher probability of being accepted. From these results we could conclude that financial indicators are not related with being accepted for further evaluation.

Tab. 2: Relationship matrix between acceptance, business model and growth in financial indicators, Kendall's tau b τ

| Financial indicators, average 2012 to 2016 | Mean values (M), Standard deviation (SD) | Business model score (Canvas total score) | Average growth in sales %, n = 81 | Compound annual growth in sales, CAGR | Total Profit/Loss | Acceptance, measured by Eta coefficient |
|--|--|---|-----------------------------------|---------------------------------------|-------------------|---|
| Average growth in sales %, n = 81 | M = 195 %, SD = 540% | .14, p = .061 | 1 | | | .042 |
| Compound annual growth in sales, CAGR, n = 81 | M = .5, SD = 1.45 | .148, p=.047 | .53, p < .001 | 1 | | .03 |
| Total Profit/Loss, n = 104 | M = -20740, SD = 138 789 | -.03, p =.66 | .009, p = .907 | .12, p = .109 | 1 | .1 |
| Average growth of Liabilities to Assets %, n =83 | M = -75%, SD = 414% | -.015, p = .84 | .05, p = .533 | .03, p = .701 | -.014, p = 85 | .193 |

Source: Own data

Our second presumption was that with good entrepreneurial practices, demonstrated with good financial indicators, entrepreneurs are competent and qualified to create a sound business model described by perfect business proposal. Against our expectations, the relationship between business model, measured by total Canvas score and specific financial indicators are almost not existent or very weak (Table 3). For some Canvas categories we found only one significant from 44 investigated relationships and three others which were close to significance (in bold letters). All are in expected direction but all are at very low level, in fact trivial.

Tab. 3: Relationship between specific Canvas categories and financial indicators measured by, Kendall’s tau b τ coefficient

| Canvas categories | Sales n = 98 | Profit n =102 | Return of Assets n = 101 | Liabilities to Assets n = 101 |
|-----------------------------|----------------------|------------------|-----------------------------|----------------------------------|
| Customer segments | .09, p = .19 | .02, p = .75 | .03, p = .66 | -.11, p = .13 |
| Value proposition | .14, p = .056 | -.09, p = .19 | -.007, p = .92 | -.019, p = .79 |
| Selling channels | -.06, p = .41 | -.036, p = .61 | -.049, p = .48 | -.074, p = .29 |
| Distribution channels | -.033, p = .65 | .02, p = .76 | -.05, p = .44 | -.009, p = .31 |
| Communication channels | -.043, p = .55 | -.048, p = .5 | -.069, p = .33 | -.009, p = .9 |
| Relationship with customers | .087, p = .22 | -.048, p = .19 | .009, p = .9 | -.085, p = .22 |
| Revenue streams | .13, p = .06 | .029, p = .67 | .093, p = .18 | -.165, p = .02 |
| Key resources | .11, p = .12 | -.003, p = .71 | .091, p = .19 | -.039, p = .58 |
| Key activities | .11, p = .11 | -.045, p = .51 | .004, p = .57 | -.057, p = .41 |
| Key partnership | .11, p = .14 | -.07, p = .33 | -.037, p = .6 | -.039, p = .58 |
| Cost structure | .1, p = .15 | .007, p = .92 | .065, p = .36 | -.13, p = .07 |

Source: Own data

As we can see (Table 4) growth financial indicators seems to be more related with ability to describe specific canvas categories. From 44 combinations of canvas business model categories and financial indicators, 9 are statistically significant. From these numbers we could conclude that *average growth in sales* leads to learning in the group of entrepreneurs. So more theirs companies grow, the more they are competent to write sound business plan.

Tab. 4: Relationship between specific Canvas categories and financial indicators measuring growth calculated by Kendall's tau b coefficient

| Canvas categories | Average growth in sales in %, n = 81 | Compound annual growth in sales, CAGR, n = 81 | Total Profit/Loss in period 2012-2016, n = 104 | Average growth of Liabilities to Assets in %, n = 83 |
|-----------------------------|--------------------------------------|---|--|--|
| Customer segments | -.034, p = .66 | .052, p = .504 | .029, p = .67 | .003, p = .965 |
| Value proposition | -.047, p = .547 | .027, p = .721 | -.089, p = .195 | .023, p = .761 |
| Selling channels | .175, p = .027 | .155, p = .046 | -.034, p = .626 | -.02, p = .794 |
| Distribution channels | .177, p = .024 | .166, p = .033 | .028, p = .688 | .005, p = .953 |
| Communication channels | .129, p = .108 | .146, p = .064 | -.042, p = .543 | .067, p = .39 |
| Relationship with customers | .048, p = .536 | .04, p = .606 | .008, p = .908 | .117, p = .129 |
| Revenue streams | .043, p = .58 | .094, p = .22 | .026, p = .704 | -.065, p = .398 |
| Key resources | .095, p = .224 | .089, p = .25 | -.025, p = .720 | -.098, p = .203 |
| Key activities | .161, p = .039 | .147, p = .55 | -.041, p = .552 | .015, p = .847 |
| Key partnership | .194, p = .015 | .115, p = .14 | -.064, p = .360 | -.009, p = .911 |
| Cost structure | .195, p = .014 | .199, p = .011 | .025, p = .723 | -.089, p = .258 |

Source: Own data

In the third block of our analysis we are showing relationships between human capital reported in the business proposal and financial indicators. In general, human capital is considered as key factor of success for new venture (Maxwell et. al., 2011, Hsu et. al. 2014, Landström, 1998). We expected that with more people in the team, they bring more different competencies, qualifications, know-how and experiences to management creating synergy effect and they should be identified in the performance of the company, but as we can see in the Table 5, first column, positive relationships are in fact almost not existing.

Naming specific people and specific job posts in the business proposal is a sign of previous preparation, organization and planning. Based on this argumentation, we expected, that if entrepreneurs proved their competence measured by financial indicators than they will have good pool of human capital. As we can see in Table 5, relationships are positive but trivial in their intensity. In the last column we do report data for knowledge about competition and our financial indicators. We expected that they will positively and strongly relate with financial indicators especially with *sales*, but as we can see, the relationship is trivial.

Tab. 5: Relationship between human resources and financial indicators, Kendall's tau b and Eta coefficient

| Financial indicators | Number of people in the team, Kendall's tau b τ | Specific people, Eta coefficient | Specific job posts, Eta coefficient | Knowledge about competition, Eta coefficient |
|---------------------------------|--|----------------------------------|-------------------------------------|--|
| Sales, n = 98 | .05, p = .49 | .075 | .101 | .105 |
| Profit, n =102 | .028, p = .7 | .032 | .045 | .067 |
| ROA, n = 101 | .004 p = .96 | .097 | .12 | .113 |
| Liabilities to Assets, n = 101 | -.011, p = .88 | .15 | .107 | .099 |
| Average growth in sales, n = 78 | .085, p = .303 | .085 | .108 | .152 |

Source: Own data

In our last table (Table 6) we report results for growth financial indicators and human resources. As we can see the relationships are again weak and trivial. We found only small relationship between *Knowledge about competition* and *Average growth in sales*.

Tab. 6: Relationship between human resources and growth financial indicators, Kendall's tau b and Eta coefficient

| Financial indicators | Number of people in the team, Kendall's tau b τ | Specific people, Eta coefficient | Specific job posts, Eta coefficient | Knowledge about competition, Eta coefficient |
|---|--|----------------------------------|-------------------------------------|--|
| Average growth in sales in %, n = 80 | .086, p = .287 | .011 | .031 | .19 |
| Compound annual growth sales, CAGR, n = 83 | .133, p = .093 | .073 | .025 | .041 |
| Total Profit/Loss, n = 104 | .031, p = .665 | .041 | .051 | .055 |
| Average growth of Liabilities to Assets in %, n =82 | -.043, p = .586 | .137 | .129 | .179 |

Source: Own data

Conclusion

Angel investors who invest into new ventures evaluate business proposals applying for finance in the process consisting of several steps. In our analysis we investigated first step of evaluation when a gatekeeper of investor's group accepts a business proposal for next steps of evaluation or rejects them. From our results we could conclude that in this first step our investors do not take into account financial performance of business proposal relying only on the data provided by business proposal. They probably implicitly expect that those nascent entrepreneurs who are very competent, which means that they have very good levels of financial indicators, are capable to write high quality business proposal. In our paper we test this presumption which

could be specified this way. There is a positive relationship between financial indicators level and quality of business proposal.

To our surprise, we found trivial or not existing relationship between financial indicators and de facto all characteristics of business proposal such as business model and its specific categories, human resources or competition. Even in specific categories of Canvas business model such as Customer segments or Relationship with customers shows trivial relationship with real performance indicator such as sales. Only exceptions are indicators measuring growth for example mean growth in sales, which seems to be related with several of the Canvas categories. We also did not found relationship between gatekeeper's acceptances and financial indicators.

These surprising findings let us conclude that entrepreneurial competence in generating positive financial indicators is different from competence in writing and describing sound business proposal. We found only of mean sales growth relationship with business model which seems that if company is growing, entrepreneurs are more competent to write better business proposal. Decision making of gatekeeper and his team in first round of evaluation is based only on content of business proposal and information in the application form. Financial indicators are not part of this standardized form, they do not take them into account in this round of evaluation. This leads to rejecting business proposals which have good financial indicators but bad business proposal and acceptance of those with good business proposals but with poor financial indicators. This crucial finding may help the gatekeeper and his team to improve their decision making process and avoid mistakes.

One of the challenges for the future research is to investigate why this specific group of investors are using decision process, which in fact in some individual cases leads to rejecting those proposals which proved their quality in the "real" life. Much larger challenge is to investigate why positive financial performance does not lead to competence in the writing sound business model, why are those two not de facto related.

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FUZZINESS VERSUS RANDOMNESS IN MANAGERIAL PROJECT EVALUATION

Simona Hašková

Abstract

Purpose: Identification of analogy and differences between the probability and fuzzy approach is performed in order to determine which procedure is more beneficial for decision-makers in the field of strategic management and to assess whether the expected present value criterion is a strong guide to the manager's decision.

Design/methodology/approach: The methodology provides tools for dealing with uncertainty in managerial problems in the sense of randomness by means of the probability approach and vagueness through the fuzzy approach.

Findings: Information advantages of the fuzzy approach are stated in comparison to the probabilistic solution. They are exhibited in the application part within the project economic valuation of the construction and sale of apartment units. The theoretical superstructure rests in the description of the differences and analogy between the probabilistic and the fuzzy approach to the economic assessment.

Research/practical implications: Expected present value is a weighted average whose calculation deletes the values of the project scenarios; this result carries less information than information from individual scenarios. The fuzzy approach produces limits of possible values whose centre value is a subjectively expected value not burdened by managers' excessive optimism or pessimism in terms of probability occurrence of cash flows in individual scenarios. Knowledge of these limits is useful for investors with different attitudes towards risk and as such can be beneficial in terms of managerial decision-making.

Originality/value: Identification of the interval limits of possible expected value enables to identify maximum investment expenditure for a lossless project.

Keywords: Project Evaluation, Fuzzy Approach, Probabilistic Approach, Expected Present Value, Fuzzy Number

JEL Codes: C61, D81, G32

Introduction: Uncertainty in Managerial Problems

Most managerial decision-making takes place in situations where the decision consequences are burdened with uncertainty. Therefore, it is necessary to distinguish uncertainty within the meaning of fuzziness (i.e., in the sense of ambiguity, inaccuracy or vagueness) and uncertainty in terms of randomness.

Randomness can be considered only in connection with the elements of the universe, the objectively identified statistical characteristics of which are known. If nothing objective is known, it is uncertainty in the sense of fuzziness (Zadeh, 1983). Vagueness is the main source of uncertainty in many decision-making situations. It is perceived as a type of uncertainty that is connected with the use of intuitive (or linguistically defined) terms (Běhounek and Cintula, 2006). In mathematics, the concept of uncertainty is processed through fuzzy sets, i.e., classes in which no sharp transition between membership and non-membership exists (an interesting example of working with fuzzy sets can be found in Farana et al. (2016) who utilized fuzzy expert system for warehouse stock optimization). To deal with the existence of randomness the probability theory is applied (a practical demonstration of probability calculus applied in risk evaluation of mining industry can be traced in Davids (2016).

The core analyses lies in examination of the relationship between the fuzzy approach and the probabilistic approach in order to clarify main principles and differences and specify existing analogies for the purpose of identifying the procedure that is more advantageous to use in terms of managerial decision-making. This goal is subjected to the methodological part. The application part compares both approaches within the problem of quantifying the expected present value of the managerial project. The study enables to determine whether the expected present value criterion is a strong guide to the manager's decision. The outcomes are discussed and interpreted. The conclusion summarizes essential ideas and original findings on the theoretical and practical level.

1 Methodology: Random and Vague Phenomena in Managerial Theory

Statistic methods of the probability theory within the issue of investment decision-making are based on the quantification of budgeted values of future cash flows that are supposed to be generated by an investment (Volf, 2014). The most utilized criterion is the expected present value $E[PV]$, which represents a sum of the expected budgeted annual cash flows $E[CF_i]$ flowing in years $i = 1, 2, \dots, n$ expressed in their present values in the sense of Cohen and Neubert (2018) – see relation (1).

$$E[PV] = \sum_{i=1}^n E[CF_i] / \prod_{j=1}^i (1 + r_j), \quad (1)$$

where CF_i , $i > 0$ stands for the positive/negative net cash flows generated by the project in the i^{th} year of its lifetime, r_j represents a positive discount rate in the j^{th} year of the project operation, symbol E stands for the weighted average.

The cash flow probability analysis can be used if the probabilities of possible occurrences of flows are known, i.e., if the frequency distribution of possible outcomes can be constructed. If the distribution is unknown, e.g., in the case of a new product demand, most decision-makers require an expert opinion in order to predict the investment time cash flows.

The fuzzy method stems from the fuzzy sets theory and represents an alternative in the case of uncertain inputs that are characterized by absence of statistical description in the structure of the CF_i values and/or uncertain discount rates r_j . A fuzzy set is presented by a class of ordered pairs where the first member is an element of the given universe of consideration and the second member is a number from the interval $\langle 0,1 \rangle$ that assigns the membership degree to a subset of the universe. The membership degree reflects a rate in which the element complies with the fuzzy subset (details in e.g., Zadeh, 2006). Such a fuzzy subset is called the fuzzy number. A fuzzy number is thus a generalization of a real number within the meaning of not referring to one single value but rather to a set of possible values each of which has own “weight” – a membership function – in the interval $\langle 0,1 \rangle$ (for further details see Dostál, Rais and Sojka (2005)).

The example of a triangular membership function is the fuzzy number $PV = (PVL, PV, PVR)$ for uncertain cash flows (the CF_i fuzzy numbers) and uncertain discount rates (the r_j fuzzy numbers) – see Hašková (2017). Indexes L and R indicate the left and right limit edges of the interval. The middle number is its subjectively expected present value, which is usually placed in the centre of the fuzzy number interval. In the case of symmetric probability density, the centre value coincides with the statistically expected value.

A significant analogy exists between a probability density function of a random variable x and the membership function, which is the membership degree of the element x to a fuzzy number. More specifically, an analogy exists between the mean or expected value $E[x]$ of a random variable x (it is a horizontal coordinate of the centre of gravity of the area under the function $f(x)$ within its definition field) and a horizontal coordinate of the centre of gravity under the course of the membership function above the interval (it is specified by a fuzzy number in the case of an uncertain variable).

This analogy is useful in solving the problems with variables that cannot be described statistically. A single-value estimate can be performed by means of a coordinate of the position of the gravity centre of a suitable fuzzy number within the interval that corresponds to the set of all potential results.

2 Application: Fuzzy Versus Probabilistic Approach

This section presents the fuzzy and probability approach in a case of demonstrative decision-making problem in the field of strategic management. The basic information and input data are entered in the analogy with results of Khosrowshahi and Kaka (2007); Kenley and Wilson (1989):

- The start-up company evaluates the project of a modern residential building on the outskirts of the capital city.
- The construction completion is planned within two years from its start. A one-year delay in the plan means that the company will choose between the option to complete the project with a one-year delay or to sell the project for an estimated price of 23 million euros in the 3rd year. The possibility of construction completion according to the plan or a one-year delay is equally probable.
- In the case that construction is completed, apartments will be sold in the following year. The budgeted income from the sale (net income is the difference between the sum of revenues and operating costs, fixed costs associated with the investment and income tax) depends on the demand for apartments.
- In the case of the apartments' sale in the 3rd year, the demand is estimated with a 70 % probability; the sale of apartments a year later, a 60 % probability demand is expected.
- The project discount rate $r = 15\%$ is equal to the average cost of capital of the project. The company will not change the structure of its long-term sources of funding in the near future; therefore, it is considered a constant in calculation procedures.
- Tab. 1 captures prediction of net incomes from the sale of apartments in the 3rd year (N_{31} and N_{32}) and in the 4th year (N_{41} and N_{42}).

The manager's task is to assess the project according to the present value criterion and to specify the highest possible investment expenditure for a project with an adequate risk rate at which the project is not loss making.

Tab. 1: The budgeted net revenues of the project of a residential building

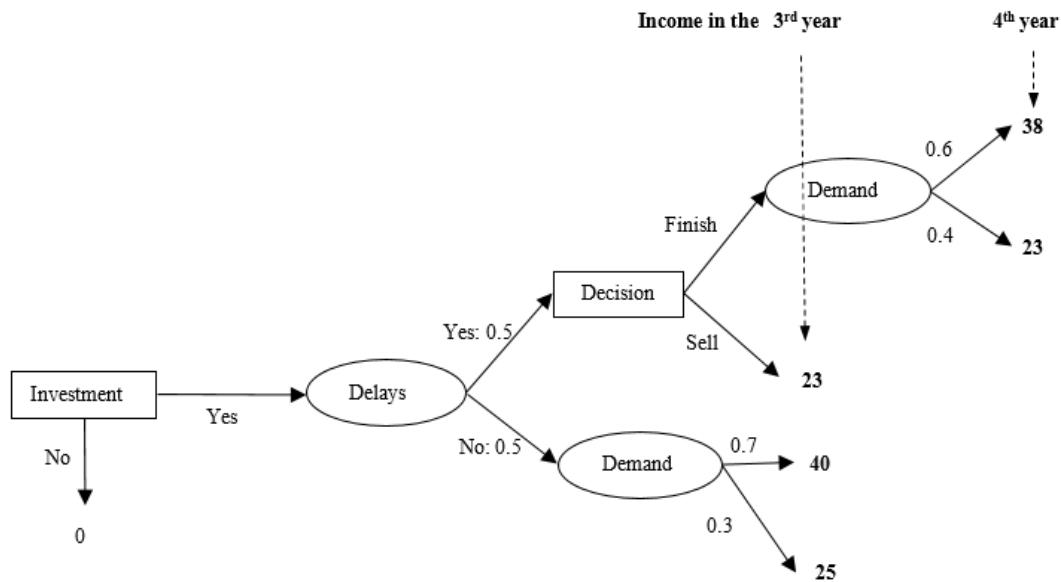
| The 3 rd year demand | Total net income on sale in the 3 rd year N ₃₁ and N ₃₂ |
|---------------------------------|--|
| Strong with probability 0.7 | 40 million euro |
| Weak with probability 0.3 | 25 million euro |
| The 4 th year demand | Total net income on sale in the 4 th year N ₄₁ and N ₄₂ |
| Strong with probability 0.6 | 38 million euro |
| Weak with probability 0.4 | 23 million euro |

Source: Author's elaboration

2.1 Construction of the Sequence Decision-Making Situation and its Analysis

The Tab. 1 data are recorded in the leaves of the decision tree in Fig. 1. The ellipses present situations characterizing the state of project implementation after the 2nd year from its start and probability of demand in the 3rd and 4th year. The rectangles indicate a decision whether to invest in the project; in the case of its realization, whether to finish it if delay occurs or to sell it unfinished.

Fig. 1: The project decision tree at current prices of the 3rd and 4th year (see data source of Tab. 1)



Source: Author's elaboration

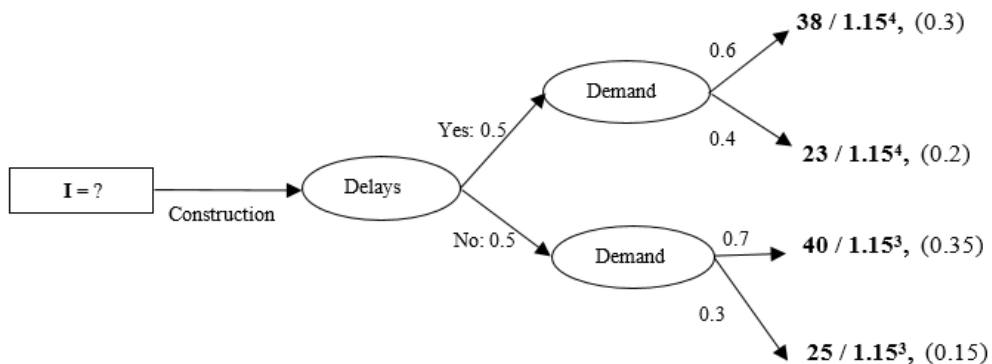
Project Value Based on Probabilistic Evaluation of Input Data

The decision task model in Fig. 1 is a sequential decision tree representing the statistical solution of the problem based on the unbiased predictions of the point estimates of random variables (see Tab. 1, right column). The completion time and demand are regarded as random variables.

Apart from the value coming from the root node in the event of a decision to invest, the positive numbers are displayed in all other tree lists, thus, $E(PV) > 0$. The question of whether to invest can be exchanged for the question “How much to invest?”. The second decision node compares the amount of 23 million euro for the project sale and the amount of 27.8 million euro given by the statistical calculus $(0.6 \cdot 38 + 0.4 \cdot 23) / 1.15 = 27.8$. As the second value is greater than the first one, the decision is known and thus, this decision node can be skipped. This step allows us to redraw the tree structure of Fig. 1 in the simpler form in Fig. 2.

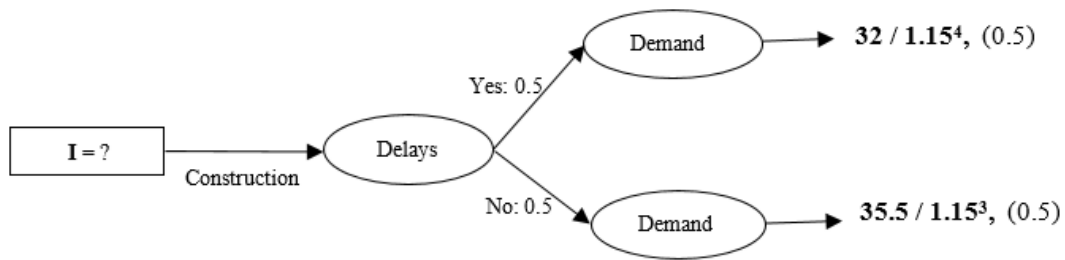
From Fig. 2 it results that $E[PV] = 0.5 \cdot (0.6 \cdot PV41 + 0.4 \cdot PV42) + 0.5 \cdot (0.7 \cdot PV31 + 0.3 \cdot PV32) = 0.5 \cdot (E[PV4] + E[PV3])$. The validity of equality $E[PV] = 0.5 \cdot (E[PV4] + E[PV3])$ enables to cut down the original number of scenarios of Fig. 2 to two scenarios and to alter the tree of Fig. 2 to the form of Fig. 3 with $E[PV4] = 32 / 1.154$ and $E[PV3] = 35.5 / 1.153$ the occurrence of which is equally probable.

Fig. 2: The simplified tree form of Fig. 1



Source: Author’s elaboration

Fig. 3: The statistic project model after scenarios reduction



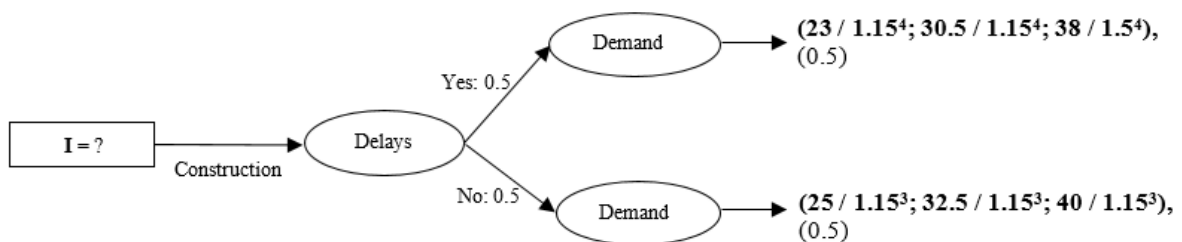
Source: author's elaboration

The searched solution equals $E[PV] = 0.5 \cdot (E[PV_4] + E[PV_3]) = 0.5 \cdot (32 / 1.15^4 + 35.5 / 1.15^3) = 20.82$ million euro, the value of which represents the internal project value. It also determines the highest possible investment expenditure for the lossless project.

Project Evaluation Based on the Fuzzy Approach

Reflecting data uncertainty in the fuzzy approach requires the substitution of anticipated point values of the variables with the triangular fuzzy numbers of the type (L; C; R), where L is the smallest considered value, R is the largest considered value and C is the centre value (an arithmetic mean). Thus, C is understood to be the subjectively expected value and, unlike the statistically expected value, which is objective as being derived from the observation, it does not converge to any of the limits of the interval of possible values. In the model, the demand for apartments represents the uncertain variable, from which the amount of net income results. In Fig. 1 the subjectively expected value C in the 3rd year equals to $30.5 / 1.15 = 26.5$. It is compared to the sum of 23 million euro for the project sale (see the second decision node in Fig. 1). The subjective value is higher than the value 23, thus, the second decision node can be skipped in analogy with Fig. 3 and the fuzzy decision tree model formed (see Fig. 4), where the second subjective value signs for 32.5 million euro.

Fig. 4: Model of the project from the viewpoint of the fuzzy approach



Source: Author's elaboration

Application of the tools of the interval calculus (Kahraman and Çebi, 2018) leads to obtaining the fuzzy number of the solution:

$$(E[PV]_L, E^*[PV], E[PV]_R) = (0.5 \cdot 23 / 1.15^4 + 0.5 \cdot 25 / 1.15^3; 0.5 \cdot 30.5 / 1.15^4 + 0.5 \cdot 32.5 / 1.15^3; 0.5 \cdot 38 / 1.15^4 + 0.5 \cdot 40 / 1.15^3) = (14.8; 19.4^*; 24),$$

in which an asterisk stands for the subjectively expected present value of potential net income from the apartments sale.

The obtained fuzzy number (14.8; 19.4*; 24) stands for the interval of possible internal project values. The left number represents the value of the pessimistic scenario; the right number the optimistic scenario and the centre number the subjectively expected project value. Concurrently, the fuzzy number defines the maximum investment expenditure for the lossless project.

2.2 Results Discussion: Probabilistic Versus Fuzzy Approach

From the comparison of the results of both approaches, it turned out that the fuzzy approach extends the statistical result for a certain amount of information. Firstly, the internal project value $E[PV]$ is a statistical variable, which is calculated as a weighted average of the values of the relevant scenarios. On the contrary, the internal project fuzzy value is a triangular fuzzy number of the type $E[PV] = (E[PV]_L, E^*[PV], E[PV]_R)$, the limit values of which stand for the lowest and largest possible present value with the centre value representing the subjectively expected value. The range $(E[PV]_L, E[PV]_R)$ can be perceived as a spread between the pessimistic and optimistic project development.

In addition, the fact that $E^*[PV] = 19.4$ is lower than $E[PV] = 20.82$ supports the opinion that managers tend to overestimate their appraisals of positive outcomes (Kahneman and Lovallo, 1993). This tendency corresponds to the probability distribution of apartments' demand in the 3rd and the 4th year.

Thus, it would not be correct to conclude that the statistical result of $E[PV] = 20.82$ million euro ensures minimal profit of 0.5 million euro for a project investment expenditure of 20 million euro. The result of the fuzzy analysis showed that to achieve this goal, the investment should not exceed the amount of 14.3 million euro (this is 0.5 less than PVL). It confirms that knowledge of the limits of possible $E[PV]$ interval provides important information for decision makers.

Conclusion

The uncertainty in the managerial decision-making can be handled by means of probability distribution if historical data of examined phenomena exist; this uncertainty is processed with probability theory. In the case of unknown frequency occurrence of the phenomena, the fuzzy approach is applied.

The expected present value criterion is the most utilized criterion of a probabilistic type in managerial decision-making. The fuzzy approach is based on the fuzzy number of present values that provides limits of possible values within the interval.

The core disparities and analogies of both approaches were described in theory, and were demonstrated in the case of calculation of the expected present value of project. The comparison of the probability result and the fuzzy result revealed that the fuzzy approach enriches the probability approach for a certain amount of information.

Primarily, from probabilistic point of view the expected present value is a weighted average the calculation of which deletes the values of the project scenarios. Such a result is a number carrying less information than the information of the scenarios. On the other hand, the fuzzy approach offers the limits of possible present values whose centre value is a subjectively expected value not being distorted by excessive optimism or pessimism of a decision maker. These limits are useful for investors with different attitudes towards risk and as such can be beneficial in terms of managerial decision-making.

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PRINCIPLES OF DATA DEFINITION FOR THE USE OF MEASURING GOVERNANCE

Christian Hitz – Milomir Vojvodic – Greyson Wicki

Abstract

Purpose: This study addresses the principles of data definition for the use of measuring governance. The study of data definition principles in the context of the measurement of governance is driven by the exponential growth of data sources accelerated by digitization. The study had two objectives: The identification of the data definition principles (1) and the examination of indicators of these principles by means of a survey (2).

Design/methodology/approach: It was a qualitative research approach for the identification of the data definition principles (objective 1). In addition to the scientific findings, interviews were carried out with Subject Matter Experts (SME). In addition, a quantitative approach was chosen to verify the indicators of the principles identified (objective 2). For data collection, >500 end users of data systems were contacted with a viral invitation. This invitation resulted in 75 completed questionnaires, of which a sample size of n=42 could be validated.

Findings: The qualitative study identified 17 elementary principles of data definition. The SME's ranked these principles. One third of the indicators describes the existence of data governance, which is essential for measuring governance. The quantitative study showed that the principles for the definition of content play a much greater role than the semantics and syntax of the Data. The perceived Data Quality is positively correlated with the principles of data definition of the Content of Information.

Research/practical implications: As data sources continue to grow exponentially, it becomes increasingly difficult to aggregate them into information and make them comparable. Since these sources are not known to each other in advance, the creation of a common denominator can only be achieved by establishing principles of data definition. The findings of this study help to define this minimum requirement of information content via principles of data definition.

Originality/value: This study is based on the research gap of non-uniform data management in the field of governance risk and compliance literature.

Keywords: Governance, Principles of Data Definition, Data Management, Data Quality

JEL Codes: M15, M42, M48

Introduction

For an effective and efficient management, control and strategic alignment of companies, managers have to make different measurements in order to make the right decisions and take the appropriate actions based on these measurements. This study mainly conducted in the context of the research framework for integrated GRC developed by Racz, Weippl and Seufert, where GRC stands for governance, risk management and compliance (Racz, Weippl & Seufert, 2010, p. 113). In modern corporate structures, the dependency on information technology is increasing constantly, especially in the processing of Data. Information and its correct interpretation are a critical success factor for an organization to be efficient, effective and competitive. Companies therefore need IT infrastructures, who record and process data for making management decisions based on relevant information (Gantz, 2014, p. 1). In addition to these IT infrastructures, generally applicable governance frameworks play an important role. Governance enables management to control and steer the company through measurements (Kneuper, 2015, p. 301). These measurements can come from different parts of an organisation and are partly subject to their own rules. Due to this diversity of rules and measures, there is a clear risk that these data will be misinterpreted. Misinterpretation can lead to an inaccurate assessment of the condition and performance of a company and to inappropriate action taken. This can lead to expenses and costs, which could be avoided, if the interpretation had been correct (Tödtmann, 2016). The GRC considerations can be applied to all areas of economics. Data governance also plays an important role in sustainable public administration. Cheong and Chang (2007, p. 1002) show data quality as a critical success factor. Khatri and Brown (2010, p. 150) describe the connection between IT governance and the principles of data definition, but do not go into further detail. Rivera, Loarte, Raymundo and Domínguez-Mateos (2017, p. 212) shows in this context that the degree of maturity in different considered domains of data quality is still mostly weak although the advantages of data governance are known. The literature discusses various challenges in this context (Brennan, 2017, p. 387). Possible solutions, however, are sought more in the organizational approaches than in the pure data definition, as the case study by Sung, Liming and Ross (2018, p. 5021) shows. These considerations give rise to the following hypotheses

H1: Principles of a Data Definition are positively associated with Data Governance

H2: A higher level of principles of a data definition is associated with higher level of perceived Data Quality

1 Assessment of Principles of Data Definition

According to Otremba (2016, p. 148) there are no congruent definitions of this term in governance, risk and compliance research. In addition, the use of the word *Governance* is predominantly related to with other terms such as IT Governance, Corporate Governance or enterprise governance and, paradoxically, is very rarely examined in detail (Schwertsik, 2012, p. 15). This ambiguity of the definition of governance in itself makes it more difficult to determine the principles of data definition. For the qualitative research and sensitizing of concepts, the approach of Box of Bricks was applied (Jonker & Pennink, 2010, p. 77)

For the survey, 18 SME's were interviewed with the aim of answering the following hypotheses supporting question.

Supporting Question: Which principles of data definition does a method of measurement have to comply with in order to provide a holistic view of the company and compare the resulting outcomes? The following Table 1 lists the codebook that elaborated and concluded the objective 1 of the study.

Tab. 1: List of Principles of Data Definition

| Principle | Indicator | Code | Description |
|------------------|--|------|---|
| Relevance | Purpose | v101 | The relevance of information is given to me when I know what it is intended to do. |
| Traceability | Determination of origin | v102 | For me, information is comprehensible when I know from which source it originates. |
| | Traceability | v103 | Information is traceable for me if I can trace it back to the source. |
| Context | Relation to Objects, Processes & Areas | v104 | I can recognize a connection when information shows the relationship of objects, processes or areas. |
| | Identification & Relation | v105 | Information only shows the relationship if the relationship to objects, processes, or areas is uniquely assigned. |
| | Temporal reference | v106 | An information shows a connection correctly only if it stands in a temporal relation. |
| Timeliness | Punctuality | v201 | Information is only valuable if it is available on time. |
| Universality | Company-wide validity | v202 | Information is universal if it is valid company-wide. |
| | Universal interpretation | v203 | Information is universal if it can be interpreted in the same way. |
| Credibility | Reputation | v204 | False information can lead to loss of reputation. |
| | Dependability | v205 | Information is credible when it is verifiable. |
| Uniqueness | Conciseness | v206 | Information is unambiguous if it has an accurate content. |
| Completeness | Accuracy | v207 | Information is complete when it accurately reproduces something. |
| | Level of detail | v208 | Information is complete when it has the right level of detail. |
| Consistency | Format | v209 | Information must be available in a correctly selected format. |
| | Structure | v210 | For consistency, it is necessary to know the degree of structuring. |
| | Freedom from repetition | v211 | A piece of information is consistent when it is free of repetition. |
| | Accuracy | v212 | A piece of information is consistent when it correctly reproduces a content. |
| Interpretability | Expressiveness | v213 | Information can be interpreted unambiguously if it is meaningful. |

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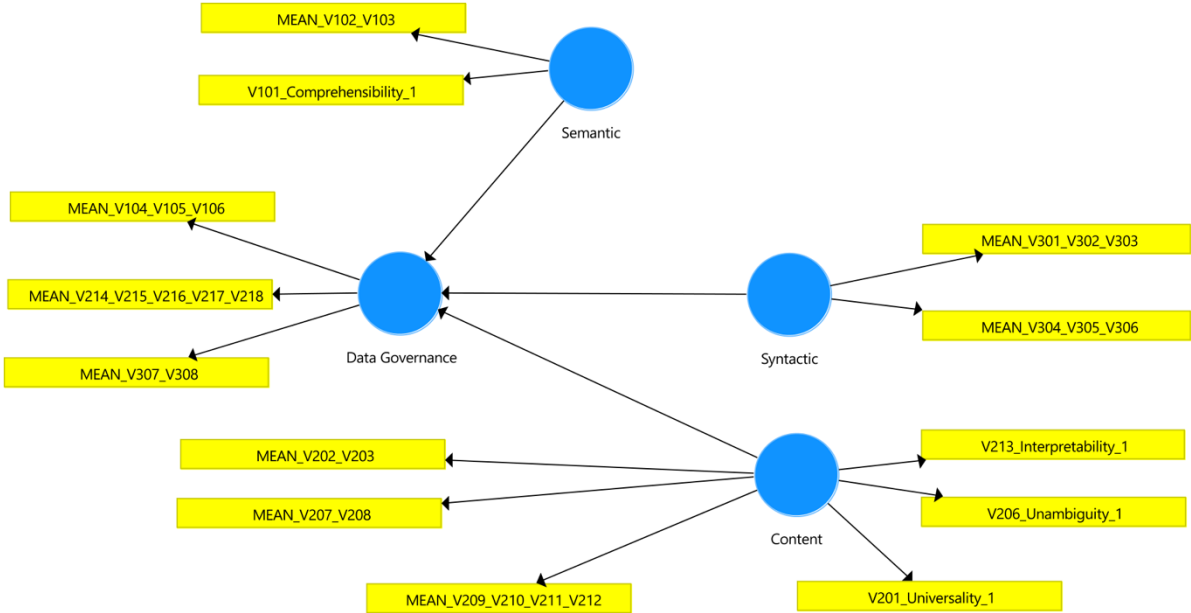
| | | | |
|-------------------|--------------------|------|---|
| Comprehensibility | Non-obviousness | v214 | Information is understandable if it is free of contradictions. |
| | Data comprehension | v215 | Information is understandable if the data is within the expected value range. |
| | Plausibility | v216 | Information is understandable if it is comprehensible. |
| | Reasoning | v217 | Information is understandable when it is logical. |
| | Ease of use | v218 | Information is understandable when it is intuitively accessible. |
| Preparation | Data structuring | v301 | Preparation is guaranteed if the data is structured. |
| | Automatability | v302 | Processing is guaranteed if the processing can be automated. |
| Extensibility | Editability | v303 | Data should be able to be refined by processing. |
| Version Control | Assertion | v304 | Data has a version control if its validity is validated. |
| Historization | Archiving | v305 | The historization of the data is then guaranteed if archived data records can be distinguished from current ones. |
| | Sequencing | v306 | The historization of the data is then guaranteed if the data records are sequenced. |
| Accessibility | Availability | v307 | Accessibility of the data is guaranteed when they are available. |
| Measurability | Comparability | v308 | The measurability of data is guaranteed if more than one data point is available. |

Source: Own elaboration

These indicators formed the basis for the questionnaire for quantitative analysis (objective 2). These principles can be assigned to three latent variables. The three categories of principles are (a) Semantic, (b) Syntactic and (c) Content. All three variables relate to Data Governance and are expected to have a positive correlation to it. The Semantic is targeting the coherence of information contents. The Syntactic is debates all technical requirements for Data Governance. Finally, the Content describes all principles, which are directly responsible of the actual meaning of the information.

Figure 1 shows the structural equation model and the relationships between the latent variables and the dependent variable Data Governance.

Fig. 1: Structural Equation Model



Source: SmartPLS, own elaboration

Survey

The survey was conducted with questions following the schema: In the observed company ... [...question...]. The observed company is to understand as the area of investigation. Answers followed a Likert Scale. Respondents must choose one of the following options: Totally disagree (1), disagree (2), neutral (3), agree (4), totally agree (5).

| |
|---|
| In the observed company ... |
| ... data is condensed into information that is relevant and useful. |
| ... information is comprehensible, because one knows from which source the data originate. |
| ... information is traceable back to the source. |
| ... data can be used to display relationships between objects, processes, or functions. |
| ... data can be uniquely assigned to an object, a process or a function. |
| ... data can be set to a temporal context. |
| ... data is available at the right time. |
| ... data becomes information that is valid company-wide. |
| ... data becomes information and is interpreted company-wide in the same way. |
| ... false information is considered a risk (e.g. planning uncertainty, loss of reputation). |
| ... information can be verified. |
| ... data is concise and accurately reflects information. |
| ... information is reproduced in detail. |
| ... information have an appropriate level of detail. |
| ... data is created in the correct data format. |
| ... data is consistent (uniform). |
| ... information is free of repetition. |
| ... information is reproduced uniformly and correctly. |
| ... information is meaningful because it can be clearly interpreted. |
| ... the information is understandable because it is free of contradictions. |
| ... there are data catalogues in which the possible values of data fields are defined or described. |
| ... information is comprehensible in terms of content. |
| ... information is understandable, because it has arisen logically (coherent). |
| ... information is intuitively understandable. |
| ... the majority of data is structured in such a way that a faultless preparation of information is possible. |
| ... the preparation of information is largely automated. |
| ... data originated at the source can later be extended by further data. |
| ... data is subject to version control, with which the valid version can be determined. |
| ... current data can be distinguished from historical data. |
| ... historized data are sequenced, i.e. the order of origin is recognizable. |
| ... the availability of data is given at any time. |
| ... several data points are always available for one piece of information, i.e. comparability is possible. |

All questions were posed in a positive formulation.

2 Data

2.1 Data Collection

For the survey, respondents were asked to evaluate survey items on a five-point scale - according to Likert (1932) from totally disagree (=1) to totally agree (=5). For each indicator of the codebook one question was risen. 75 respondents followed the invitation, whereof 42 completed the survey. The Data has been processed with the SmartPLS Software (Ringle, 2015).

Tables 2-4 show the descriptive statistics of the collected data set. The questions on the Data Governance were phrased to measure the perceived Data Quality based on the dependant variable Data Governance.

Tab. 2: Correlation and Covariance Matrix Used for Analysis

| | Content | Data Governance | Semantic | Syntactic |
|-----------------|---------|-----------------|----------|-----------|
| Content | 1 | 0.6583 | 0.4541 | 0.3186 |
| Data Governance | 0.6583 | 1 | 0.4139 | 0.372 |
| Semantic | 0.4541 | 0.4139 | 1 | 0.5193 |
| Syntactic | 0.3186 | 0.372 | 0.5193 | 1 |

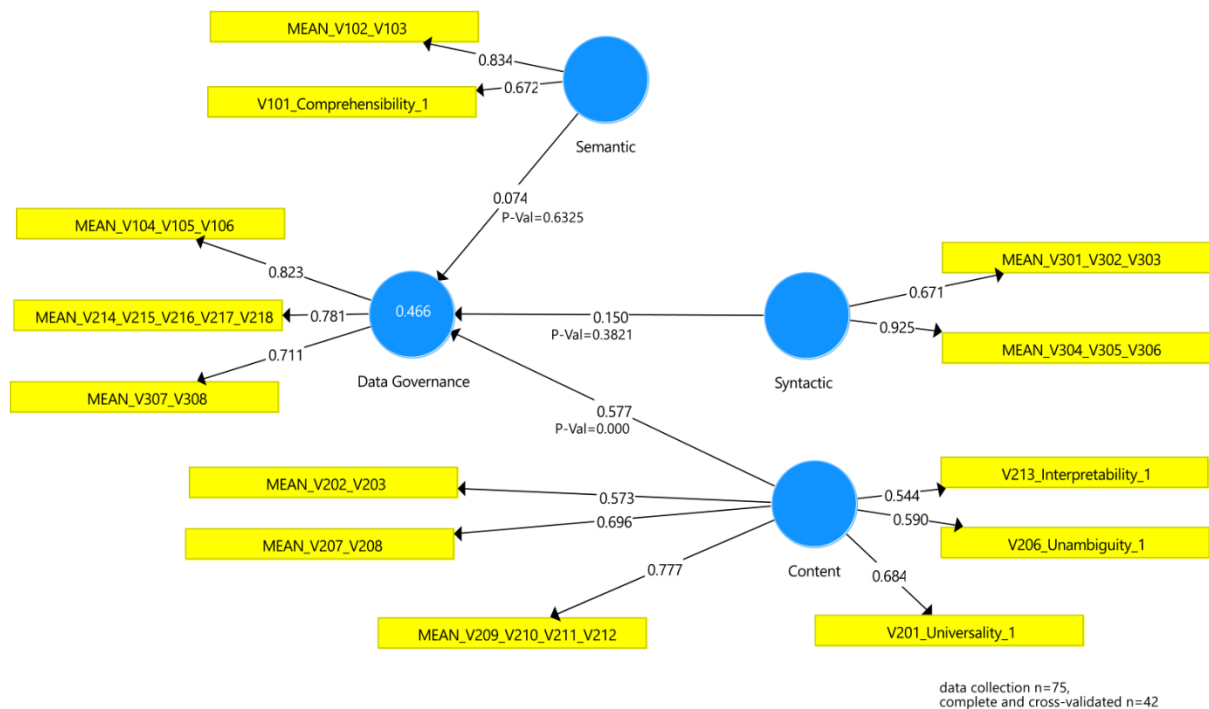
Source: SmartPLS, own elaboration

Tab. 3: Indicator Statistics Used for Analysis (n=42)

| Indicators | Mean | Median | Min | Max | Standard Deviation | Excess Kurtosis | Skewness |
|-------------------------------|-------|--------|-------|-----|--------------------|-----------------|----------|
| V101_Comprehensibility_1 | 3.905 | 4 | 1 | 5 | 0.84 | 2.322 | -1.064 |
| MEAN_V102_V103 | 3.5 | 3.5 | 1.5 | 5 | 0.845 | -0.424 | -0.215 |
| MEAN_V104_V105_V106 | 3.571 | 3.667 | 2.333 | 5 | 0.699 | -0.441 | -0.088 |
| V201_Universality_1 | 3.357 | 4 | 1 | 5 | 0.996 | -0.76 | -0.489 |
| MEAN_V202_V203 | 3.488 | 3.5 | 2 | 5 | 0.783 | -0.33 | -0.422 |
| MEAN_V204_V205 | 3.679 | 3.5 | 1.5 | 5 | 0.73 | 0.799 | -0.515 |
| V206_Unambiguity_1 | 3.548 | 4 | 1 | 5 | 0.822 | 1.166 | -0.824 |
| MEAN_V207_V208 | 3.643 | 3.5 | 2 | 5 | 0.718 | 0.108 | -0.527 |
| MEAN_V209_V210_V211_V212 | 3.375 | 3.5 | 2 | 5 | 0.678 | -0.047 | 0.13 |
| V213_Interpretability_1 | 3.571 | 4 | 2 | 5 | 0.76 | -0.231 | -0.083 |
| MEAN_V214_V215_V216_V217_V218 | 3.333 | 3.4 | 2 | 4.2 | 0.516 | 0.026 | -0.618 |
| MEAN_V301_V302_V303 | 3.175 | 3.333 | 1 | 5 | 0.781 | 0.838 | -0.389 |
| MEAN_V304_V305_V306 | 3.484 | 3.667 | 1 | 5 | 0.949 | 0.685 | -0.774 |
| MEAN_V307_V308 | 3.476 | 3.5 | 2 | 5 | 0.723 | 0.328 | 0.037 |

Source: SmartPLS, own elaboration

Fig. 2: Path Coefficients and R² in the Structural Equation Model



Source: SmartPLS, own elaboration

All data has been processed by the SmartPLS “PLS Algorithm”. The Means have been preprocessed manually in a Spreadsheet Calculation Software. In addition to categorising question have been risen such as size and origin of company. Role of respondent in the firm. Existence of Data Governance like organisational structures. This information was used to cross validate the given answers and in case to eliminate not helpful contents.

2.2 Data Interpretation

Figures in Tab 2 show that individual constructs between latent variables and the indicators have very strong relationships. However although they positively correlate with each other, the path coefficient between the latent variables *Syntactic* and *Semantic* is very weak toward the dependant variable. It is mainly the latent variable *Content* that describes a great portion of the dependent variable ($R^2=0.466$) in the model.

Having said this, H1 cannot be rejected. All constructs are positively associated with Data Governance albeit with different strengths.

The analysis of Tab 3 shows that the median of the sample is very much around the neutral position. This opens up the interpretation that many data providers have answered the

question neutrally or that the extreme ones are cancelled out. It is surprising that the path strengths diverge so much from the relationships between indicators and construct. According to Hair et al. (2017, p. 61) a distribution is considered skew if the given number is greater than +1 or lower than -1. A similar general guideline applies to kurtosis. Here, if the number is greater than +1, the distribution represents a peak or outlier. In the case of the Indicator V101_Comprehensibility_1 exceeds these guidelines of skewness and/or kurtosis and therefore considered as non-normal data.

Said this, a high level of principles cannot be determined on a statistical robust basis. The Hypothesis H2 therefore has to be rejected.

Due to the low number of samples we bootstrapped 500 subsamples in order to gain the statistical relevance of the model. Table 4 shows the result on the loadings between the variables towards the dependent variable.

Tab 4: Path Coefficients (Mean, Standard Deviation, T-Values, P-Value)

| Path | Original Mean | Sample Mean | Standard Deviation | T Statistics | P Value |
|------------------------------|---------------|-------------|--------------------|--------------|---------|
| Content -> Data Governance | 0.5769 | 0.5701 | 0.1332 | 4.3326 | 0.0000 |
| Semantic -> Data Governance | 0.0743 | 0.1257 | 0.1552 | 0.4785 | 0.6325 |
| Syntactic -> Data Governance | 0.1496 | 0.1536 | 0.1711 | 0.8748 | 0.3821 |

Source: SmartPLS, own elaboration

Conclusion and Limitations

The study has shown that information depends on a large number of factors. They all have an impact on maintaining Data Governance. The perceived Data Quality is strongly driven by the definition of content. Coherence and processing play a subordinate role or are not perceived by respondents. What you see is what you judge. For this reason, companies are strongly recommended to invest in the clear definition of information content. The perceived Data Quality is primarily based on the expectations of the information an end user receives. For Data Governance problems based on lack of coherence, there is virtually no perception. Data Governance issues based on technical inconveniences are not perceived as part of such issues. The results are astonishing, because it is in the nature of any business model that Data Governance is often destroyed by a lack of coherence. This semantic is considered to have the slightest influence. Further studies could be undertaken in this area to shed more light on this insight and its reasons.

This study was prepared with experts from Switzerland. The approaches are thus based on the expertise of data experts from the same region but work in international corporations. These experts work in the highly regulated Swiss financial sector with sensitive data with a high criticality. Nevertheless, it is possible that a cross-national comparison would lead to different results. This study also showed that there are different views in the understanding of data governance between the knowledge of Subject Matter Experts (SME) and the users. While the experts consider elements of Semantic and Syntactic to be very relevant and play an important role, respondent gave no great importance to them. The results show this so impressively that we do not believe that the picture would look different with another, larger data set. Furthermore, the considerations about the maturity level of Rivera et al. (2017, p. 212) show that the challenge of solving problems with content elements alone is not enough and after many years of research with this matter, these problems remain unsatisfactorily solved. Future research must deal with further framework conditions of Data Governance.

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HOW ENTERPRISING ARE NON-BUSINESS STUDENTS?

Marian Holienka – Jana Holienková – Peter Gál

Abstract

Purpose: Nowadays, majority of attention in entrepreneurship education is still devoted to business students. However, they are quite far from being the most enterprising, showing greatest business appetite or having the domain substance to build their businesses upon. Thus, we call for a shift of this paradigm. In this paper, we support this suggestion by analysing how enterprising are students in selected non-business fields and what are the factors behind.

Design/methodology/approach: We investigate for differences between students in selected non-business disciplines in enterprising tendency and entrepreneurial characteristics, entrepreneurial propensity and its potential drivers. Our sample, obtained through own data collection in years 2017 and 2018, comprises of 288 university students from four disciplines (engineering, sports, arts, and pedagogy) studying at four universities in Slovakia.

Findings: Our analysis yielded findings on entrepreneurial propensity, enterprising tendency and personality and entrepreneurship education background of students of sports, arts, engineering and pedagogy. We constructed the hypothetical profiles of the analysed groups of students with respect to the above-mentioned attributes. We suggest that entrepreneurship is an integral phenomenon in non-business student populations.

Research/practical implications: Entrepreneurship is an integral phenomenon in non-business student populations. We suggest further elaboration building on the presented work, including more extensive examination, comparisons with business students, extending the scope of analysis to other disciplines, or employing more sophisticated statistical methods.

Originality/value: Research on entrepreneurship among non-business students is still rather scarce, especially in case of Slovakia. More importantly, there is a clear lack of systematic attention to entrepreneurship education, training and support in non-business fields. We call for shifting the cliché that entrepreneurship education and support is meant for business students.

Keywords: Student Entrepreneurship, Non-Business Fields of Study, Enterprising Tendency, Personality Traits, Entrepreneurship Education

JEL Codes: L26

Introduction

Nowadays, majority of attention in entrepreneurship education at universities is still devoted to business students. According to GUESSS (Global University Entrepreneurial Spirit Students' Survey) 2016 results from Slovakia (Holienska et al., 2018), only 10% of interviewed business students, but as many as 64.9% of humanities students, 69.7% of natural sciences students or 58.9% of social sciences students have not attended any course on entrepreneurship so far. In general, 40.0% of students in Slovak GUESSS sample (Holienska et al., 2018) and 55.4% of students interviewed in GUESSS 2016 globally received no entrepreneurship education (Sieger et al., 2016). Despite being exposed to entrepreneurship education most intensively, business students are quite far from being the most enterprising, showing the greatest business appetite or having the domain substance to build their businesses upon. GUESSS 2016 study in Slovakia showed that, in terms of involvement in active entrepreneurship, business students were outperformed by students of engineering, agriculture, sports and sciences of art (Holienska et al., 2018). Also, while business students certainly receive education on the nature and functioning of markets and business organizations as well as training on the related business skills, this educational background will actually not equip them with many domains that could serve as a substance of their future entrepreneurial projects. Unlike them, on contrary, students in other disciplines such as (and certainly not limited to) engineering, sports, medicine or sciences of arts will usually graduate with high levels of professional qualification that could serve as a substance of a potential entrepreneurial activity in their respective field. However, they will be often poorly prepared to utilize these assets via entrepreneurial path due to missing entrepreneurship education or training, so their entrepreneurial potential remains underutilized. Thus, we call for a shift of the paradigm that entrepreneurship education is mainly (or, in worse case even "exclusively") for business students. In this paper, we aim to provide supporting argument for our suggestion by analysing the enterprising tendency and entrepreneurial propensity of university students in selected non-business fields of study and exploring potential origins of differences between disciplines among personality traits and entrepreneurship education. The main research question of our paper is: how enterprising are non-business students and what is their personality and entrepreneurship education background?

1 Literature review

Personality approach is perhaps the most classical, yet the most controversial approach to entrepreneurship (Rauch and Frese, 2012). While the earlier efforts that were aimed at

identifying the great and heroic personality of an entrepreneur lead to ambiguous conclusions (Neck et al., 2014) and even to perdition (Gartner, 1988), recent years brought a revival of personality, especially thanks to sounder theoretical background, conceptualizations taking into consideration situational aspects and mediating processes, and improved quality of methodological approaches (Rauch and Frese, 2012). Based on the current development of knowledge in the field of personality approach to entrepreneurship, Rauch and Frese (2012) have developed a conceptualization how individual differences are related to entrepreneurship (in terms of business creation and business success) – a model of entrepreneurs' personality characteristics and success. The model follows a proximal – distant logic and distinguishes between the two categories of personality traits according to their relevance to entrepreneurship: distant broad personality traits and more proximal specific personality traits. The broad traits are not assumed to directly influence entrepreneurship involvement or outcomes, but rather indirectly through influencing more specific traits and adoption and utilization of knowledge, skills and abilities. This conceptualization developed by Rauch and Frese (2012) serves as a main theoretical grounding of our study, in which we focus on three key components of this model: broad personality traits, specific personality traits and knowledge, skills and abilities.

Broad personality traits are supposed to be less strongly related to entrepreneurship, as their taxonomies are not directly related to behaviours relevant for entrepreneurship (Rauch and Frese, 2012). However, former meta-analytical reviews found significant relationships between several broad traits and entrepreneurship (Brandstätter, 2011; Rauch and Frese, 2007). Unlike majority of former studies relying on five-factor model of personality (Rauch and Frese, 2012; Brandstätter, 2011), we decided to employ the interpersonal dimensions of personality (Leary et al., 1964, in Kožený and Ganický, 1976), due to strong link between entrepreneurship (and related traits and knowledge, skills and abilities) and interpersonal interaction.

Specific personality traits are more proximal to specific concepts - specific behaviours and tasks performed by entrepreneurs (Baum and Locke, 2004). One of their conceptualizations has been introduced by Caird (1990, 1991, 1993), who developed a concept of enterprising tendency (basically defined as a tendency to start-up and manage projects) and its components, as well as the respective measurement instrument. According to Caird, entrepreneurs as individuals demonstrate psychological attributes on enterprising people in the business context. In particular, Caird proposed the following specific personality traits as key components of the enterprising tendency: calculated risk-taking, creative tendency, high need for achievement, high need for autonomy, and an internal locus of control. In our study, we will employ Caird's conceptualization as specific traits proximal to entrepreneurship.

Knowledge, skills and abilities (KSAs) in relation to entrepreneurship are individual factors influencing individual's behaviour and performance in relation to entrepreneurship (Markman, 2012). Entrepreneurial KSAs fall into a broader concept of entrepreneurship-relevant human capital (Ramos-Rodriguez, 2010). One of the ways to develop this specific type of human capital is participation in entrepreneurship education and training. Its effect on entrepreneurial propensity has been researched quite broadly, including the context of V4 countries and Slovakia (Nowiński et al., 2019). Thus, in our study, we will focus on students' participation in entrepreneurship education as well as on perceived effect of received education and training on improvement of selected entrepreneurial KSAs.

In our study, we focus on non-business students from different fields of study assuming occurrence of some between-group differences in their broad and specific personality traits and perceived entrepreneurial knowledge, skills and abilities, further related to entrepreneurial actions and outcomes. This assumption is built on a rationale that each discipline (in terms of respective professions and their professional environments) has certain specifics and unique features that attract and select particular personalities while discouraging some others, while entrepreneurship itself also works similarly as a very specific kind of "profession" (Baron and Hmieleski, 2018). Secondly, as not only the exposure to entrepreneurship education is different (both in terms of quality and quantity), but also characters of study programmes and their components differ in certain aspects, studying in various fields might influence adoption and development of certain entrepreneurship-related KSAs in different extent and form.

2 Material and methods

Our analysis is based on a sample of 288 university students of four non-business disciplines (engineering, sports, science of arts, and pedagogy) at four universities in Slovakia. Participants were acquired using a convenience sampling method, with two sampling criteria: an active full-time university study and studying in a study program belonging to one of the above-mentioned fields of study. Our sample comprised of 74 engineering students, 75 sports students, 66 students of sciences of arts, and 73 pedagogy students. As for the demographic attributes, our sample consisted of 149 female and 124 male respondents (15 respondents did not indicate their gender) with an average age of 22.16 years (minimum=19, maximum=27).

The sample was obtained through own data collection using a survey instrument comprising of several modules. First, measures of entrepreneurial propensity level, exposure to entrepreneurship education and perceived effect of education on certain KSAs were adopted

from the GUESSS questionnaire (Sieger et al., 2016). Second, broad personality traits were measured using the standardized Slovak version of the Interpersonal diagnosis of personality questionnaire (Leary, T. et al., 1964, in: Kožený and Ganický, 1976) that creates a classification system of interpersonal behaviour based on eight diagnostic categories. Third, specific personality traits - entrepreneurial characteristics were measured using the General Enterprising Tendency v2 Test - GET2 test (Caird, 1991) in Slovak translation.

Our exploratory analysis employed nonparametric tests (as our data are not normally distributed) - Kruskal-Wallis test for comparison of multiple independent samples in values of continuous quantitative variables, and Chi-Square test to compare independent populations in values of categorical variables. The analysis was executed in IBM SPSS v.24 package.

3 Results and discussion

In the first step of our analysis, we examined entrepreneurial propensity of university students in the analysed fields of study (Tab.1).

Tab. 1: Entrepreneurial activity and propensity in different disciplines

| | | Eng. (N=74) | Sports (N=75) | Arts (N=65) | Ped. (N=73) | Chi-square (p-value) |
|----------------------------|------------------------|----------------|------------------|----------------|----------------|-------------------------|
| Entrepreneurial activity | Yes | 27.0% (20) | 16.0% (12) | 38.5% (25) | 9.6% (7) | 19.278 (.000) |
| | No | 73.0% (54) | 84.0% (63) | 61.5% (40) | 90.4% (66) | |
| Entrepreneurial propensity | Active | 18.9% (14) | 9.3% (7) | 23.1% (15) | 2.7% (2) | 46.021 (.000) |
| | Nascent | 8.1% (6) | 6.7% (5) | 15.4% (10) | 6.8% (5) | |
| | Intention after school | 23.0% (17) | 16.0% (12) | 24.6% (16) | 17.8% (13) | |
| | Intention 5 yrs. after | 37.8% (28) | 49.3% (37) | 21.5% (14) | 30.1% (22) | |
| | No intention | 12.2% (9) | 18.7% (14) | 15.4% (10) | 42.5% (31) | |

Source: Own elaboration

As can be seen from the results in Tab 1., involvement in entrepreneurial activity is especially high among students of sciences of arts and among engineering students. Both groups also exhibit highest intention to start a business after school. Interesting pattern is observed among sports students who exhibit moderate entrepreneurial activity or intention to start one straight after studies, but very high (close to 50%) proportion of them indicates ambition to start a business in a 5-years horizon after completing their education, which in our opinion corresponds with forthcoming end of active career among professional sportsmen. Contrary, pedagogy students show the lowest involvement in running business activities, and definitely the highest proportion of individuals who never plan to start their own business.

Further, we analysed the levels of enterprising tendency and particular entrepreneurial characteristics and searched for differences among the examined disciplines (Tab. 2).

Tab. 2: Enterprising tendency and entrepreneurial characteristics in different disciplines

| | Field of study | N | Mean | Mean rank | Kruskal-Wallis Test | Sig. (2-sid.) | Pairwise comparisons | | | |
|---|----------------|----|-------|-----------|---------------------|---------------|----------------------|------|------|------|
| | | | | | | | Eng. | Sp. | Art. | Ped. |
| Overall enterprising tendency (GET score) | Eng. | 74 | 29.41 | 127.98 | 26.756 | .000 | - | .000 | NS | NS |
| | Sp. | 75 | 33.09 | 182.61 | | | .000 | - | NS | .000 |
| | Art. | 66 | 30.89 | 149.79 | | | NS | NS | - | NS |
| | Ped. | 73 | 28.49 | 117.31 | | | NS | .000 | NS | - |
| Need for achievement | Eng. | 74 | 6.39 | 131.34 | 9.406 | .024 | - | .054 | NS | NS |
| | Sp. | 75 | 7.15 | 166.53 | | | .054 | - | NS | .053 |
| | Art. | 66 | 6.73 | 149.03 | | | NS | NS | - | NS |
| | Ped. | 73 | 6.37 | 131.12 | | | NS | .053 | NS | - |
| Calculated risk taking | Eng. | 74 | 7.05 | 126.92 | 27.501 | .000 | - | .000 | NS | NS |
| | Sp. | 75 | 8.36 | 183.13 | | | .000 | - | NS | .000 |
| | Art. | 66 | 7.55 | 149.27 | | | NS | NS | - | NS |
| | Ped. | 73 | 6.90 | 118.32 | | | NS | .000 | NS | - |
| Need for autonomy | Eng. | 74 | 3.04 | 142.87 | 5.679 | .128 | - | NS | NS | NS |
| | Sp. | 75 | 3.37 | 159.90 | | | NS | - | NS | NS |
| | Art. | 66 | 3.08 | 146.47 | | | NS | NS | - | NS |
| | Ped. | 73 | 2.78 | 128.55 | | | NS | NS | NS | - |
| Internal locus of control | Eng. | 74 | 6.65 | 134.53 | 10.692 | .014 | - | NS | NS | NS |
| | Sp. | 75 | 7.45 | 167.90 | | | NS | - | NS | .014 |
| | Art. | 66 | 7.03 | 148.68 | | | NS | NS | - | NS |
| | Ped. | 73 | 6.45 | 126.79 | | | NS | .014 | NS | - |
| Creative tendency | Eng. | 74 | 6.27 | 137.95 | 6.611 | .085 | - | NS | NS | NS |
| | Sp. | 75 | 6.76 | 160.21 | | | NS | - | NS | NS |
| | Art. | 66 | 6.52 | 152.08 | | | NS | NS | - | NS |
| | Ped. | 73 | 5.99 | 128.16 | | | NS | NS | NS | - |

Source: Own elaboration, NS = not significant

The results in Tab. 2 show that students in all examined fields exhibit medium levels of enterprising tendency. Within this category, however, we still find significant differences – engineering and pedagogy students are less enterprising compared to students of sports. Further, when looking at levels of entrepreneurial characteristics, there is the same ranking pattern according to mean values across all five attributes, with highest levels achieved by students of sports, followed by students of arts and engineering, and lowest levels indicated by pedagogy students. Statistical significance was observed in case of three out of five characteristics, always in favour of sports students compared to their pedagogy and engineering counterparts. As for differences in classification, sports students exhibit medium level of need for achievement (the other groups indicate low levels), while pedagogy students are the only group with low levels of calculated risk taking and need for autonomy (other groups exhibit medium levels).

In the third step, our analysis focused on broad personality traits – interpersonal aspects of personality and differences among students in the analysed disciplines.

Tab. 3: Personality traits of students in different fields of study

| Interpersonal dimension | Field of study | N | Mean | Mean rank | Kruskal-Wallis Test | Sig. (2-sid.) | Pairwise comparisons | | | |
|------------------------------|----------------|----|------|-----------|---------------------|---------------|----------------------|------|------|------|
| | | | | | | | Eng. | Sp. | Art. | Ped. |
| Managerial autocratic | Eng. | 74 | 4.72 | 116.19 | 20.436 | .000 | - | .000 | .021 | NS |
| | Sp. | 75 | 6.95 | 172.87 | | | .000 | - | NS | .019 |
| | Art. | 66 | 6.23 | 157.20 | | | .021 | NS | - | NS |
| | Ped. | 73 | 5.27 | 132.58 | | | NS | .019 | NS | - |
| Competitive narcissistic | Eng. | 74 | 4.91 | 117.28 | 22.683 | .000 | - | .000 | .016 | NS |
| | Sp. | 75 | 6.88 | 174.19 | | | .000 | - | NS | .004 |
| | Art. | 66 | 6.41 | 159.58 | | | .016 | NS | - | NS |
| | Ped. | 73 | 5.33 | 127.95 | | | NS | .004 | NS | - |
| Aggressive sadistic | Eng. | 74 | 4.53 | 131.57 | 5.887 | .117 | - | NS | NS | NS |
| | Sp. | 75 | 5.20 | 154.79 | | | NS | - | NS | NS |
| | Art. | 66 | 5.44 | 158.42 | | | NS | NS | - | NS |
| | Ped. | 73 | 4.68 | 134.45 | | | NS | NS | NS | - |
| Rebellious distrustful | Eng. | 74 | 4.93 | 129.20 | 6.716 | .082 | - | NS | NS | NS |
| | Sp. | 75 | 5.51 | 148.40 | | | NS | - | NS | NS |
| | Art. | 66 | 6.17 | 163.94 | | | NS | NS | - | NS |
| | Ped. | 73 | 5.11 | 138.43 | | | NS | NS | NS | - |
| Self-effacing masochistic | Eng. | 74 | 3.38 | 123.31 | 16.456 | .001 | - | NS | .002 | NS |
| | Sp. | 75 | 3.12 | 129.54 | | | NS | - | .011 | NS |
| | Art. | 66 | 4.67 | 173.05 | | | .002 | .011 | - | NS |
| | Ped. | 73 | 4.16 | 155.53 | | | NS | NS | NS | - |
| Docile dependent | Eng. | 74 | 4.32 | 111.57 | 17.950 | .000 | - | .002 | .001 | NS |
| | Sp. | 75 | 5.85 | 159.45 | | | .002 | - | NS | NS |
| | Art. | 66 | 6.20 | 164.31 | | | .001 | NS | - | NS |
| | Ped. | 73 | 5.41 | 144.61 | | | NS | NS | NS | - |
| Cooperative overconventional | Eng. | 74 | 4.80 | 111.86 | 22.904 | .000 | - | .001 | .000 | NS |
| | Sp. | 75 | 6.87 | 164.15 | | | .001 | - | NS | NS |
| | Art. | 66 | 7.12 | 169.88 | | | .000 | NS | - | NS |
| | Ped. | 73 | 5.74 | 134.46 | | | NS | NS | NS | - |
| Responsible hypernormal | Eng. | 74 | 4.76 | 119.55 | 13.554 | .004 | - | .013 | .014 | NS |
| | Sp. | 75 | 6.24 | 161.29 | | | .013 | - | NS | NS |
| | Art. | 66 | 6.41 | 162.40 | | | .014 | NS | - | NS |
| | Ped. | 73 | 5.25 | 136.36 | | | NS | NS | NS | - |

Source: Own elaboration, NS = not significant

Results displayed in Tab. 3 indicate that the analysed groups of students exhibit certain differences in their typical personality profiles in terms of interpersonal behaviour (we found statistically significant differences in six out of eight dimensions), while at the same time all groups fall into adaptive and moderate forms of behaviour. Both sports and arts students, in general, exhibit extraversion, friendly and considerate behaviour and are open to cooperation. They are strong personalities but use their self-confident independence in an affiliative manner and adequately to respective situation. Their behaviour is driven by power and ambitions, but they tend to build authority based on abilities, not power. However, these two populations seem to differ in submission dimension – while sports students are more self-effacing in perceiving their personal contribution and tend to give credits to the other team members as well, students of arts have higher tendency to accentuate their individual importance. As for the engineering

students, in general, they tend to be more dominant in managing others, have higher focus on dominance-driven authority, are rather self-effacing in favour of the other team members, exhibit the highest rates of conformity, conventionality and responsibility towards others. Finally, students of pedagogy, in general, typically exhibit similar forms of interpersonal behaviour as engineering students, but they differ in submission dimension, tending to exhibit lower humility and higher perceived individual importance.

Finally, the last step of our exploration looked at entrepreneurship education exposure (Tab. 4) and perceived effect of received education on selected entrepreneurial KSAs (Tab. 5).

Tab. 4: Entrepreneurship education exposure in different fields of study

| | Eng. (N=74) | Sports (N=75) | Arts (N=65) | Ped. (N=73) | Chi-square (p-value) |
|-------------------|----------------|------------------|----------------|----------------|-------------------------|
| No course | 41.9% (31) | 45.3% (34) | 63.1% (41) | 49.3% (36) | 22.307 (.008) |
| Elective | 31.1% (23) | 12.0% (9) | 10.8% (7) | 16.4% (12) | |
| Compulsory | 27.0% (20) | 34.7% (26) | 20.0% (13) | 28.8% (21) | |
| Special programme | 0.0% (0) | 8.0% (6) | 6.2% (4) | 5.5% (4) | |

Source: Own elaboration

The lowest participation in entrepreneurship education was indicated by arts students, while engineering students enjoyed the highest exposure. However, more than half of it was achieved through elective courses, and none of engineering students in our sample studied in a special entrepreneurship-related study programme.

Tab. 5: Effects of education on entrepreneurial KSAs in different fields of study

| | Engineering (N=74) | | Sports (N=75) | | Arts (N=66) | | Pedagogy (N=73) | |
|-----------------------------|-----------------------|------|------------------|------|----------------|------|--------------------|------|
| | mean | SD | mean | SD | mean | SD | mean | SD |
| Understanding entrepreneurs | 3.68 | 1.89 | 3.72 | 1.78 | 2.98 | 1.68 | 2.57 | 1.69 |
| Steps to start a business | 3.49 | 1.88 | 3.91 | 1.78 | 3.03 | 1.63 | 2.86 | 1.75 |
| Managerial skills | 3.34 | 1.84 | 3.34 | 1.86 | 3.24 | 1.82 | 2.45 | 1.62 |
| Networking skills | 3.95 | 2.02 | 3.15 | 1.67 | 3.64 | 1.92 | 2.81 | 1.92 |
| Opportunity alertness | 3.82 | 2.06 | 3.36 | 1.69 | 3.55 | 1.87 | 2.78 | 1.69 |

Source: Own elaboration

Pedagogy students exhibited the lowest perceived effects of received education in case of all of the considered KSAs. On the other hand, highest perceived effects were declared by sports students (in case of rather “hard” skills, e.g. understanding attitudes, values and motivations of entrepreneurs, or actions required to start a business) and engineering students (in case of rather “soft” attributes, e.g. networking skills or opportunity identification ability). Nevertheless, all mean values were in the negative part of the 1-7 evaluation scale.

Summarizing our findings, we constructed the hypothetical profiles of the analysed groups of students. These can serve as a basis for further analysis and development of implications. First, students of science of arts in our sample show highest involvement in entrepreneurship despite not being the most enterprising (especially in terms of lower risk-taking, slightly lower achievement motivation and internal locus of control), exhibit interpersonal forms of behaviour relevant for entrepreneurship with higher individualism tendency. Also, they are least exposed to entrepreneurship education, show lower levels of “hard” KSAs but quite high levels of “soft” KSAs. Second, students of sports in our sample are moderately involved in entrepreneurship but have high entrepreneurial aspirations in 5 years after school (perhaps in the horizon of ending an active sports career) as well as highest enterprising tendency and all entrepreneurial characteristics (especially risk-taking and need for achievement). They exhibit interpersonal forms of behaviour relevant for entrepreneurship, with higher tendency of being self-effacing and collectivistic. They show high participation in entrepreneurship education, mainly compulsory courses, high self-evaluation of “hard” KSAs but lower self-evaluation of “soft” KSAs. Third, engineering students in our sample exhibit high involvement in entrepreneurial activity and lowest share of individuals abstaining from entrepreneurship. Their enterprising tendency is moderate and so are their entrepreneurial characteristics. They exhibit higher tendency to dominate and manage others, but also rather high conformity, conventionality and collectivism. They show the highest participation in entrepreneurship education, more than half of them in elective courses, and comparatively high self-perception of “hard” KSAs and the highest self-perception of “soft” KSAs. Finally, pedagogy students in our sample show the lowest entrepreneurial activity (furthermore, 2/3 of that being in nascent stage) and 40% share of entrepreneurial abstainers. They are moderately enterprising and have moderate levels of entrepreneurial characteristics (with the low need for autonomy). They exhibit higher tendency to dominate and manage others, but also rather high conformity and conventionality, and tend to be rather individualistic. Half of them took part in entrepreneurship education, mostly in compulsory courses, but they are comparatively worst in perceiving its contribution to improving their KSAs (they assess it as almost “not at all”).

Conclusion

To conclude, our analysis yielded findings on entrepreneurial propensity, enterprising tendency and personality and entrepreneurship education background of students of sports, arts, engineering and pedagogy. We suggest that entrepreneurship is an integral phenomenon in non-business student populations that deserves appropriate, systematic and targeted attention. The presented paper is exploratory by nature and had been developed on a limited sample. Our implications are thus directed towards further elaboration building on the presented work, including more extensive examination, comparison with business students, extending the scope of analysis to other disciplines (e.g. health and medicine, computer science etc.), or employing more sophisticated statistical methods to examine causalities between the analysed concepts.

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COMPARISON OF PORTFOLIOS USING MARKOWITZ AND DOWNSIDE RISK THEORIES ON THE CZECH STOCK MARKET

Zuzana Janková

Abstract

Purpose: The paper deals with the comparison of Markowitz and downside risk portfolio theories and the practical application of both approaches on the Czech stock market. Two investment portfolios of stocks of companies included in the PX index of the Prague Stock Exchange have been constructed and their results are compared.

Design/methodology/approach: For the purposes of this paper, the secondary research method has been chosen based on structured data collection in order to clarify the scientific knowledge of the modern and post-modern portfolio theory issues. The research part of the paper deals with eight stocks, which were included in the PX index in the period from 1/2013 to 8/2018. Empirical data are obtained from the official website of the Prague Stock Exchange.

Findings: The added value of the paper can be seen in the empirical testing and comparison of modern and post-modern portfolio theory in a small capital market with low market liquidity, such as the Czech stock market, since not many of them have been performed yet.

Research/practical implications: The comparison of both approaches suggests that risk measurement using standard deviation is considered inappropriate in modern portfolio theory. Furthermore, it is evident that the more the instrument departs from the normal distribution, the greater the differences in the risk assessment will be. Shortcomings of the Markowitz approach are remedied by post-modern portfolio theory that measures risk through downside risk, which adequately responds to the asymmetry in returns.

Originality/value: According to research, it is possible to state that modern theory allocates stocks to the portfolio stocks with a high return-to-risk ratio. Furthermore, lower ability of modern theory to diversify the portfolio has been demonstrated. The post-modern portfolio achieves lower risk rate and greater diversification and seems to be more suitable for creating a portfolio even in a small and less effective market.

Keywords: Portfolio, Theory of Portfolio, Downside Risk, Markowitz Approach

JEL Codes: C45, G11, G12, G17

Introduction

One of the key business characteristics is insufficient financial diversification. In particular, profits of companies suffer from significant systematic risks. Chen et al. (2010) states that entrepreneurs can use individual investment instruments or well-created market portfolios for trading in order to diversify the systematic business risks. Regardless of diversification advantages, the majority of companies tend to hold less diversified portfolios, which is considered costly and non-optimal, according to Kelly (1995). Gurley-Calvez and Lugovskyy (2018) states that entrepreneurs are confronted by a number of risks in their business activities and balance business-related financial risk by changing their personal investment strategy. Their results from the survey suggest that entrepreneurs do mitigate business-related financial risk by reducing their personal portfolio share of risky financial assets, but at only half the magnitude estimated by previous studies. Lafontaine and Shaw (2016) point out that empirical research suffers from the lack of suitable data and from the inadequate analysis of some important features of the determinants of the entrepreneurial choice. Çanakoglu et al. (2018) examines the entrepreneur's investment portfolio in which each investment generates expected returns and some information about a specific aspect of the market for a single business opportunity. Authors develops a model that analyzes imperfect market data, while factoring in the entrepreneur's risk preference and operational shortages of resources.

In 1952, Markowitz caused a revolution in portfolio modelling as he was the first one to formulate the basics of quantitative portfolio theory. His model is relatively simple to calculate since it is based on mean-variance optimization and allows systematic evaluation of diversification effects. Thus it became a commonly used model for portfolio arrangement and analysis, which is still used today. Nevertheless, the assumption of multivariate normally distributed asset returns is the main and fundamental problem of this theory. However, according to Čumová (2005), empirical research has regularly shown that returns are not distributed normally but typically skewed with heavy tails. This fact poses a question whether there are other practically applicable models that work better than Markowitz's approach. The aim of the paper is to determine an alternative approach to portfolio modelling based on secondary research and compare the currently commonly applied modern portfolio theory and derive fundamental implications following from their application in the Czech stock market.

1 Portfolio Theory

The investment portfolio theory determines how an individual investor allocates free funds to the investment portfolio. Brada (1996) defines a portfolio as a combination of investment instruments that are appropriate to be held so that the created portfolio has the predetermined properties. Cipra (1995) defines a portfolio as a set of different instruments minimizing the risk associated with investing while maximizing return flowing from these instruments.

The reason for building a portfolio is primarily to raise capital or increase the investor's wealth. Another reason is gambling in the stock market, when investors, or rather speculators, expect to see, for example, future growth in the market price of the investment instruments in the portfolio and excessive profits. Others can make use of geographical and time differences between individual financial markets to gain large profits.

1.1 Markowitz Portfolio Theory

The beginning of the emergence of modern portfolio theory dates back to 1952 when H. Markowitz published an article titled "*Portfolio Selection*". Markowitz's theory is based on the assumption that an investor has certain funds to be invested for a predetermined period of time and sells the investment assets held at the end of the period. This theory seeks to maximize the expected return on the portfolio at a given risk, or to minimize the risk for a given level of expected return. According to modern portfolio theory, the investor should estimate the expected return and the standard deviation of each portfolio, and choose the most appropriate variant according to the relative sizes of both parameters.

Modern portfolio theory is a sophisticated investment decision-making approach that helps the investor to classify, estimate and control both the type and the level of expected risk and return. This theory mathematically formulates the concept of diversification in investing with the aim of selecting a collection of investment assets that has lower risk collectively than any individual asset. Rani (2012) adds that diversification reduces the risk even if the asset returns are not negatively correlated, and even if they are positively correlated.

Sharpe and Alexander (1990), as well as Sunnicht (2008), point out that just like any other theory, even modern theory works with several simplifications:

- It uses a quadratic utility function, and this is related to the presumption of risk aversion of all investors, or rather, the preference for a lower level of risk to a higher level, while this aversion being the same for all investors. Furthermore,

the given quadratic function assumes investor's greed, which results in the investor's preference for greater wealth to less wealth.

- It assumes a normal distribution of returns for all investment assets considered, and its breach significantly distorts the actual riskiness of these assets.
- The investor allocates funds to the portfolio for only one period.
- There is no risk-free asset.
- The risk is measured by standard deviation and variance, however, the observance of this assumption leads to an anomaly consisting of penalization of both the positive variability and negative variability.
- Short sale is prohibited.

As described by Bodie et al. (2013), modern portfolio theory has long served as a guideline for professional portfolio management. Though there is a huge amount of literature commenting on the limited assumptions of this theory, the Markowitz framework remains essentially intact, although it was introduced more than sixty years ago.

Kaplan and Siegel (1994) published an article claiming that optimization through *mean-variance*, an important part of modern portfolio theory, is flawed. Swisher and Kasten (2005) state that post-modern portfolio theory presents a new method of allocating investment assets based on return and downside risk. The core of the innovative theory is the recognition that the standard deviation is inappropriate. Risk is emotional: fear of a bad result, such as fear of loss or insufficient efficiency.

1.2 Downside Risk Portfolio Theory

An alternative view of modern portfolio theory was offered in 1952 by Roy, which was eventually labelled as Post-modern Portfolio Theory or Downside Risk Theory. Sortino (1996) points out that Markowitz's portfolio theory focuses primarily on maximizing expected returns, while post-modern portfolio theory emphasizes the possibility of losing and failing to meet the investor's goal. In other words, attention is paid to the possibility that the expected return will be under the determined reference value of the expected return. According to Čumová (2005), a fundamental change can also be found in the understanding of risk, which is partly based on the findings of behavioral finances, because the risk is defined as the failure to achieve the expected return, or the possibility of loss incurrence.

Markowitz himself (1959) noted that the risk measurement approach presented in post-modern portfolio theory is more appropriate than the variance proposed by him. For this reason Markowitz suggests to measure risk by means of a one-sided measure of variability, however, given the complexity of the calculation by means of semi-variance, his proposal was not accepted. The advantage of the post-modern model is also the absence of the necessity of assuming a normal distribution, as evidenced by Ferguson and Rom (1995). Campion (2009) adds that Markowitz's portfolio theory neglects the individuality of investors, their characters or objectives, which causes severe limitations in its practical application. On the other hand, the downside risk portfolio theory takes into account the uniqueness of each investor through variables in the risk calculation.

1.3 Other Models

Vaclavik and Jablonsky (2012) offer alternative models in their paper which also include, apart from post-modern portfolio theory, which deals mainly with the assumption of a normal return distribution, Elton Gruber's (2010) behavioral finance theory addressing the problem of risk averse investor and the issue of efficient markets concerns. Furthermore, there is the stochastic portfolio theory introduced by Hasuike and Ishii (2009) and Fernholz (2010), and the latest alternative to the classical theory, namely the fuzzy portfolio selection model by Fang et al. (2008). Both theories deal with the assumption of constant correlations of investment assets in the portfolio. In literature, an approach to portfolio diversification using mean absolute deviation as formulated by Konno and Yamazaki (1991) can also be found. This model represents a somewhat different approach that does not take into account the mutual correlations between the assets in the portfolio due to computational problems.

2 Comparison of Modern and Post-modern Portfolio Theory

2.1 Examined Set

Burza cenných papírů Praha, a.s. (BCPP, Prague Stock Exchange), is the largest and oldest securities market organizer in the Czech Republic. The official index of BCPP is the PX index, which was created in 2006 by merging the PX50 and PX-D indices.

PX Index is a capitalization-weighted index of most traded stocks. It currently consists of 12 stocks. The table below shows the weight of the individual stocks included in the PX

index. Stocks that have the largest weight in the index include three stocks, namely Erste Group Bank, Komerční banka and ČEZ, which have a share in the index of around 20%.

Tab. 1: Weights of the Current PX Index Base

| PX Index Constituents | 2018 |
|-----------------------|--------|
| ERSTE | 20.74% |
| KB | 19.14% |
| ČEZ | 19.52% |
| VIG | 8.19% |
| O2 | 5.31% |
| PM | 2.89% |
| STOCK | 2.90% |
| CETV | 2.64% |
| PFNON | 0.55% |
| KOFOLA | 0.45% |
| MONETA | 9.48% |
| AVAST | 5.31% |

Source: BCPP Official Site, 2018

PX Index is a capitalization-weighted index of most traded stocks. It currently consists of 12 stocks. The table below shows the weight of the individual stocks included in the PX index. Stocks that have the largest weight in the index include three stocks, namely Erste Group Bank, Komerční banka and ČEZ, which have a share in the index of around 20%.

The research part of the paper is focused on eight stocks, which were included in the PX index in the period from 1/2013 to 8/2018. These are Erste Group Bank AG (ERSTE), Komerční banka (KB), ČEZ, a.s. (ČEZ), ViennaInsurance Group (VIG), O2 Czech Republic, a.s. (O2), Philip Morris ČR (PM), StockSpirits Group Plc (STOCK), CentralEuropean Media Enterprises Ltd. (CETV), Pegas Nonwovens SA (PFNON), Kofola ČeskoSlovensko, a.s. (KOFOLA), MONETA Money Bank, a.s. (MONETA), and AVAST Plc (AVAST). The end-of-month stock prices in the examined period are used.

2.2 Research Results

From historical stock data of the PX index, the monthly return, mean-variance and downside risk are calculated, as well as the difference between the two types of risk. The values obtained are shown in the following table.

In terms of valuation, O2 has the highest return, with a monthly value of 2.21%, and a CETV of 1.44%. On the contrary, STOCK (-0.09%) and VIG (- 0.73%) incurred losses. The most risky from the Markowitz's point of view is CETV with 11.79% and O2 with the risk of 11.19%, i.e. the highest performing company, confirming the trade-off between return and risk.

Somewhat striking is the high risk of the loss-making company STOCK (10.31%). The risk in post-modern portfolio theory reaches lower values compared to modern portfolio theory. The largest downside risk is connected to STOCK (6.49%) and CETV (5.18%).

Table 2 Stock Return and Risk

| Constituent | Return | Mean-variance | Downside risk | Difference |
|-------------|--------|---------------|---------------|------------|
| ERSTE | 0.73% | 7.31% | 4.18% | -3.13% |
| KB | 0.14% | 4.17% | 2.36% | -1.81% |
| ČEZ | 0.23% | 5.64% | 3.35% | -2.29% |
| VIG | -0.73% | 6.22% | 4.34% | -1.88% |
| O2 C.R. | 2.21% | 11.19% | 3.77% | -7.41% |
| PM | 0.64% | 3.80% | 2.26% | -1.53% |
| STOCK | -0.09% | 10.31% | 6.49% | -3.82% |
| CETV | 1.44% | 11.79% | 5.18% | -6.61% |
| PFNON | 0.87% | 4.78% | 2.68% | -2.10% |

Source: Own elaboration

The correlation coefficient provides the investor with information about the degree and strength of the interdependence between stocks. The diversification effect arises at the time when the correlation coefficient is lower than one, as shown in the table; it is valid for all PX index stocks under review.

Tab. 3: Matrix of Correlation Coefficients

| | ERSTE | KB | ČEZ | VIG | O2 C.R. | PM | STOCK | CETV | PFNON |
|----------------|--------------|-----------|------------|------------|----------------|-----------|--------------|-------------|--------------|
| ERSTE | 1 | 0.1552 | 0.1697 | 0.3661* | 0.0183 | 0.0752 | 0.0185 | 0.1908 | 0.0675 |
| KB | 0.1552 | 1 | 0.2624* | 0.0834 | 0.1692 | 0.3841* | -0.1651 | 0.1117 | 0.2227* |
| ČEZ | 0.1697 | 0.2624* | 1 | 0.2666* | -0.0610 | -0.1320 | 0.0929 | 0.0175 | 0.1264 |
| VIG | 0.3661* | 0.0834 | 0.2666* | 1 | -0.1088 | -0.0218 | 0.2799* | 0.2328* | -0.0372 |
| O2 C.R. | 0.0183 | 0.1692 | -0.0610 | -0.1088 | 1 | 0.1965 | -0.0873 | -0.0557 | 0.2119 |
| PM | 0.0752 | 0.3841* | -0.1320 | -0.0218 | 0.1965 | 1 | -0.1257 | 0.0073 | 0.1297 |
| STOCK | 0.0185 | -0.1651 | 0.0929 | 0.2799* | -0.0873 | -0.1257 | 1 | 0.0125 | 0.0481 |
| CETV | 0.1908 | 0.1117 | 0.0175 | 0.2328* | -0.0557 | 0.0073 | 0.0125 | 1 | -0.0626 |
| PFNON | 0.0675 | 0.2227* | 0.1264 | -0.0372 | 0.2119 | 0.1297 | 0.0481 | -0.062621 | 1 |

Source: Own elaboration

* correlation coefficients are statistically significant at the confidence interval of 90%

The lowest dependence is shown between stock of Komerční banka and STOCK with the value of -0.1651, and also between Philip Morris and STOCK with -0.1257. There is a negative correlation of STOCK to the O2 telephone company. On the other hand, the highest mutual dependence is shown between the stock of Philip Morris and Komerční banka, namely 0.3841. There is a very strong dependence of 0.3661 between ERSTE and VIG Group. Generally, it can be stated that the correlation between the selected stock samples is very low, therefore the selected items are suitable for inclusion in the portfolio since this guarantees a high diversity level.

Tab. 4: Alfa and Beta Coefficients

| Constituent | β | α |
|--------------------|---------------------------|----------------------------|
| ERSTE | 1.5620 | 0.7254% |
| KB | 0.5908 | -0.0875% |
| ČEZ | 1.2562 | 0.1542% |
| VIG | 0.9600 | -0.8719% |
| O2 | 0.1847 | 1.8912% |
| PM | 0.2271 | 0.3354% |
| STOCK | 0.0961 | -0.4291% |
| CETV | 0.7808 | 1.2590% |
| PFNON | 0.1713 | 0.5514% |

Source: Own elaboration

The Beta coefficient can be used to quantify systemic risk. All stocks analyzed, except for ERSTE and ČEZ, have the Beta value in the range of one to zero, indicating that returns from these stocks move in the same direction as the market portfolio return, however, they are declining or growing more slowly than the portfolio. For ERSTE and ČEZ, the Beta value is higher than one, indicating that their return is rising or falling faster than the market portfolio return. Another equally important coefficient is the alpha coefficient derived from CAPM.

The Alpha coefficient can be used to assess whether the stock is overvalued, undervalued, or adequately valued. Three stocks showed a negative alpha coefficient, specifically KB, VIG and STOCK. Alpha below zero means that the stocks are overvalued and it is advisable to sell them to make a profit. For other companies, the Alpha coefficient was higher than zero, from which it can be concluded that the stocks are undervalued and the buyer will benefit from their purchase.

On the basis of the calculations, the weight of the selected stocks in the portfolio is determined according to modern and post-modern portfolio theories. It can be noticed that modern portfolio theory tends to allocate stocks with a high return-to-risk ratio to the portfolio. This is particularly evident in the O2 and CETV stocks, the two most profitable stocks, whose weight in the modern portfolio is higher than in post-modern portfolio theory. This fact results in insufficient diversification, which is a serious complication limiting the practical use of modern portfolio theory. A higher effort of post-modern portfolio theory to diversify the portfolio can also be noticed, as evidenced by the weight of individual stocks in the portfolio.

Tab. 5: Weight of Stocks in the Portfolio

| Constituent | Modern portfolio | Post-modern portfolio |
|--------------------|-------------------------|------------------------------|
| ERSTE | 11.01% | 11.95% |
| KB | 6.34% | 6.90% |
| ČEZ | 8.38% | 9.61% |
| VIG | 9.42% | 12.42% |
| O2 | 17.35% | 10.90% |
| PM | 5.93% | 6.79% |
| STOCK | 16.00% | 18.68% |
| CETV | 18.14% | 14.88% |
| PFNON | 7.43% | 7.88% |

Source: Own elaboration

It is clear from the table below that the portfolio compiled in accordance with modern portfolio theory has higher monthly return by 0.1938%, which is not a major difference. On the other hand, the portfolio compiled in accordance with post-modern portfolio theory is less risky by a total of 3%.

Tab. 6: Return and Risk of Portfolio

| Model | Return | Risk |
|------------------------------|---------------|-------------|
| Modern portfolio | 0.7730% | 7.1797% |
| Post-modern portfolio | 0.5792% | 4.1386% |
| Difference | 0.1938% | 3.0411% |

Source: Own elaboration

Discussion

Sumnicht (2008) saw the shortcomings of modern portfolio theory in particular in three areas. He considers the risk assessment using overall return variability and normal distribution of returns to be a mistaken approach, and he also questioned the appropriateness of using the quadratic utility function to express risk perception by the investor. Markowitz's theory assumes a symmetrical distribution in risk perception, but in fact the risk is asymmetric with significant negative skew.

The post-modern portfolio theory replaces the total variability rate by a unilateral variance, which leads to more relevant risk estimates. The suitability of Markowitz or downside risk theory strongly depends on the probable distribution of return of the share instruments allocated to the portfolio, as noted by w and Kasten (2005). Champion (2009) adds that investors most often perceive risk as the probability of loss and failure to achieve the target return. The appropriateness of the choice of risk measure depends to a certain degree on the choice of portfolio investment assets. The results of the empirical research applied to the Czech stock market show that the analysed data sample significantly diverges from the normal or symmetrical probability distribution, which is demonstrated by significant differences in the risk values, in particular for the mostly asymmetrical return of O2 and CETV.

Champion (2009) saw the more the asset departs from the normal distribution, the greater the differences in the risk assessment of the asset will be, and, consequently, the resulting differences in the composition of the resulting portfolio. The resulting portfolios created in the Czech market show comparable return; however, they differ significantly in terms of the risk borne by the investor. There are also differences in the composition of both portfolios.

Post-modern theory penalizes stock demonstrating considerably asymmetrical return distribution and allocates lower weight to them. Browman and Hurry (1993) state that vast majority of investors understand risk in line with the downside risk theory. However, Swisher and Kasten (2005) note that although the advantage of using semi-variance is undisputed and widely accepted by the professional public, its use is still scarce.

Conclusion

The paper deals with the comparison of modern and post-modern portfolio theories and their practical application in the Czech stock market, namely on selected stocks included in the PX index of the main Prague Stock Exchange. The comparison of both approaches suggests that risk measurement using standard deviation is considered inappropriate in modern portfolio theory. Furthermore, it is evident that the more the asset departs from the normal distribution, the greater the differences in the risk assessment will be. Shortcomings of the Markowitz approach are remedied by post-modern portfolio theory that measures risk through downside risk, which adequately responds to the asymmetry in returns.

The paper discussed empirical testing and comparison of modern and post-modern portfolio theory in a small capital market with low market liquidity, such as the Czech stock market. The research presented so far has not been extensive. Based on the results it can be stated that the post-modern theory seems to be the most suitable alternative of portfolio modelling even in a small and less effective market, mostly due to the considerably asymmetrical returns distribution of stock listed in the Czech stock market. According to research, it is possible to state that modern theory allocates stocks to the portfolio with a high return-to-risk ratio. Furthermore, lower ability of modern theory to diversify the portfolio has been demonstrated. The difference between the profitability of modern and post-modern portfolios is negligible, but the post-modern portfolio achieves lower risks and greater diversification.

The assumption of static correlation rate in time is problematic in both theories. However, in reality, there is a tendency towards change of mutual dependencies between the instruments. For example, the research of Ang Chen (2002) confirmed the mutual correlation increase at times of market drops. The study should be extended by alternative portfolio models of Elton and Gruber (2010), Fernholz (2010) or Fang et al. (2008) and the strength of the revised empirical research should be monitored not only in the Czech market but also in other capital markets.

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INNOVATIVE ACTIVITY OF ENTERPRISES IN THE HEALTH CARE SECTOR IN COOPERATION WITH OTHER ENTITIES BASED ON THE EXAMPLE OF THE LODZ PROVINCE

Jadwiga Kaczmarska-Krawczak

Abstract

Purpose: Innovative processes of enterprises do not only depend on the innovative potential of organisations building their potential individually, but on the cooperation of enterprises with other entities which allow the activity economization. It is a result of scale of action and sharing the costs and risk of undertakings. Cooperation between enterprises contributes to constant search, as well as to the use of the R&D results, new projects, concepts and innovations in practice.

Design/methodology/approach: Empirical research was held within the period of June – July 2018 using the survey methodology. Surveys covered the cooperation of enterprises from the health care sector within the innovative activity with other entities.

Findings: Enterprises from the health care sector pay close attention to scientific research and cooperation in creating innovations with universities and scientific research institutes. Cooperation provides them with a broader access to knowledge and other resources. It allows the entry on new markets or the increase of market share. What is more, it allows to achieve synergy and other benefits which an enterprise focused only on itself cannot reach.

Research/practical implications: Enterprises from the health care sector pay close attention to cooperation in the creation of innovations with other entities. Those aspects link to active involvement in innovative processes and the undertaking of actions in this regard, but also to an active attitude in acquiring necessary resources.

Originality/value: The article presents new results of research concerning the cooperation of enterprises from the health care sector within the innovative activity with other entities in Lodz Province, Poland. The author's contribution to scientific achievements in the economics comes down to designation of specific directions. Those concern the cooperation of enterprises from the health care sector, summary of the cooperation areas of enterprises together with the verification of innovations developed in particular areas of cooperation, and recommendations in the scope of shaping further cooperation for the fields of science and business.

Key words: Innovation, Health Care, Innovative Activity, Cooperation

JEL Codes: I15,O31

Introduction

The cooperation of enterprises from the health care sector in terms of innovative activity determines the implementation of many valuable and creative solutions within the product/service, process, marketing and organisation spheres. This dependency makes companies still search for new areas of cooperation with a broader scope, with a greater number of national and foreign entities. Philosophy of socio-economic development allows to notice that the drivers of development are rooted in knowledge, information and innovation. Furthermore, particular role in the triad of those factors is played by abilities of the entities and economies in the areas of creation, absorbing and diffusion of innovations. New or significantly improved solutions appear on the basis of feedback between differentiated entities of socio-economic life. In Poland, in the health care sector, the tendencies to implement an increasing number of innovations can be observed. This process, however, is still slow in comparison to other countries. Poland is placed on the 39th place in the innovation index with a score of 41.67 points out of 100 possible. In the efficiency statement, the position of Polish economy in the world is slightly weaker. The innovation efficiency coefficient for Poland is 0.69, which gives us the 42nd place in the world (Global Innovation Index 2018). The “Doing Business 2018” rank compares the conditions for business running in 190 countries. Poland, considering the ease of business running in 2018, was ranked 27th, which means a slight deterioration in relation to year 2017, when Poland was placed on the 24th place in the rank (Doing Business 2018).

The aim is to assess the innovative activity of enterprises in the health care sector in cooperation with other entities based on the example of the Lodz province.

1 Cooperation of enterprises from the health care sector

Medical sector is considered a sector belonging to the advanced industry sector with a high-technology advancement. It is a world priority and, as indicated by Eurostat, even though the health care systems in the European Union countries are organised and financed in a different way, their common objective is a universal access to high quality services, both for entities and society. In 2015, a new Agenda for Sustainable Development 2030 was adopted and indicated 17 Objectives for Sustainable Development as the action directions of international society. Among those seventeen objectives, one applies to the health sector. The health care sector covers enterprises operating in such areas as biotechnology and pharmaceutical industry, biomedical, cosmetic and therapeutic technologies, environment protection of production and

medical devices, and institutions concerned with the development of this type of technology Gwarda-Gruszczyńska (2013).

Current research results indicate that the health level of the society is strictly related to the level of economic development. Society which is healthy, capable of working and long-living is able to produce more goods and services. This factor directly influences the development, and a high development level provides a possibility to transfer more resources onto the health care sector. Enterprises functioning in the medical sector must undertake actions in a difficult environment. From the one hand, they have to be open for patients' needs, from the other hand, the need of cooperation with medical community is significant. What is more, they have to try to stay ahead of the competition offering more and more modern services, products or technologies. Implementation of innovations and conducting research in medical sector is expensive and requires involvement of many entities to succeed Gadowska and Różycka (2016). A dynamic progress of knowledge, technology and increasing competition encourage the companies to implement innovations which are becoming a necessity for the functioning or development of enterprises on the market. Innovation of enterprises may be indicated by such factors as: knowledge, owned resources and abilities, but also the creation of inventions and ideas which constitute the basis for innovations Stawasz (2017). In general, with increasing innovativeness, ambiguity and uncertainty increase and more complex learning processes are needed. Processes for discovering, diffusing and incorporating new knowledge require longer and closer cooperation between the partners involved Gemünden, Salomo and Hölzle (2007). Kothandaraman and Wilson claim that 3 basic elements have a decisive meaning in the processes of partnership formation between enterprises: extraordinary value for a client, key competences of partners and quality of relations between the enterprises creating the network Kothandaraman and Wilson (2001). The networks of partners cooperating with enterprises in terms of innovation creation are often called the innovation ecosystems Nambisan and Sawhney (2018). Davis and Spekman suggest to cooperate on the basis of three rules: connectivity, community, collaboration Davis and Spekman (2004).

It is worth noting that the essence of innovation process is very complex and its functioning can be initiated differently, with a different course and set of feedback. Innovative activity is characterised by fragmentation and the cooperating entities clearly tie into the idea of creating the synergy effects. Innovative potential building on the basis of enterprise cooperation with other entities should be treated by companies as a strategy of their development. They should consider relations between expenditures and results which shall be satisfying for all organisations in the cooperation.

Enterprises which got involved in the cooperation with the environment indicate the possibility to strengthen their position on the national and international market as the source of their motivation. Their method is to launch new or modernize the already offered products or services. Companies have great awareness of possible results from the cooperation with the environment. They see positive influence of cooperation in terms of innovative activity with other entities on their competitiveness and efficiency. Cooperation allows them a wider access to knowledge and other resources. It allows them to enter new markets or increase the share in the market and achieve synergy or other benefits which cannot be achieved by an enterprise focused only on itself. In the globalising economy, innovation has been widely recognised as a major driver of sustainable economic growth in both developed and developing countries. Regions have become key factors shaping the generation and diffusion of new knowledge and economic evolution. The past decades have witnessed the changing scales and space of innovation, the conceptualization of which involves national innovation systems, sectoral innovation systems, regional innovation systems and global innovation networks Aalbers and Castree (2015).

The change of awareness and beginning to think in the categories of an innovative company is important for many companies. For the change of managers' and company owners' awareness to occur, it is significant to learn good practices of innovative enterprises operating in the world and try to adopt them to Polish conditions. That is why it is important to cooperate and maintain extensive contacts with other entities on the national and international market and go beyond existing networks of relationships in order to open up for new possibilities (open innovations). What is more, a very significant factor supporting the cooperation of different entities is the creation of the atmosphere of creativity and the culture of innovation Beers and Zand (2014).

2 Role of innovations in the cooperation of enterprises

Innovative activities of organisations are based on the definition of entrepreneurship created by Schumpeter (1960) and Drucker (1992). Schumpeter describes entrepreneurship as a characteristic of people who are resourceful and persistent in overcoming barriers and pursuing objectives, e.g. to introduce a new product or technology, to open a new market, to gain new sources of raw materials. He is considered a precursor of innovation who describes this term as new ideas, discoveries or inventions which are a result of creative thinking. Schumpeter defines innovation very widely – as technical solutions but also as economic

projects (e.g. to gain a new market or to use a new raw material) and thinks that innovations occur in organisational changes and interpersonal relationships Golińska-Pieszyńska (2007). According to Schumpeter, entrepreneurial activities should improve the effectiveness of companies. In Drucker's view, the implementation of innovation means, on the one hand, to implement many small changes, on the other hand, a few significant, radical changes to the existing products and processes. Drucker believes that "systematic innovation consists in the purposeful and organised search for changes in the existing products and in the systematic analysis of the opportunities such changes might offer for economic or social innovation" Drucker (2004). Barnett defines innovation as any idea, process or thing that is new and qualitatively different from what already exists Chauvel and Borzillo (2017).

The path to sustainable prosperity and affordable universal health coverage shall depend more on the capacity to innovate in the way we innovate than on accelerating technology development Dube, Jha, Faber, Struben, London, Archisman Mohapatra, Drager, Lannon, Joshi and McDermott (2014).

The ability of companies to create and implement innovations, known as innovativeness, is strategic as it means to constantly invest in research and development, know-how, technologies and improvement of employee qualifications and experience. This attitude enables to get maximum benefits in the form of new or modernized products and services. Innovativeness, which is associated with creativity, originality and better usefulness (quality) of solutions, means not only to make the current company's activity more efficient, but also to take actions that are focused on maintaining competitive advantage in the future Brdulak and Gołębiowski (2003).

3 The innovative activity of enterprises in the health care sector in cooperation with other entities based on the example of the Lodz province

The first stage of the research process was the quantitative analysis of the market (analysis of potential respondents who were to participate in the survey). To achieve this goal, the assumptions regarding the characteristics of the surveyed companies were adopted. The survey included enterprises representing industries, such as biotechnology, biomedical technologies, pharmaceutical industry, cosmetics and electrotherapeutic industry, medical devices industry and environmental protection of production. The research also involved entities dealing with the development of the aforementioned technologies. The affiliation of enterprises to the health care sector was determined by the research survey method. The selection of enterprises was

based on the Polish Classification of Activities, PKD (sections: 21.10.Z; 21.20.Z; 26.60.Z; 32.50.Z; 72.11.Z; 72.19.Z; 86.90.Z).

According to data received from The Statistics Poland in 2018, there were 734 enterprises operating in the health care sector in Poland in the Lodz province. The sampling frame was the REGON register of the Lodz Province which selected 432 enterprises based on business activities. After selecting a pool of potential respondents in order to verify the adopted assumptions (regarding the nature of enterprises and their affiliation to the sector) and confirmation of contact details, companies were contacted by phone.

The next stage of research process was to develop a research tool – a questionnaire. The questions covered the wide-ranging problems of cooperation of enterprises from the health care sector in the scope of creating innovative undertakings. The aim was to obtain the fullest information possible related to the conditions of cooperation, in particular, to define the areas and benefits of cooperation, identify partners in the process of creating innovation, sources of financing innovative activities and factors that impede cooperation in the creation of innovation.

A total of 113 enterprises joined the research. Due to the lack of answers, sometimes just over 50% of the survey, part of them was rejected from the research group. Finally, surveys from 97 companies were qualified for the analysis (which constituted 22.45% of the research sample).

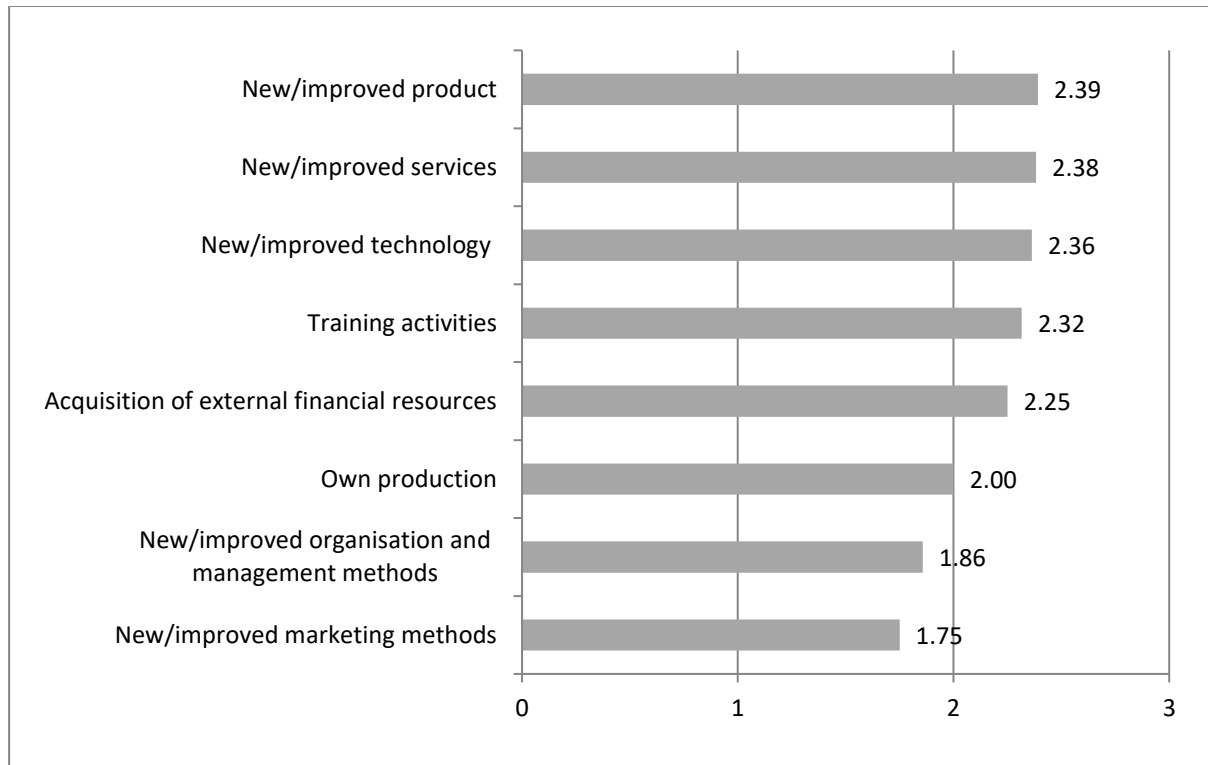
While analysing the empirical data from primary research questionnaires, the percentage of structure, weighted averages and the importance hierarchy of variables were used. Empirical research was carried out in the period from June to July 2018. As a research technique, the CATI method was used in a telephone interview.

The health care sector has an unlimited development potential, which strongly affects other sectors of the economy and is able to shape them. Moreover, it is prone to rapid technological changes and it fulfills very important functions from both economic and social point of view.

The health care sector is based on research and development, and this is why enterprises operating in this field run their own R&D or cooperate with others. Their own knowledge, competent collaborators or matching partners are of great importance. According to the World Health Organisation statistics, there are many global problems that can be significantly affected by the health sector. Thus, there is a need for continuous development and creating solutions and technologies related to health protection.

Enterprises operating in the health care sector pointed to the continuous nature of long-term cooperation in the field of innovative activity. Nearly 70% of companies indicated that cooperation is focused on cooperation with a partner in the long run.

Fig. 1: Cooperation areas within the innovative activity



Source: Own

Note: respondents assessed particular areas of cooperation using a scale: 3 – high rating, 2 – average rating, 1 - low rating and 0 if the listed area did not appear. The figure of assessment factor was counted as a weighted arithmetic average

The most significant areas of cooperation in the health care sector include: new/improved product (2.39 indications) and services (2.38 indications), and also new/improved technology (2.36). One can observe a statistically significant relationship between the size of the enterprise and the introduction of mainly product innovations ($v = 0.112$, $p=0.012$).

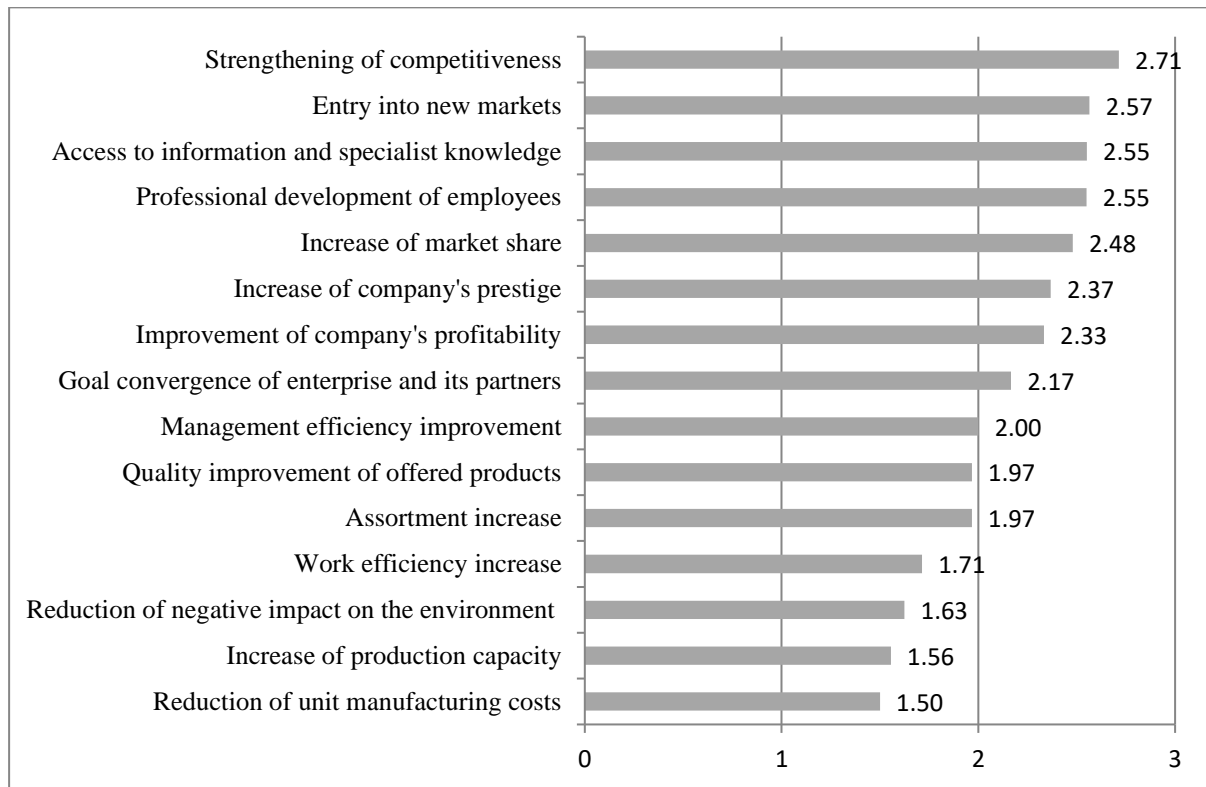
Among product innovations, a significant role is played by research on the development of innovative medicines useful in the treatment of e.g. cancer, cardiovascular diseases and other disease units. New/improved services in the health care sector consider the technology and information innovations using ICT technologies mainly used by telemedicine. Those technologies cover a wide range of all technologies enabling manipulation and transfer of information. All communication media and media enabling the recording and processing of

information fall within the conceptual scope of ICT technology. Thanks to those technologies, it is possible to wirelessly communicate with systems supporting health and life independence of elderly or disabled people. A significant role in health care is also played by implemented IT systems. They enable the entities participating in the system to gather, analyse and share digital content concerning medical events. The companies indicated the use of new generation materials or implants (e.g. exoskeleton – worn robot) and development of new technologies connected with cardiology among the medical technology development.

Considering the activity sector of surveyed enterprises, one should note a high response rate concerning the training activity (2.32 indications). Further on, the cooperation areas include: acquisition of external financial resources for the creation of innovative undertakings which frequently require considerable financial outlays (2.25) and own production (2.00). The least indicated areas were new/improved organisation and management methods (1.86 indications) and new/improved marketing methods (1.75 indications).

In the area of organisation and management methods, the most often implemented innovations are: methods concerning quality management systems, methods of responsibility share and decision making by employees. They undoubtedly improve the functioning of entities and increase their operational efficiency and satisfaction of different groups of stakeholders. Within the area of marketing methods, the enterprises indicated the use of online marketing tools (e-marketing) which allows the creation of positive image. Other actions in this area are targeted at distribution of products and services, their promotion or price strategy. Within the same e-marketing tools, it is also possible to mention the use of network technology (intranet) which performs the function of internal network and can also constitute a tool to carry out marketing research.

Surveyed enterprises rate the cooperation of enterprises with other entities as beneficial. It is indicated by the catalogue of benefits which according to the enterprises result from the cooperation with other entities (Fig. 2). The basis of cooperation is the assumption of diversity and equivalence of perception and defining its subject. Individual partners see different aspects of the issue that the cooperation concerns. They have various resources and operational tools and report various interests and expectations. Therefore, the direct benefit for all entities involved in this process is the possibility of a multilateral analysis of the subject of cooperation. Respecting different attitudes and decisions is a prerequisite for reaching an agreement. If there was no difference of interest, cooperation between the companies would become devoid of purpose.

Fig. 2: Benefits from the cooperation of enterprises within the scope of innovative activity


Source: Own

Note: respondents assessed particular benefits using a scale: 3 – high rating, 2 – average rating, 1 - low rating and 0 if the listed benefit did not appear. The figure of assessment factor was counted as a weighted arithmetic average

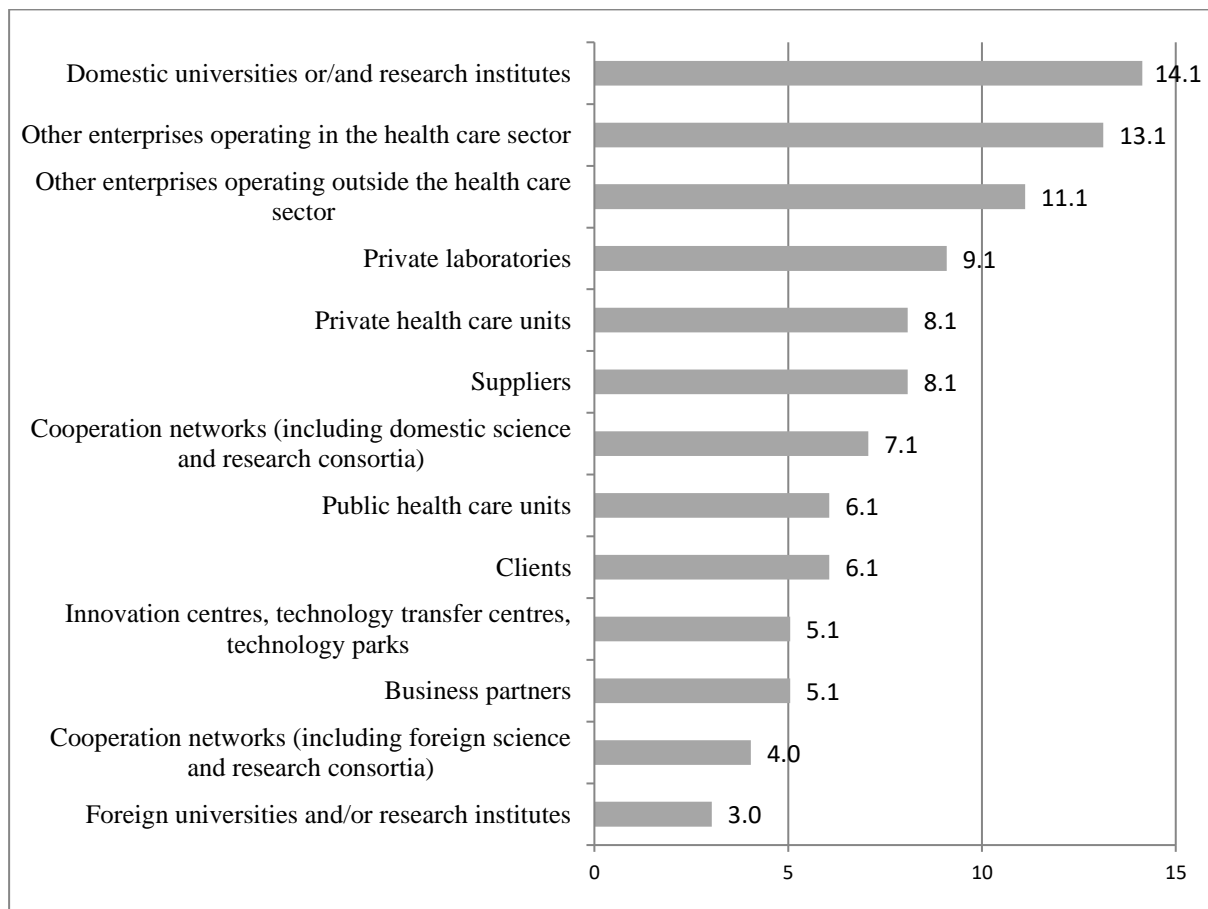
The meaningful, according to the respondents, benefits resulting from the cooperation in terms of the innovative activity are the strengthening of enterprises' competitiveness (2.71 indications), entry into new markets (2.57 indications), professional development of employees and access to information and specialist knowledge (2.55 indications). It is worth noting that the competitiveness of enterprises as an advantage is indicated mainly by large companies. This relationship is confirmed in the statistical survey, there is a statistically significant ($p=0.01$) relationship between the size of the enterprise and increasing competitiveness as a benefit of cooperation, although the strength of this relationship is small ($v=0.282$). The processes of knowledge absorbing result from the ability of companies to reach incentives to develop further innovative activity. A little less indications (2.37) consider the benefits concerning the increase of company's prestige and improvement of company's profitability (2.33). Enhanced cooperation in terms of the increase of enterprise's prestige is a reason for the development and, as a result, competitiveness of companies on the national, European and world markets.

On the one hand, the highest rated benefits by the companies, resulting from cooperation, focus on hard-to-measure factors, such as the increase of competitiveness and access to knowledge. On the other hand, those benefits translate into the results of entities' activity which have a measurable and calculable nature.

Other benefits which in the opinion of enterprises are brought by cooperation with other entities are assigned with lower score (value of assessment indicator was in the range of 2.17 to 1.63). The most often indicated benefits in the following order were: goal convergence of enterprise and its partners and also management efficiency improvement, quality improvement of offered products, assortment increase, work efficiency increase and reduction of negative impact on the environment.

The research shows that cooperation in practice is caused by the lack of adequate resource potential or the search for sources of additional value. However, not all enterprises decide to cooperate with one another, which may result from the need to protect intellectual property or distrust of potential partners.

Fig. 3: Entities cooperating with enterprises in terms of innovation creation (%)



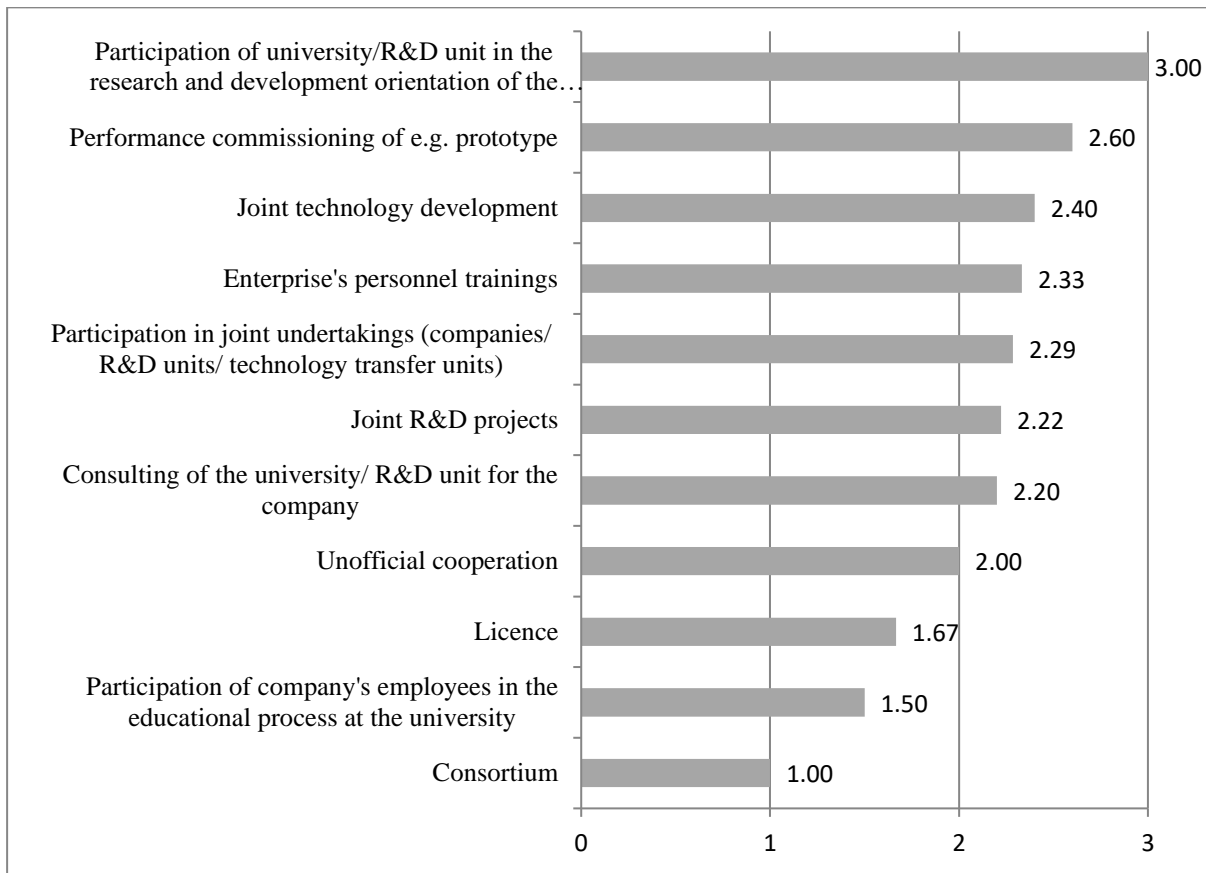
Source: Own

The most important entities in the health care sector are the domestic universities and research institutes (14.1%), other enterprises operating in the health care sector (13.1%) and operating outside the health care sector (11.1%). This leads to the conclusion that enterprises from the health care sector consider that the domestic universities and research institutes have major potential in innovation creation cooperation. Enterprises on grounds of time and necessity to quickly launch new technologies on the market indicate the cooperation with other companies from the health care sector and the ones functioning outside of this sector. It is significant to highlight that an important role for the surveyed enterprises is played by cooperation with private laboratories (9.1%), private health care units (8.1%) and suppliers (8.1%). Those constitute a significant cooperation party for companies operating in this sector, as well as the clients. Cooperation with clients was assessed on a relatively low level and totaled slightly over 6%. It may mean the creation of innovative undertakings with a more standard than personalised nature which were tailored to the needs of specific clients.

A small percentage of surveyed enterprises indicated the cooperation with entities situated abroad. Only 4% of respondents said that they cooperate with companies within foreign networks and 3% cooperate with foreign universities/research institutes. That forms the conclusion that enterprises create innovations mainly with domestic entities. Nevertheless, it would be worth to attempt to broaden the cooperation relation of enterprises with entities which are outside the borders of Poland. It could be a valuable source of knowledge and support a new direction of undertakings carried out in this sector.

Regarding the forms of implemented cooperation (Fig. 4), the surveyed enterprises most often indicate the participation of a university or R&D unit in the research and development orientation of the company (assessment indicator: 3.00), performance commissioning of research by a university/R&D unit for the company (2.60) and joint technology development (2.40). Considering the enterprise's operation sector, the relatively high assessment indicator should be noted – 2.33, concerning enterprise's personnel trainings within the innovative activity of companies and also participation in joint undertakings (2.29) and joint R&D projects (2.22).

Fig. 4: Cooperation forms of enterprises with other entities in terms of innovation creation



Source: Own

Note: respondents assessed particular forms of cooperation using a scale: 3 – high rating, 2 – average rating, 1 - low rating and 0 if the listed form of cooperation did not appear. The figure of assessment factor was counted as a weighted arithmetic average

The enterprises which do not have the ability to acquire or adopt technology have much to gain from the cooperation in their creation. Low response was received by undertakings of a consulting nature of universities/research and development units for the company.

Conclusion

Cooperation between enterprises contributes to a constant search, as well as to a use of the R&D results, new projects, concepts and innovations in practice. It is vital for business to develop technologies and services, introduce new solutions in organisation and management, improve infrastructure, especially regarding the collection, processing and sharing of information.

The network of partner relationships between the parties is constantly subject to various changes depending on the directions of its development. Enterprises should go beyond existing networks to create new opportunities (open innovation). Cooperation should be perceived as dynamic and changeable, which forces new arrangements among entities.

According to enterprises, factors which justify the cooperation in terms of innovative activity include: increase of company's ability to create competitive advantage, access to scientific knowledge and exchange of information and knowledge, and also share of risk and costs of research and development and innovative works. Cooperation contributes also to an increase of the quality level of provided services and manufactured products, and is targeted at the achievement of positive results, mainly of medical nature.

Decisions concerning the choice of innovations which should be implemented are often made intuitively which in many cases leads to the failure of the undertaking. In order to pursue the achievement of added value from innovations launched on the market, the potential of the innovation should be measured at first. In order to do so, according to Tuff, the classification of innovations can be used as per the consultants of the Doblin company, by checking the "temperature of the concept" and "warmth index of the concept" in order to define its potential for economic added value Tuff (2011).

An interesting stream of further research could be a comparative analysis of cooperation of the enterprises from the health care sector in terms of innovative activity in the European Union countries. An investigation of this type of issues could become a basis for recommendations concerning the creation of cooperation within innovative processes and works on shaping of the cooperation model of companies with different stakeholders.

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DIGITAL ENTREPRENEURSHIP: RESKILLING AND UPSKILLING WITH MOBILE MASSIVE OPEN ONLINE COURSES

Ladislava Knihová – Štěpánka Hronová

Abstract

Purpose: Sophisticated technological solutions and digital transformation represent a challenge not only for entrepreneurs and governments but they have considerable implications for education and learning as well. The objective of the research is to particularise the concept of digital entrepreneurship within Industry 4.0 with regard to the availability of the relevant mobile massive open online courses focused on topics particularly useful for (digital) entrepreneurs and entrepreneurship per se.

Design/methodology/approach: In harmony with the research objectives, sequential mixed methods research, specifically multi-phase research design, has been applied. The research design included the following research methods: quantitative content analysis, exploratory analysis, comparative analysis as well as descripto-explanatory study. The scope has been limited to two main platforms (iOS and Android) providing current mobile courses in English for (digital) entrepreneurs. Monetization strategies have not been considered.

Findings: The authors obtained comprehensive results and identified 242 multimedia mobile educational courses on (digital) entrepreneurship evidencing a direct connection between the digital skills for entrepreneurs and the courses' content. The research indicated important interrelations of the identified variables evidencing a trend towards higher rating of courses.

Research/practical implications: The most remarkable implications are: (a) update on digital entrepreneurship and related digital skills, (b) survey of mobile educational courses for entrepreneurs by world's most reputable universities, (c) current trends' observation, and (d) suggestions for specific areas of closer collaboration between universities and entrepreneurs.

Originality/value: Out of numerous research projects on massive open online courses, several analyse entrepreneurship education; however, the presented study fills a research gap focusing on mobile apps as a new platform within massive open online courses. Thus, the in-depth analysis of data on the above topics has the potential to contribute to the development of digital entrepreneurship in the Czech Republic and serve academia as a benchmarking tool.

Keywords: Digital Entrepreneur, Digital Revolution, Innovation, MOOCs, Upskilling

JEL Codes: L26, I23, O31

Introduction

Technological advancement and innovation are galloping at a very high speed forcing entrepreneurs, organizations and governments to catch the pace. These entities can either play the role of uninvolved observers, active users, and/or innovative creators steering the wheel of smart digital technologies. The Czech Republic (CR) strives to belong among the latter. In February 2019, *The Research, Development and Innovation Council*, an advisory body to the Government of the Czech Republic, put forward a breakthrough document entitled *Innovation Strategy of the Czech Republic 2019 - 2030* (RVVI, 2019). It focuses on the following pillars: (1) R&D: R&D Funding and evaluation, (2) Technology: Polytechnic education, (3) Start-ups: National start-up and spin-off infrastructure, (4) Digitalization: Digital state, digital production, and digital services, (5) Excellence: Innovation and Research Centres, (6) Investment: Smart Money, (7) Patents: Intellectual Property Protection, (8) Smart Infrastructure: Mobility and construction environment, and (9) Smart People: Smart Marketing. Out of these, digitalization of all spheres of life represents both an interesting opportunity and challenge for entrepreneurs and educational institutions operating in the CR. There are also significant export opportunities for R&D, smart technologies, higher-value goods and knowledge-intensive services. The following section of the paper, Chapter 1, sets the framework for the topic explaining essential terminology and presenting theoretical background. Subsequently, Chapter 2 of the research project offers important findings related to mobile massive open online courses (MOOCs) in the form of mobile apps for (digital) entrepreneurship as a learning environment suitable for reskilling and upskilling of managers to be ready in time for the challenging needs of the incoming Industry 4.0.

1 Theoretical framework

1.1 Entrepreneurial environment

Digital technologies have fundamentally changed the nature of entrepreneurial environment which has become less predictable and rather uncertain. As a result of technological advances, *entrepreneurs* change into *digital entrepreneurs* without much time to prepare for a radically new way of managing their businesses. New digital skills need to be mastered for effective digital transformation. (Sousa & Rocha, 2019)

For the purposes of this study, the term *digital entrepreneurship* is to be understood in harmony with the definition proposed by the European Commission: “*Digital entrepreneurship*

embraces all new ventures and the transformation of existing businesses that drive economic and/or social value by creating and using novel digital technologies.” (Bogdanowicz, European Commission, & Joint Research Centre, 2015, p. 38)

Based on *The European Index of Digital Entrepreneurship Systems (EIDES) 2018*, the Czech Republic ranked 15th among the 28 EU countries with the score standing at 42.3 points having been slightly below the EU’s average of 47.1. The highest score of 80.7 was received by Denmark while the lowest score of 21.6 was given to Romania. The EIDES placed the CR into the group of catcher-up countries. The strongest pillars of the CR (out of the 8 EIDES defined) are: *market conditions* and *knowledge creation & dissemination*. The weakest identified point was *networking & support*. (Autio et al., 2018)

If digital entrepreneurs want to stay competitive, they need to reskill and upskill themselves and their teams by acquiring new digital skills. Jennifer Robertson, an expert contributor for Forbes, expressed it in the following way: *“In order to achieve digital transformation, succeed in the world’s digital revolution, and arguably help our economy, we must consider a more flexible, accessible, and timely means of learning the skills for our digital economy.”* (‘Grads of Life BrandVoice: Digital Revolution Demands Changes to Education’, 2018) In their study on entrepreneurship education, Christian Friedl et al. noticed that *“MOOC providers have realized that their real audience are not universities and the higher education market but rather the labor market, in particular people who aim at achieving professional and career growth.”* (Christian Friedl, Christoph Resei, Agnes Zur, & Andrea Kalafúsová, 2018) Simultaneously, implementation of advanced technologies is becoming a critical factor. If entrepreneurs ignore it, they could become extremely vulnerable to their competitors who work on it hard. It will directly influence their bottom line. Bender et al. in McKinsey Quarterly Report 2018/4 stated: *“Digitally reinvented incumbents—those using digital to compete in new ways, and those making digital moves into new industries—are twice as likely as their traditional peers to experience exceptional financial growth.”* (Bender, Henke & Lamarre, 2018, p. 46)

In order to be less vulnerable, continuous education in “new disciplines” is the way to go. Today, in order to satisfy their learning preferences, learners have a wide range of educational courses at their disposal.

1.2 Digital transformation challenges education

For colleges, universities and traditional business schools, the epoch of digital transformation is a great opportunity to provide modern study programmes which have the potential to meet the dynamically changing needs of learners and their future employers. Methods of instruction with the extensive use of technologies may attract students and improve learning outcomes in a visible way. Unfortunately, many of these educational institutions are lagging behind the anticipated level, e.g. possessing academic excellence, but lacking digital skills. **(Evans & Myrick, 2015)** For educational institutions, staying relevant to real-world demands in the digital epoch requires a vision supported by the whole organization, not just by few technology fans – it needs hands-on involvement of whole teams.

Another challenge for traditional universities is represented by MOOCs, especially their mobile platforms which have been operating since 2014. Mobile MOOCs have brought a radical change in access to knowledge and skills. These apps are very quickly adopted especially by young audience. As a rule, learners experience engaging learning opportunities, user-friendly environment with no limits as for time or access – and, subsequently, they expect the same standards and flexibility from traditional universities which can hardly cope with the complexities of the issue.

1.3 Current real-world digital skills needs for entrepreneurs

Since the advent of Industry 4.0 and the start of 4th industrial revolution, dynamic trends of automation, digitalization and digital information exchange in many industries challenge all aspects of human lives and put much higher demands on entrepreneurs, business managers, governmental bodies and human resources within businesses, companies and organizations. European Commission (2015) lists the following indispensable areas to concentrate on in business and governmental orientation to create growth opportunities of the future. In order to improve business operations, sharpen business intelligence and invent new business models, strong focus on digital technologies such as mobile and cloud solutions, big data processing and orientation on social media is inevitable. Since 2015, as a result of dynamic changes, the following innovations have become constituent parts of Industry 4.0: Internet of Things (IoT), Simulation, Cybersecurity, System integration, Cloud computing, Nanotechnology, 3D, Big Data, Augmented reality, and Robots. These areas should be reflected in the content of educational courses, both face-to-face and online.

2 The research project on mobile MOOCs for (digital) entrepreneurship

2.1 Objectives, research questions and research methods

The objectives of the research is to particularise the concept of digital entrepreneurship within Industry 4.0 with regard to the availability of the relevant mobile MOOCs focused on topics particularly useful for (digital) entrepreneurs and entrepreneurship per se.

In order to meet the requirements of the research, the following *research questions* have been formulated:

- RQ1: Which, if any, mobile massive open online courses on entrepreneurship / digital entrepreneurship exist?
- RQ2: Is it possible to reskill and upskill entrepreneurs / digital entrepreneurs with mobile MOOCs in the era of Industry 4.0?
- RQ3: Which variables correlate with high rating of mobile MOOCs' apps for (digital) entrepreneurs?

For the purposes of this study, the authors have devised the sequential mixed methods research design, specifically multi-phase research. This research design has been chosen since it provides a more holistic and integrated approach to data analysis and interpretation. Using multiple research methods provides the authors with better opportunities to answer the research questions in detail.

The research was conducted in several stages. In the initial stage, exploratory approach was applied in an attempt to explore the availability of MOOCs in the form of mobile educational apps. (Tab. 1) Employing the keyword search within the database comprising 5,000 mobile MOOCs, the most relevant courses for entrepreneurs / digital entrepreneurs were identified with the help of pre-defined keywords. The systematic search and comparative analysis of courses provided by Coursera and edX on both the iOS and Android mobile platforms revealed in total 242 relevant courses, including innovative type of skills particularly needed for the incoming epoch of Industry 4.0. (Tabs. 2 & 3). Consequently, the RQ1 could be answered. Further stages followed deploying qualitative and quantitative research methods: (1) descripto-explanatory study of the randomly selected sample courses (answering RQ2) with the aim to justify their relevance to the target group from the viewpoint of reskilling and upskilling potentials (Tabs. 4 & 5), and (2) quantitative content analysis (in reply to RQ3) of the randomly chosen research sample sets (lower-rated and higher-rated courses) from the total population of 242 aimed at uncovering trends in variables influencing mobile MOOCs' apps

assessment by their alumni. Finally, the collected data sets were synthesised and critically evaluated by the authors answering RQ 1-3.

Regarding the timeline, the research was carried out in January and February 2019. Due to the highly volatile character of data, February 7 and 10, 2019 were selected to be the data collection dates; in-depth analyses were carried out in the second half of February 2019.

With the ambition to reach the highest research quality, special precautions have been taken: (a) in order to guarantee the quality of the selected mobile courses, only those provided by the best and reputable world universities have been considered; (b) the keywords (1) entrepreneurship, (2) digital entrepreneurship, and (3) digital have been used. Due to the fact that the courses on entrepreneurship might have titles not containing the selected keywords, a special attention has been given to organic search via Google search engine and to the use of app stores searching tools. With one of the course providers, Coursera, an advanced search tool available on their webpage has been utilized, too. Also, with respect to the specific system of course ranking within Apple Store and Google Play, app store optimization (ASO) rules have been taken into consideration. Thus, the obtained data has been localized and evaluated as for their usefulness in relation to the research questions and objectives.

2.2 Research findings

The *exploratory analyses* within the mixed methods research design are followed by the authors' critical evaluation of the mobile courses for entrepreneurs from the perspective of their relevance to the current real-world needs of entrepreneurs / digital entrepreneurs. The research into the topic has been restricted to two main MOOCs providers (Tab. 1), both founded in 2012, i.e. Coursera (Stanford University) and edX (Harvard University and MIT). Close collaboration with the world's leading universities and educational providers (280+) guarantee the highest possible quality of more than 5,000 courses to over 49 million learners.

Tab. 1: Coursera & edX course providers

| COURSERA | | edX | |
|---------------------|------------|---------------------|------------|
| Learners | 35 million | Learners | 14 million |
| University partners | 150+ | University partners | 130 |
| Courses | 2,700+ | Courses | 2,300+ |
| Specialization | 250+ | Specialization | N/A |
| Degrees | 4+ | Degrees | 9 |

Sources: *Coursera* - authors own elaboration based on (“About”, 2018) and *edX* - authors own elaboration based on (“About us”, 2013).¹¹

Some statistics related to both of the analysed course providers follow, using the above-mentioned selected keywords. The results are presented in the tables below (Tabs. 2 & 3). As can be seen in Tab. 2, Coursera provides 144 mobile courses found on the basis of the keyword “*entrepreneurship*” with language modifications and other specifications detailed in the chart.

Tab. 2: Research data set 1 – keyword ‘entrepreneurship’

| Course provider | | Coursera (Stanford University) | | | | | |
|----------------------|---------------|--------------------------------|---------------------|--------------------------------|----|-------------------|----|
| Keyword | | Entrepreneurship | | | | | |
| Total No. of courses | | 144 | | | | | |
| Language: | Level: | Partner: | Main Skills: | | | | |
| English | 113 | Beginner | 75 | University of Pennsylvania | 12 | Entrepreneurship | 22 |
| French | 13 | Intermediate | 15 | HEC Paris | 11 | Innovation | 14 |
| Spanish | 10 | Mixed | 54 | University of Maryland | 11 | Business Model | 9 |
| Russian | 4 | | | University of Illinois | 10 | Finance | 9 |
| Portuguese (Brazil) | 3 | | | University of Virginia | 9 | Management | 7 |
| Chinese | 1 | | | ESSEC Business School | 8 | Customer | 6 |
| | | | | Michigan State University | 8 | Investment | 6 |
| | | | | EIT Digital | 6 | Corporate Bond | 5 |
| | | | | Israel Institute of Technology | 6 | Value proposition | 5 |

Source: Authors own elaboration based on <https://www.coursera.org/browse/business/entrepreneurship>

In order to juxtapose at least two different course providers, we have further identified 21 courses focused on entrepreneurship with edX. By way of illustration, there are 10 randomly ordered courses on entrepreneurship: (1) Entrepreneurship, (2) Creativity & Entrepreneurship, (3) Entrepreneurship: DO Your Venture, (4) Entrepreneurship in Emerging Economies, (5) Entrepreneurship for Global Challenges in Emerging Markets, (6) Becoming an Entrepreneur, (7) Identifying Entrepreneurial Opportunities, (8) Enabling Entrepreneurs to Shape a Better World, (9) The Entrepreneurial Mindset and (10) Thinking & Acting like an Entrepreneur.

¹¹ Data sets shown in Tabs. 1 – 3 and Fig. 1 were collected on 7th Feb., 2019; in Tabs. 4 - 6 on 10th Feb., 2019.

Well-chosen titles of these courses prove the opinion that titles can be telling. All courses work on both operation systems, i.e. iOS and Android.

Tab. 3: Research data set 2 – keyword ‘digital entrepreneurship’

| | | | | | | | |
|----------------------|---------------|---------------------------------|---------------------|----------------------------|---|-----------------------|---|
| Course provider | | Coursera (Stanford University) | | | | | |
| Keyword | | Digital entrepreneurship | | | | | |
| Total No. of courses | | 17 | | | | | |
| Language: | Level: | Partner: | Main Skills: | | | | |
| English | 13 | Beginner | 8 | EIT Digital | 6 | Innovation | 4 |
| French | 2 | Intermediate | 7 | Sciences Pro | 2 | Sales | 3 |
| Portuguese (Brazil) | 2 | Mixed | 2 | Universidade de São Paolo | 2 | Marketing | 2 |
| | | | | Copenhagen Business School | 1 | Marketing strategy | 2 |
| | | | | HEC Paris | 1 | Product development | 7 |
| | | | | Institut Mines-Télécom | 1 | Competition | 1 |
| | | | | Michigan State University | 1 | Growth strategies | 1 |
| | | | | University of Copenhagen | 1 | Intellectual property | 1 |
| | | | | University of Illinois | 1 | MarCom | 1 |

Source: Authors own elaboration based on <https://www.coursera.org/courses?query=digital%20entrepreneurship>

The term ‘*digital entrepreneurship*’ has not been fully established yet – 17 different courses have been found on Coursera (Tab. 3) and only two courses were found on edX. Therefore the authors continued the search by a related word ‘*digitalization*’ with the response of 58 courses actually referring to digital entrepreneurship. Again, by way of illustration, with the edX provider, there are 10 randomly ordered courses on digitalization: (1) Digital transformation strategy, (2) Digital branding and engagement, (3) Digital transformation leadership, (4) Digital strategy and action, (5) Digital Transformation: Market and Industry Analysis, (6) Digital leadership, (7) Digital strategy, (8) Digital transformation, (9) Reputation management in a digital world, and (10) Industry 4.0: How to Revolutionize your Business. All courses work on both operation systems, i.e. iOS and Android.

In order to compare the real-world needs of entrepreneurs / digital entrepreneurs, the following two randomly chosen courses one from each platform are described in detail. The descriptive analysis of the following two courses' syllabi provides a sufficiently broad overview of the course instructional design, structure and content. (See Tabs. 4 & 5). Further explanation complementing the descripto-explanatory study is to be found in Chapter 3.

Tab. 4: Mobile Course “Entrepreneurship Specialization”

| Course name | Entrepreneurship Specialization (Coursera) | |
|--|--|------------|
| Partner | University of Pennsylvania | |
| Description: | Wharton's Entrepreneurship Specialization covers the conception, design, organization, and management of new enterprises. This four-course series is designed to take you from opportunity identification through launch, growth, financing and profitability. You'll develop an entrepreneurial mindset and hone the skills you need to develop a new enterprise with potential for growth and funding, or to identify and pursue opportunities for growth within an existing organization. | |
| Syllabus: | There are 5 courses in this Specialization. Entrepreneurship 1: Developing the Opportunity | |
| WEEK 1 Introduction and Course Materials (3 videos – total 21 m) | 0.1 Introduction to the Professors and Wharton 8m 0.2 What Is Entrepreneurship? 5m 0.3 Can You Teach Entrepreneurship? 6m Module 1: Introduction to Entrepreneurship (9 videos – total 141 m, 2 readings, 1 quiz) 1.1 Course Introduction 21m 1.2 Profile of the Entrepreneur 5m 1.3 Entrepreneurship in Established Firms 18m 1.4 Venture Creation's Role in Society 8m 1.5 Types of Enterprises 9m 1.6 Technology Entrepreneurship 14m 1.7 Impact Entrepreneurship 13m (Optional) The Role of Venture Creation in Society: Interview: Andy Rachleff, Founder, Wealthfront, Co-founder, Benchmark Capita 115m (Optional) Entrepreneurship in Established Companies: Interview with Scott Mills, EVP, Chief Administrator Officer, Viacom 32m | |
| WEEK 2 Module 2: Opportunity Analysis (9 videos – total 71 m, 2 readings, 1 quiz) | 2.1 Opportunities and Uncertainty 7m 2.2 Push and Pull and the Sources of Innovation 13m 2.3 Customers as Sources of Opportunities 16m 2.4 Importance of the Idea (VIDE Model) 13m 2.5 Assessing Opportunities 7m 2.6 The Tournament Approach 7m (Optional) From Idea to Opportunity: Interview with Amy Errett 24m | |
| WEEK 3 Module 3: Markets, Need-Finding and Planning (8 videos – total 99 m, 2 readings, 1 quiz) | 3.1 Defining the Focal Market: Market Segmentation 4m 3.2 Understanding User Needs 26m 3.3 Competitive Analysis 9m 3.4 Generating Ideas with Individuals and Groups 4m 3.5 Planning: Assumptions 11m 3.6 Planning: Discovery Driven Planning 17m 3.7 Planning: Discovery Driven Planning Worksheet 8m (Optional) Talent Management and Development: Interview with Jackie Reses 15m | |
| WEEK 4 Module 4: Pitching, Testing, and Prototyping (8 videos – total 98 m, 2 readings, 1 quiz) | 4.1 The Elevator Pitch 8m 4.2 Testing your Idea: Customer Interviews 9m 4.3 Testing your Idea: Surveys 17m 4.4 Creating a Prototype: Physical Goods 19m 4.5 Creating a Prototype: Software 17m 4.6 Creating a Prototype: Services 4m 4.7 Summary and What's Ahead 1m (Optional) Launching a Start-up: Interview with Co-founders of Prayas Analytics 20m | |
| Beginning of study | Flexible schedule | Fixed date |
| | ✓ | --- |
| Length of the course | 4 weeks of study, 1-2 hours/week | |
| Operation system | Android | iOS |
| | ✓ | ✓ |
| Course evaluation by participants | The feedback of the course Entrepreneurship 1: Developing the Opportunity is stunning: in total 4.8 points (out of 5) is the result of 1.851 ratings. In the 408 reviews, 70% of learners affirm that they have started a new career after the course, 69% got a tangible career benefit from this course, and 12% got a pay increase or promotion. | |

Source: Authors' own elaboration based on a) search in Apple App Store and Google Play App Store and b)

<https://www.coursera.org/specializations/wharton-entrepreneurship>

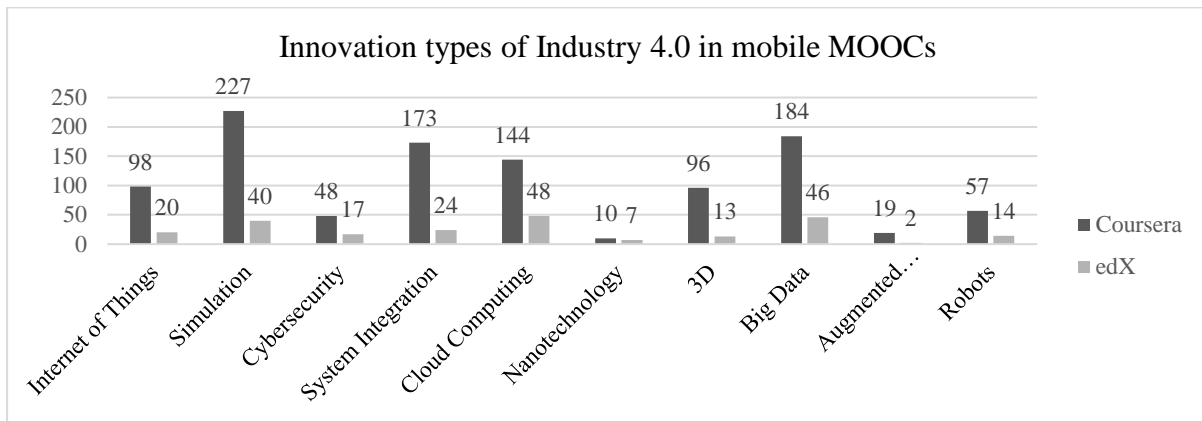
Tab. 5: Mobile Course “Digital transformation strategy”

| Course name | | |
|---|---|------------|
| Digital transformation strategy (edX) | | |
| Partner | | |
| KTH Royal Institute of Technology | | |
| <p>Description: This course will help you value potential network transformations and identify a secure path to reach your business goals. The addressed questions: How can you identify the main challenges for companies facing a digital transformation? • How to formulate a strategy handling the challenges identified when facing a digital transformation. • How to know what kind of projects to go for, versus the ones to forgo. • How to recognize when the timing for digital transformation is right. The course will help you handle the above issues and provide the concrete tools and strategies to ensure continued success while delivering customer value in a new context.</p> | | |
| <p>What you'll learn: How to analyze and predict the future value network of your business • How to evaluate and chose a future desired role and end state for your company or organization • How to navigate in a future business environment and create the necessary strategies to overcome critical challenges • How to use the theories, models, and tools needed when re-positioning under uncertain conditions</p> | | |
| This course is part of the Digital Transformation Professional Certificate program. | | |
| Beginning of study | Flexible schedule | Fixed date |
| | ✓ | --- |
| Time to complete the course | 10 weeks; 2-3 hours a week | |
| Operation system | Android | iOS |
| | ✓ | ✓ |
| Course evaluation by participants | Evaluation has not been provided by edX | |

Source: authors' own elaboration based on a) search in Apple App Store and Google Play App Store and b) <https://www.edx.org/course/digital-transformation-strategy-0>

In an attempt to answer the question of real-world digital skills needed in the era of Industry 4.0, the analysis revealed the following data based on Industry 4.0 innovation types (Fig. 1.) The results demonstrate a strong focus of mobile MOOCs providers on digital skills which is by no means accidental. Newly designed mobile courses can help learners use rapidly changing technology with greater ease through the well-balanced mix of theory and practice. Comparative study of both mobile MOOCs providers revealed that Coursera offers a much greater choice of courses focused on digital skills than edX, however further data collection would be needed to determine the pros and cons of both providers. Considering instructional design, both courses provided by Coursera and edX contain videos, additional reading, tests/quizzes, real-life examples and case studies.

Fig. 1: Digital skills and mobile MOOCs based on innovation types in Industry 4.0



Source: authors' own elaboration based on <https://www.coursera.org/browse> and <https://www.edx.org/course>

In order to address RQ3, deploying quantitative content analysis (Tab. 6), two mobile MOOCs groups with focus on Industry 4.0 innovation types were identified based on their ratings (1 = the worst; 5 = the best). The lowest figures of the whole population reached the trough of 3.0 while the highest were at 5.0; thus a higher-rated (4.1 - 5.0) and lower-rated group (3.0 - 4.0) were established.

Tab. 6: Variables influencing mobile MOOCs ratings

| HIGHER-RATED COURSES (4.1-5.0) | | | | | | | | | | LOWER-RATED COURSES (3.0-4.0) | | | | | | | | | |
|--------------------------------|------------------|-----------------|--------------|------------------------------|-----------------------------|---------------------------------|----------------------------------|-----------------|------------|-------------------------------|------------------|-----------------|--------------|------------------------------|-----------------------------|---------------------------------|----------------------------------|-----------------|------------|
| Random Course No. | No. of lecturers | Length in weeks | New career % | Tangible career benefit in % | Pay increase/promotion in % | Core skills defined YES-1, NO-0 | Foreign subtitles (No. of lang.) | No. of students | Cumulative | Random Course No. | No. of lecturers | Length in weeks | New career % | Tangible career benefit in % | Pay increase/promotion in % | Core skills defined YES-1, NO-0 | Foreign subtitles (No. of lang.) | No. of students | Cumulative |
| 1 | 4 | 4 | 50 | 20 | 0 | 1 | 1 | 32000 | 32000 | 1 | 1 | 7 | 0 | 0 | 0 | 0 | 1 | 285 | 285 |
| 2 | 1 | 4 | 17 | 25 | 0 | 1 | 0 | 24000 | 56000 | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 78 | 363 |
| 3 | 7 | 4 | 80 | 62 | 29 | 1 | 0 | 22000 | 78000 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 794 | 1157 |
| 4 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 6000 | 84000 | 4 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 677 | 1834 |
| 5 | 4 | 4 | 0 | 0 | 0 | 0 | 1 | 5100 | 89100 | 5 | 2 | 4 | 24 | 22 | 0 | 0 | 0 | 18000 | 19834 |
| 6 | 2 | 2 | 50 | 29 | 17 | 0 | 1 | 30000 | 119100 | 6 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 9500 | 29334 |
| 7 | 5 | 4 | 33 | 36 | 17 | 1 | 0 | 12000 | 131100 | 7 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 947 | 30281 |
| 8 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 22000 | 153100 | 8 | 1 | 4 | 60 | 43 | 0 | 0 | 0 | 19000 | 49281 |
| 9 | 1 | 4 | 80 | 75 | 40 | 1 | 3 | 15000 | 168100 | 9 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 12000 | 61281 |
| 10 | 1 | 4 | 67 | 75 | 0 | 1 | 1 | 15000 | 183100 | 10 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 1900 | 63181 |
| Σ | x | x | x | x | x | 6 | 7 | x | x | Σ | x | x | x | x | x | 0 | 1 | x | x |
| Ø | 2,7 | 3,9 | 37,7 | 32,2 | 10,3 | x | 0,7 | 18310 | x | Ø | 1,9 | 4,1 | 8,4 | 6,5 | 0 | x | 0,1 | 6318,1 | x |
| % | 100% | 100% | 70% | 70% | 40% | 60% | 50% | x | x | % | 100% | 100% | 20% | 20% | 0% | 0% | 10% | x | x |

Source:

Authors' own elaboration based on <https://www.coursera.org/browse>

Random sampling was applied within each group bringing the values of variables shown in Tab. 6. Flexible schedules, similar types of instructional activities and the possibility to upload the certificate onto one's professional LinkedIn profile were typical features of both groups (100%) making no difference towards the ranking score (not included in the chart).

However, in terms of other selected variables, the results varied significantly. The following correlated with a trend towards higher rating: explicitly defined core skills to be achieved (60% : 0%)¹²; stated benefits: alumni success e.g. promotion (70% : 20%); multi-member expert lecturing team (2.7 : 1.9 per course); foreign language subtitles (0.7 : 0.1 per course) and length of the courses whereas shorter were preferred. The figures in Tab. 6 showed that higher-rated courses report more transparently and in higher volumes about all variables. The research also indicated the trend of greater amount of participants subscribing for higher rated courses.

3 Summary and discussion

The analysis carried out by the authors serves as a basis for finding answers to the research questions. In reply to RQ1, 242 multimedia mobile MOOCs on entrepreneurship / digital entrepreneurship were identified. Some courses are logically grouped to offer learners a certain specialization. All explored courses have flexible schedules and work on both main platforms (iOS and Android). There are some barriers in searching the desired content due to full-text type of search. The course can be undiscovered just because the relevant keyword is not in their titles, but it is a question of time when this barrier is removed thanks to artificial intelligence wider deployment in search engine tools (already in use by Google and Microsoft). For some Czech learners, English can be another barrier. Our in-depth analysis showed that with some courses subtitles in other languages exist; however, only one course with subtitles in Czech language was discovered. As for the RQ2, our findings imply that there is a direct connection between new digital skills needed and the syllabi of the analysed courses fully covering the new digital skills needed for all innovations and new paradigms within Industry 4.0. Thus, there is a high probability that it is possible to reskill and upskill learners in digital entrepreneurial skills with the help of mobile MOOCs. Learners' satisfaction and new career prospects corroborate it. RQ3 focusing on rating revealed a trend towards required transparency and precise definition of the core skills acquired in the courses as well as tangible benefits (alumni feedback, promotion), multi-expert teams ensuring high quality of instruction & content and subtitles in foreign languages. These increase ratings and amounts of students. With the use of quantitative and qualitative data analyses, the objectives of this paper have been fulfilled and all research questions have been answered in detail and in due context. Nevertheless, further research into the topic focused on qualitative content analysis and the

¹² The percentage in brackets shows ratios of higher to lower rated courses.

unique selling points of the mobile MOOCs related to entrepreneurship / digital entrepreneurship is proposed by the authors. The research clearly proves that digitalization can be considered a milestone both for education and business around the globe and it represents a big challenge for all.

Conclusion

The aim of the research was to particularise the concept of digital entrepreneurship within Industry 4.0 with regard to the availability of the relevant mobile MOOCs focused on topics particularly useful for (digital) entrepreneurs and entrepreneurship per se.

In order to reach the specified research objectives, sequential mixed methods research design, specifically multi-phase research, has been applied, deploying the quantitative content analysis as an empirical research method suitable for systematic analyses.

In conclusion, the authors feel strongly that the research provides significant stimuli for academia and other professional educators in relation to their future roles in mobile education. Promising opportunities consist mainly in the following areas: (a) localization in the form of subtitles of the already existing mobile massive open online courses into Czech language; (b) creation of one's own educational mobile apps (e.g. based on business practice demand) while presenting educators' expertise both globally and locally; (c) modification of the content focus of EU grants available for the Czech Republic by explaining the needs for new mobile educational strategies and their funding; (d) use of the existing mobile courses as a benchmark for designing modern university study programmes.

Based on the identification and analyses of mobile learning courses, the paper sheds new light on learning opportunities for digital entrepreneurs who wish to shape and upgrade their skills in order to create high-value goods and innovative solutions for their customers and stay competitive in the long run.

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INNOVATION TYPOLOGY: COMPARATIVE STUDY ON CENTRAL EUROPEAN COUNTRIES

Lucia Kohnová – Ján Papula – Nikola Salajová

Abstract

Purpose: The purpose of this research article is to present the importance of innovation for sustainable development of companies in the era of the Fourth Industrial Revolution. This paper presents the topic of specific types of innovations that are conducted by companies with the main objective focused on analysis of differences among organizations based on the country of operation, company size and company maturity.

Design/methodology/approach: The research method of data collection in this research was an extensive survey of enterprises from five EU countries. The research tool was an electronic questionnaire that was distributed to representatives and management of organizations. This research was part of a research project, which was realized during the period 2015-2018. Research objectives are achieved with extensive analysis using statistical Chi square testing of significance of differences found among selected groups of companies.

Findings: The analysis in our research has shown several differences between analyzed countries, where Austrian and German companies conducted product innovation significantly more than Slovak and Czech companies. 54% of large companies have conducted technological innovation recently, while smaller companies conducted mainly product innovation. Growing companies conducted all types of innovation more than mature companies.

Research/practical implications: The importance of innovation in current dynamic environment pushes companies into fast decisions regarding future development. Slovak and Czech companies need to sustain their competitiveness to Austrian and German companies mainly by increasing product innovations. Large companies may face slower pace of growth.

Originality/value: This unique research consisting of 1482 companies provides important view on differences in behavior of companies. The originality of the research comes from the comparison of five European countries, where SK and CZ companies are compared to stronger economies as DE, AT and CH. Identified statistically significant differences provide managers important information that can lead to specific actions in their future innovation management.

Keywords: Innovation Management, Industry 4.0, Innovation Typology

JEL Codes: O30, Q55

Introduction

Innovation is a fundamental factor that effects company's competitiveness in the current economic development (Seclen Luna, 2018). It is an unavoidable strategy which combines and synthesizes various processes in order to achieve desired outputs. The necessity for innovation has been dramatically increased because of the changes coming with the Fourth Industrial Revolution. Industry 4.0 significantly changes products and production systems concerning the design, processes, operations and services (Ślusarczyk, 2018). New technologies, digitalization, automatization, robotization as well as the change in consumer preferences lead to the point, where organizations need to revise their general and innovation strategy, while only possibility to adapt to these changes will be through innovation. While technologies are the main driver of Industry 4.0, it is the processes and organization that need to change in order gain competitive advantage and be able to compete on the market. In this article we focus on specific innovation types based on the content of innovation. In the literature review this article discusses the theory on innovation and its importance, innovation typology and its relevance to Industry 4.0. Further, the data of extensive survey conducted on companies from five European countries are introduced and analyzed. We used non-parametrical Chi square test for analyzing the significance of differences found among the sample groups. Based on the findings we draw conclusion and discuss further implications of our research.

1 Literature review

Innovation is currently one of the most discussed topics in the professional society as well as among entrepreneurs. The innovation theory supported by many studies highlights the importance of innovation for decades. The father of innovation theory is considered an Austrian and American economist Joseph A. Schumpeter (1883-1950) because of his ideas and insights that most influenced further innovation. Schumpeter in his publication "In his Theory of Economic Development" (1911), talked about the term "combination of developmental change" which is used as the forerunner of the concept of innovation (Schumpeter, 1987). With the development of the economy, the authors have discussed the very essence of innovation, individual innovation tools or their benefits, on the basis of which the definitions slightly differ. Drucker describes innovation as: "a specific tool for entrepreneurs to use change as an opportunity for another business or other service. Innovation can be presented as discipline, can be learned and can be used (Lee-Ross, Lashley, 2009). O'Sullivan and Dooley describe innovation more specifically, such as: " Application of practical tools and techniques that make

changes, both small and large, in products, processes and services, with the result of introducing something new for the organization, adding value to customers and contributing to the organization's knowledge base" (O'Sullivan, Dooley, 2009). We can observe several common features in the definitions. Innovation can be perceived as: something new; the change agent; process; value carrier and invention (Aiken, Hage, 1971; Wang, Kafouros, 2009; Ram, Cui, Wu, 2010).

Innovations are classified in the theory based on a number of criteria, whether the content of innovation, the radicality of innovation, whether innovation is done internally or in collaboration with external environments, and so on. All typologies have the basic assumption that innovations bring something new or improved, but they are differentiated in the sources for these innovations and their final effects. The most used innovation typology is according to Oslo Manual, where innovations are divided into 4 basic types according to content: product innovation, process innovation, organizational innovation and market innovation. (Oslo Manual, 2005) Historically, innovation was considered primarily as a change coming from research and development activities, in particular technological innovation. Research by Arundel et al. points to the development of innovation perceptions that have advanced from research and development to innovation that is not based on investment in this area but can arise in processes, marketing, or organization systems and its positioning (Arundel et al., 2008).

Product innovation is nowadays most important type of innovation for many companies, while they try to achieve their competitiveness by utilizing the market and customer opportunities (Pisano, 1997, Adner and Levinthal 2001, Kuncoro, 2017). OECD defines product innovation as a good or service that is either new or significantly improved. They further complement the definition with stating that it is an innovation introduced to the firm's market before any other competitor, meaning the innovation may be already available in other markets (OECD, 2017).

The nature of product innovation is however changing. Many authors agree, that the rules of product development have already changed. Due to Industry 4.0 era and its characteristics, the future of product development will be based on smart and connected products, utilizing internet of things, digitalization, network systems or new smart manufacturing processes (Gerlitz, 2015, Buhr, 2017, Prause, 2015). According to Brettel et al., Industry 4.0 focuses on establishment of intelligent and smart products with the outcome of rapid product development (Brettel, et al. 2014). These changes in product development will influence also the development processes enabling flexible production as well as enabling smart manufacturing. Process innovation can be understood as introduction of new methods for

production. According to Pianta, while product innovation is associated with competitiveness strategy, process innovations aim to achieve price competitiveness by achieving efficiency gains from process thanks to utilizing new technologies coming from technology change (Pianta, 2001, Bogliacinom, Pianta, 2010). While product innovation is often perceived as the most common introduced innovation by companies, process innovation has a strong value for the company, due to the fact that it is more difficult to imitate by competitors (Annieque, Asakawa, 2015). Competitors are not usually able to observe the facilities of a company, thus the internal processes are more obscure.

Technology changes that drive the changes in product or process innovations are driven by Industry 4.0. In fact, the Fourth Industrial Revolution is not influencing solely the product or process innovation, it has a large impact in business model innovation, all in the context of achieving long term competitiveness and utilizing as well as creating new markets. Business model innovation is driven by changes-innovations of products, processes as well as the organization of the company (Kiel, et al. 2017).

Innovation and Industry 4.0

Industry 4.0 refers to major changes in the current industry. The essence of the changes is digitization. It is about digitizing products, services, digitizing and optimizing business processes. Digitization will affect almost all areas of life. The basic elements of Industry 4.0 are cyber-physical systems, the Internet of Things, and services that lead to Smart factory. The introduction of Industry 4.0 expects highly flexible mass production, real-time coordination, optimization of value chains, lower complexity costs, the emergence of completely new services and business models (Rakyta, Fusko, 2016; Jeck, 2017). Industry 4.0 uses the power of cloud computing, big data and even machine learning (AI) in order to find the best possible solutions to the whole manufacturing process. The term Internet of Things is often used in the context of Industry 4.0. IoT solutions may allow a company to more efficiently locate and monitor inventory, connect factory assets and ERP/MES systems. It can offer augmented reality views for work instructions delivery, monitoring assets in real-time, operational intelligence for real-time visibility of KPIs (Duraj, 2018).

Industry 4.0 has increasingly influenced consumers' perception on product innovation, quality, variety and speed of delivery. Cyber-Physical System-based manufacturing and service innovations are two essential trends and challenges for manufacturing industries. Companies are receiving more attention by academia and industries, using two types of innovative development: service innovation and industrial big data (Lee, Kao, Yang, 2014). Innovations

in Industry 4.0 include, in particular, technological innovations. Technological innovations are solutions to human needs and can become new engines to promote economic growth and social improvement by transformation. They can also have a negative impact. The introduction of technological innovations are expected to replace spinning, weaving and machining in the textile industry by 3-D printing of clothes and so on. Employees fear mass unemployment and growing inequality between employees who own and control new technologies and who do not (Li, Piachaud, 2018). Some of technological innovations that will affect future development are: Computer-Aided Design and Manufacturing (CAD/CAM), Integrated engineering system, digital automation with sensors, flexible manufacturing lines, simulations/analysis of virtual models, big data collection and analysis, Digital Product-Service Systems, Cloud Services for products. These technologies have three main advantages that are characteristic for Industry 4.0: vertical integration, horizontal integration and end-to-end engineering. Vertical integration involves the integration of ICT systems, horizontal integration is business-to-business collaboration within the supply chain, end-to-end engineering is the creation of a product value chain from development to sales. Benefits for business growth: configuration between machines and products - product customization, CPS support – dispatch to decision-making processes, productivity with higher efficiency (Dalenogare et al., 2018).

In order to create effective innovation management it is essential to focus on knowledge management and acquiring new knowledge. This requires expenditure on research and development, collaboration with other entities, introducing new organizational methods, leading to innovation. This provides the organization with "dynamism", it is understood as a dynamic organization that is infinitely innovative and adaptable to the market through the adoption of new forms of organization. The introduction of new organizational methods can be done in three different ways. By introducing new processes in the way of doing business, by changing the organization of the workplace or by reshaping the management of the external relations (Fernandez-Crehuet, Litago, 2018).

2 Research method

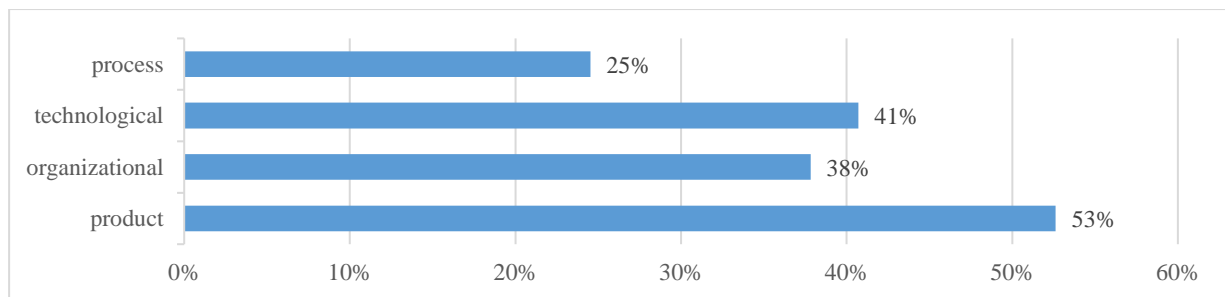
The main objective of this research was to analyze the types of innovations that companies have recently conducted and to examine the differences based on the categorization and comparison of the research sample. The research method of data collection in this research was an extensive survey of enterprises from five EU countries. The research tool was an electronic questionnaire that was distributed to representatives and management of organizations. This research was part

of a research project, where data were collected during the period 2015-2016. In the framework of a survey of 1482 respondents, businesses were analyzed according to the country of operation: Slovakia (SK, N=489), Czech Republic (CZ, N=419), Austria (AT N=220), Germany (DE, N=187) and Switzerland (CH, N=167). In addition, the sample was analyzed from the point of view of the size of the organization (micro 1-9 employees, small 10-49 employees; medium-sized 5-249 employees; large 250 and more employees) and the stage of maturity (starting, growing and mature organizations). In the analysis, the methods of descriptive statistics and advanced statistical methods were used as a Chi square test for the significance of differences, the significance being tested at the level $p = 0.05$.

3 Results and discussion

Of the total sample of 1482 companies surveyed, the most common type of innovation realized in 2014-2016 were product innovations, realized by 53% of the companies surveyed. On the contrary, process innovations were at least realized, with a total of 25% of the companies surveyed. (Fig. 1)

Fig. 1: Percentage comparison of respondents who conducted selected types of innovation in past two years (n=1482)

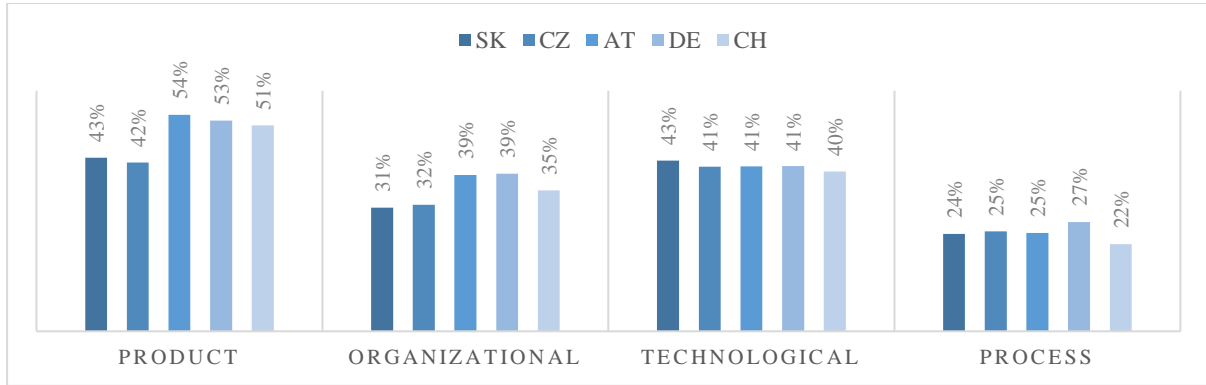


Source: Own processing

We looked further at the behavior of the companies surveyed according to the country in which they operate, as shown in Figure 2. The most significant differences can be observed in product innovations. Product innovations were conducted more by Austrian, German and Swiss companies than Slovak and Czech companies. From the viewpoint of Austrian, German and Swiss companies, it was at the same time the most conducted type of innovation. In Slovakia and in the Czech Republic, companies have conducted about the same product and technological innovations. A more pronounced difference was also found in organizational innovation where the Austrian and German companies conducted this type of innovations more

than companies from other countries. The least implemented type of innovation in all countries was process innovation.

Fig. 2: Percentage comparison of companies which conducted selected types of innovation based on the country of operation



Source: Own processing

The significance of individual differences between countries was tested using the Chi square test, where $p = 0.05$. In terms of product innovation, a significant difference was found between Slovak companies and Austrian companies (11%) and Slovak and German companies (10%), as well as between Czech and Austrian (12%), Czech and German (11%) and Czech and Swiss companies (9%). In organizational innovations, a statistically significant difference was found only for Slovak and Austrian companies (8%) and Slovak and German companies (8%). In the case of technological and process innovations, no significant differences were found between the countries surveyed. (Tab. 1)

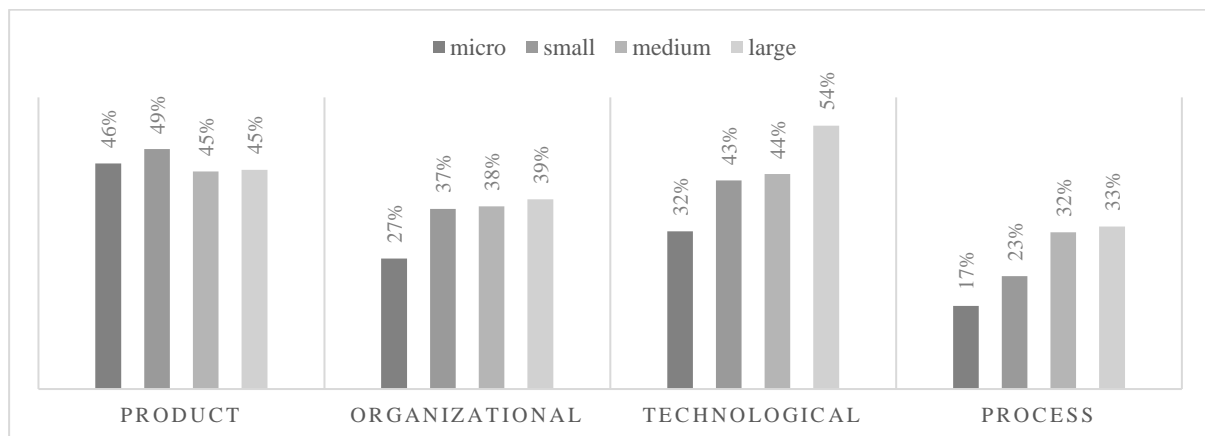
Tab. 1: Chi square test results based on country of operation (yes – significant difference, no – non-significant difference)

| | | SK | CZ | AT | DE | CH |
|-----------------------|----------------------------------|----------------------------------|-----|-----|-----|-----|
| | <i>product</i> | SK | - | no | yes | yes |
| CZ | | no | - | yes | yes | yes |
| AT | | yes | yes | - | no | no |
| DE | | yes | yes | no | - | no |
| CH | | no | yes | no | no | - |
| | | SK | CZ | AT | DE | CH |
| <i>organizational</i> | SK | - | no | yes | yes | no |
| | CZ | no | - | no | no | no |
| | AT | yes | no | - | no | no |
| | DE | yes | no | no | - | no |
| | CH | no | no | no | no | - |
| | <i>technological</i> | no significant differences found | | | | |
| <i>process</i> | no significant differences found | | | | | |

Chi square test significance level tested at $p < 0.05$. Source: own processing

We further looked at the differences in company behavior based on its size shown in Figure 3. In the research sample we compared 541 micro companies, 389 small companies, 276 medium companies and 276 large companies. Micro companies most often conducted product innovations (46%) as well as small companies (49%) and medium-sized companies (45%). Large companies most often conducted technological innovations (54%). Differences can be observed between the different sizes of companies, especially in technological and process innovations. In organizational innovation, only micro companies differ from others, while they conducted this type of innovation less than other groups of companies.

Fig. 3: Percentage comparison of companies which conducted selected types of innovation based on company size (n=1482)



Source: Own processing

Based on statistical testing of the identified differences, we found that in the context of product innovation, the companies surveyed do not differ significantly. Significant difference was found with organizational innovation between micro companies and all other company sizes (10-12% difference). In the case of technological innovations, a significant difference was found between micro companies and other company sizes, but also a significant difference was found between small and large companies (11%) and medium-sized and large companies (11%). From the perspective of process innovations, significant differences were found between all sizes of companies, except medium-sized and large, that conducted this type of innovation similarly (32% and 33%). (Tab. 2)

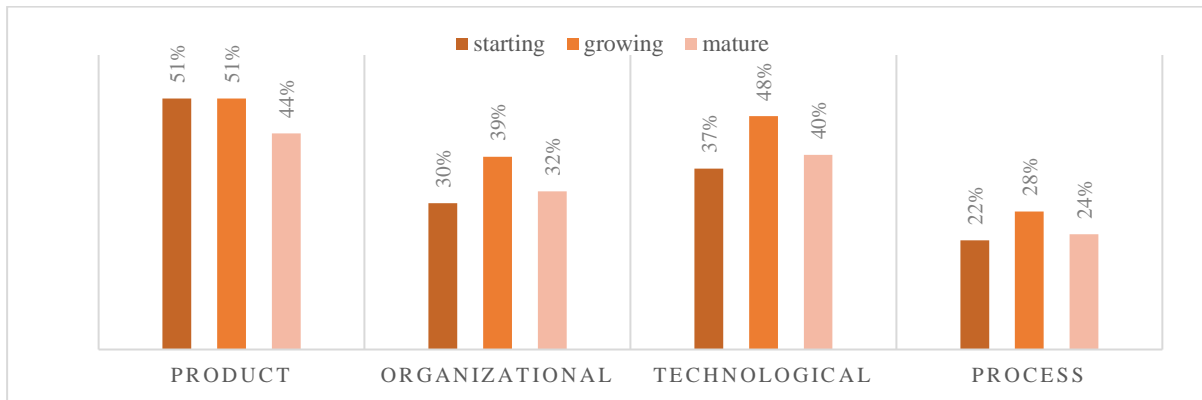
Tab. 2: Chi square test results based on company size (yes – significant difference, no – non-significant difference)

| <i>product</i> | no significant differences found | | | | |
|-----------------------|----------------------------------|--------------|--------------|---------------|--------------|
| <i>organizational</i> | | micro | small | medium | large |
| | micro | - | yes | yes | yes |
| | small | yes | - | no | No |
| | medium | yes | no | - | No |
| | large | yes | no | no | - |
| <i>technological</i> | | micro | small | medium | Large |
| | micro | - | yes | yes | Yes |
| | small | yes | - | no | Yes |
| | medium | yes | no | - | Yes |
| | large | yes | yes | yes | - |
| <i>process</i> | | micro | small | medium | Large |
| | micro | - | yes | yes | Yes |
| | small | yes | - | yes | Yes |
| | medium | yes | yes | - | No |
| | large | yes | yes | no | - |

Chi square test significance level tested at $p < 0.05$. Source: own processing

We have identified a number of differences in the comparison of companies based on the stage of maturity, comparing 156 starting, 389 growing and 937 mature companies. Starting and growing companies conducted product innovations equally with 51%, 7% more than mature companies. In the case of organizational, technological and process innovation, growing companies outweighed both mature and starting companies. (Figure 4)

Fig. 4: Percentage comparison of companies which conducted selected types of innovation based on company maturity (n=1482)



Source: own processing

When analyzing the significance of the identified differences, significant differences were found only for organizational and technological innovations. Growing companies have made organizational innovations significantly more than starting (9% difference) and mature companies (7% difference). Also, growing companies have made technological innovation significantly more than starting (11% difference) and mature companies (8% difference). (Tab. 3)

Tab. 3: Chi square test results based on company maturity (yes – significant difference, no – non-significant difference)

| <i>product</i> | no significant differences found | | | |
|-----------------------|----------------------------------|----------|---------|--------|
| | | starting | growing | mature |
| <i>organizational</i> | starting | - | yes | no |
| | growing | yes | - | yes |
| | mature | no | yes | - |
| <i>technological</i> | starting | - | yes | no |
| | growing | yes | - | yes |
| | mature | no | yes | - |
| <i>process</i> | no significant differences found | | | |

Chi square test significance level tested at $p < 0.05$. Source: own processing

Discussion

Our research identified several findings that can serve to better understanding of business activities in response to the development of the external environment. These results, regards to the size of the sample being examined, have the indisputable and noticeable value. In the context of ongoing Industry 4.0 changes, technological innovation was one of the areas of our interest. The level of technological innovation is the same in all the countries surveyed. Technological innovation activity is growing with the growth of the enterprise size. This indicates a deliberate investment of medium and large enterprises into technology-related changes. Although new technologies are the domain of start-ups, even in matured organizations, the innovation rate in technology innovation is 40%. In the growing organizations even 48%.

In the context of complex innovations geared to business model innovations, we can identify weak level of process innovations. Surprisingly, the rate of process innovation is the same in all the areas studied. We cannot talk about a shortcoming. The level of activity in process innovations, as well as technological innovation, is also increasing with the size of businesses.

The areas of product and organizational innovation have different characteristics. In both, AT, DE and CH companies are more active and SK, CZ are less active. Therefore, if we want to talk about areas that reflect the difference between more innovative and less innovative countries, we can say that the difference is in product and organizational innovations. If we want to identify the same activity at a given time and thus to talk about the impact of a unified external environment, we need to turn the attention towards process and technological innovations.

According to European Industry 4.0 indexes of readiness, Slovakia and Czech Republic lack behind Austria or Germany (Roland Berger Strategy Consultants, 2014, Pelle et al., 2016) in preparedness. While innovation is considered as a key to industrial success (Lukes, Stephan, 2017), it needs to be accelerated in order stay competitive. While Austria, Germany or Switzerland are among leaders in preparedness for Industry 4.0 there were no significant differences found in their innovation activity. Our findings are in line with Industry 4.0 readiness outcomes, and imply that Slovakia and Czech Republic need to foster their activity in product and organizational innovations, while they perform significantly less in these types of innovation compared to leaders in preparedness. Based on the literature focused on product innovation it is necessary to be able to utilize new technology for product development. This is especially the case of Slovakia and Czech Republic, while their technological innovation level

is similar to the level of innovation leaders (AT, DE, CH) they must be able to utilize the technology in product innovation in order to create competitive products and services.

Conclusion

The main objective was to analyze the types of innovations that companies have recently conducted and to examine the differences based on the categorization and comparison of the research sample. Based on these results, we want to enhance the level of scientific discussion and bring relevant findings to the support for further analyzes in the subject.

Development in the business environment of the last decade have encouraged businesses to innovate. The growing debate over Industry 4.0 since 2012 has opened new opportunities for stimulations and points out the opportunities. Our research has confirmed high activity in technological innovation, especially in large organizations. Interestingly, the level of technological innovation activity is almost the same in all the countries surveyed. The same trend is also indicated by the process of process innovation. These findings correspond to the development of expert and scientific discussion on the necessary changes and innovations. This need is debated in the context of global competitiveness as well as in the need to prepare for a possible economic stagnation or recession in the future.

This research should contribute to the knowledge, that there is no difference between advanced innovators (such as Germany, Austria and Switzerland) and moderate innovators like Czech and Slovak in the field of technological and process innovation. Businesses hesitant about investing should not only track their local competitors but should follow examples of good practice and keep pace with innovations. It is a good sign that large companies have taken the initiative because they tend to incite also their suppliers, which are small and medium-sized enterprises.

Limitations and further research

The limit of research is a short timeframe of the research. This research gives a static view. In further research, we will want to compare these findings in a 5-year period. Another limit is the overall view of business activity within the countries surveyed. In order to confirm certain innovation strategies, we need to look deeper at the level of individual respondents, for example specific industries. While our research sample covered many different sectors, the comparison of sectors would not be statistically representative to the whole population, only to the research sample. This is due to the small representation of specific sectors in the sample group. In further

research, we plan to focus more specifically on differences between sectors and we also plan to focus on business model innovation.

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THE ASSESSMENT OF LABOR RESOURCES QUALITY IMPROVEMENT MODELS BY ENTREPRENEURS

Alexandr Kokovikhin – Ekaterina Ogorodnikova – Andrey Plakhin

Abstract

Purpose: This article presents an analysis of entrepreneur satisfaction with the labor resources quality improvement models. The results obtained are of great importance, since they will improve the efficacy of the regional executive bodies of state power in programs for staffing small and medium-sized businesses.

Design/methodology/approach: A survey of entrepreneurs on the website of the Ministry of Investment and Development of the Sverdlovsk Region, was conducted from November 2017 to January 2019. A total of 3420 questionnaires were sent, filled out and returned. The effect of using a particular model on the availability of frames is checked on the basis of the models of pair regression.

Findings: The results of the study allow us to conclude on the greatest impact of public-private partnership models while improving the quality of labor resources from the perspective of providing entrepreneurial activities. The use of this model will improve the security of entrepreneurs labor resources.

Research/practical implications: It has been revealed that the most effective model regarding labor resources quality improvement directed at ensuring entrepreneurial activity is through a state-private partnership dual model. The authors proposed an institutional model for organizing the dual training of labor resources with the participation of large and small businesses.

Originality/value: The presented study uses a unique data set for the regions of Russia. Approbation of the method is made on the basis of materials obtained in the course of studies conducted in 2017-2019.

Keywords: Subjects of Small and Medium Business, Labor Resources Quality Improvement Models, Performance Indicators, Public-Private Partnership

JEL Codes: J24, J31, M51

Introduction

One of the main resources that ensures the growth of entrepreneurial activity is the quantitative and qualitative characteristics of labor resources. Currently, there are a number of labor resources quality improvement models in the region in effect. These are: a regional strategy for the development of the vocational education system, a unified system of standards for the working professions of vocational education, dual education and the holding of the WorldSkills championships. This study is needed because of the difficulty of creating effective models for the formation of labor resources with the necessary qualifications to ensure entrepreneurial activity in the region.

1 Theoretical basis

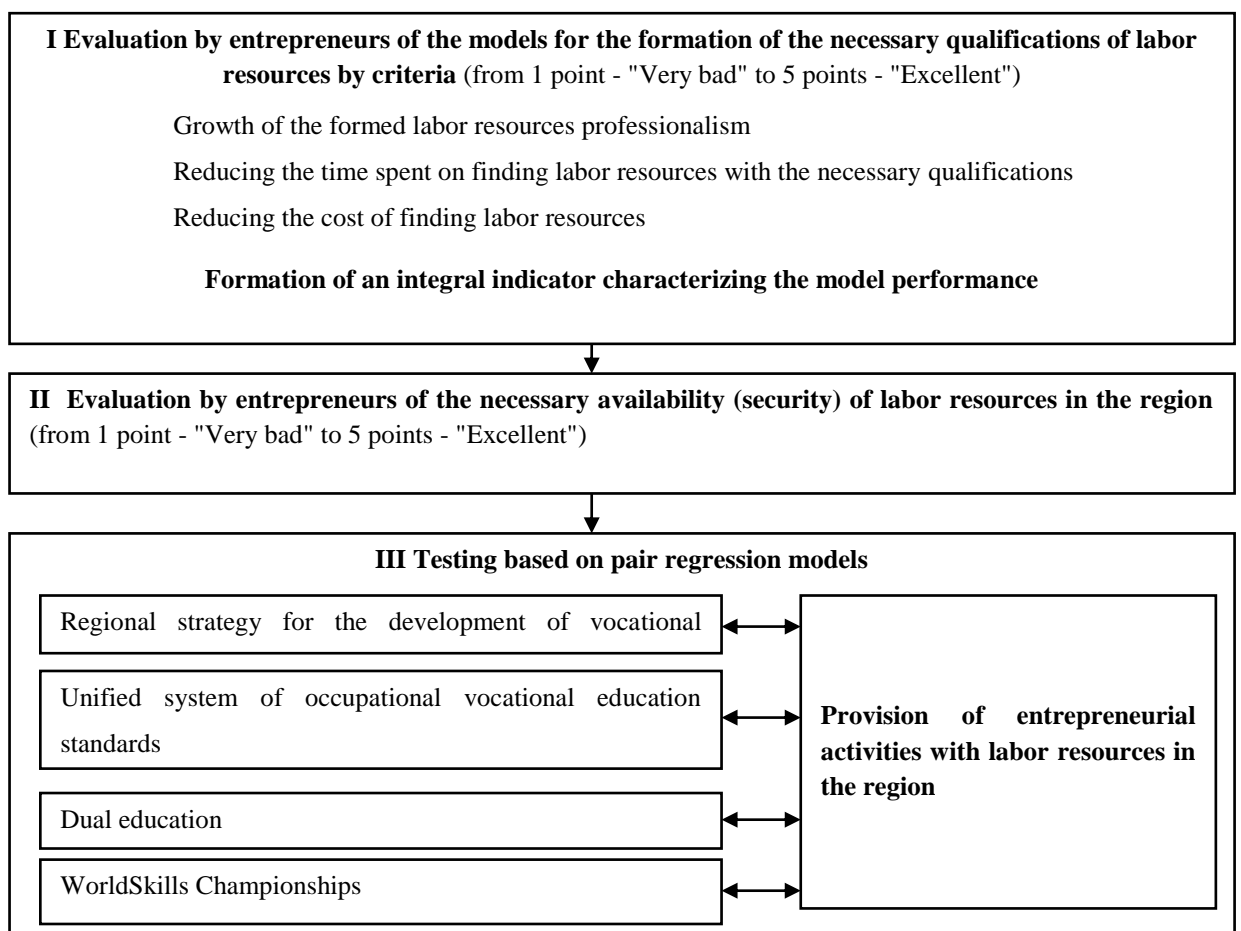
In the resource theory, the complex of the resources available to the entrepreneur is targeted towards long-term business success. From the point of view of B. Wernerfelt, any organization is able to secure sustainable competitiveness for itself through the rational management and sharing of material and non-material resources at its disposal (Wernerfelt, 2015). Human resources are one of the most important conditions for long-term competitiveness and, accordingly, a factor in the investment attractiveness of this territory. The most important resources constituting the investment potential are; the quantitative and qualitative characteristics of labor resources, the labor market institutions, and the used human resource management mechanisms. These resources generally ensure the availability of labor resources that possess the necessary qualifications for an entrepreneur. Determining as a priority of the state policy of improving the institutional environment of the territory corresponds to the dominant approach in the theory of entrepreneurship presented in the works (Reynolds, 2004). In particular, the winner of the International Award for his contribution to the study of entrepreneurship and small business in 2010 (Lerner, 2009). As the main direction of effective state policy of entrepreneurship, development determines the quality of the infrastructure, including the formation of labor resources qualification. The analysis vector covers social partnership issues formulated within the framework of the International Labor Organization (Bertola, 2000) concepts, which enables implementation of the World Bank policy targeted towards ensuring equalization of working conditions amongst the different countries. Thereby ranking working conditions according to the standard of institutional norms of the Organization for Economic Cooperation and Development countries (Botero, 2004).

2 Methods

A significant role in the assessment of development conditions by entrepreneurs plays the assessment of the labor sphere. Its characterization is carried out within the framework of the competence-based approach and is the basis for the notion of the availability of the necessary labor resources for entrepreneurial activity, as well as models for the formation of the necessary labor resources quality. Figure 1 shows the methodology used by entrepreneurs to evaluate the models targeting the formation of the necessary labor resources qualifications.

- Regional strategy for the development of vocational education
- Unified system of occupational vocational education standards
- Dual education
- WorldSkills Championships

Fig. 1: Technique of evaluation by entrepreneurs the models of formation the necessary labor resources qualifications



Source: Compiled by the authors

At the first stage of the methodology, entrepreneurs evaluate the effectiveness of the models for the formation of the necessary qualifications of labor resources according to three criteria:

- The growth of professionalism within the formed labor resources;
- Reductions to the time spent searching for labor resources of holding the necessary qualifications;
- Reducing the cost of finding labor.

Based on the results obtained, an integral indicator is formed for assessing the effectiveness of these models using formula 1:

$$I_n = k_1 + k_2 + k_3 \quad (1)$$

k_1 – scores the increase in the professionalism of labor resources as a result of using the model (valued from 1 to 5), k_2 – scores the reduction to the time spent searching for appropriate labor resources holding the necessary qualifications as a result of using the model (valued from 1 to 5), k_3 – scores the reduction to the cost of finding labor resources as a result of using the model (valued from 1 to 5).

At the second stage, the assessment of labor resources by the entrepreneurs in the region (from 1 point – "Very bad" to 5 points - "Excellent") is made on the basis of survey materials from the website of the Ministry of Investment and Development of the Sverdlovsk Region (<http://mir.midural.ru/node/598/>).

At the third stage, the following hypotheses are tested based on the pair regression models:

The provision of entrepreneurial activities with labor resources in the region is ensured through the implementation of a regional strategy for the development of a vocational education system, formula 2:

$$Y = b_0 + b_1 X_1 \quad (2)$$

Y - the assessment of the availability of labor resources by entrepreneurs in the region,
 X_1 - an integral indicator of the assessment of the effectiveness of the regional strategy for the development of the vocational education system

The provision of entrepreneurial activity with labor resources in the region is ensured by the introduction of a unified system of standards for working professions, formula 3:

$$Y = b_0 + b_1 X_1 \quad (3)$$

Y - the assessment of the availability of labor resources by entrepreneurs in the region,

X_1 - an integral indicator of the assessment of the effectiveness of the unified system of standards for working professions

Provision of entrepreneurship with labor resources in the region is ensured through the introduction of dual education, formula 4:

$$Y = b_0 + b_1 X_1 \quad (4)$$

Y - the assessment of the availability of labor resources by entrepreneurs in the region,

X_1 - an integral indicator of the assessment of the effectiveness of the regional strategy for the development of the introduction of dual education

Provision of entrepreneurial activities with labor resources in the region is ensured by holding World Skills Championships, formula 5:

$$Y = b_0 + b_1 X_1 \quad (5)$$

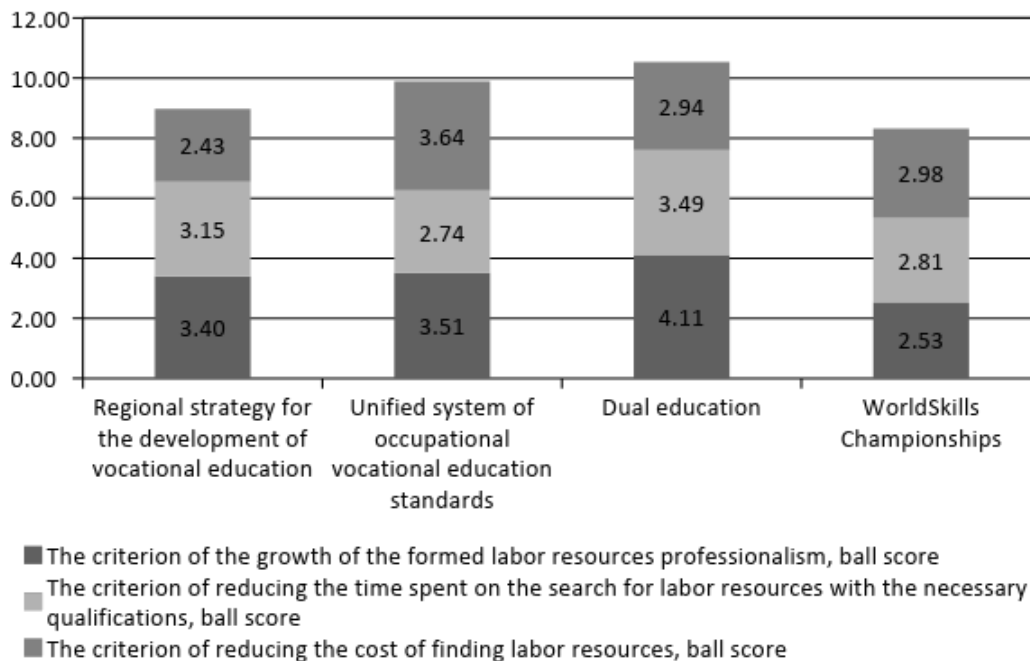
Y - the assessment of the availability of labor resources by entrepreneurs in the region,

X_1 - an integral indicator of the assessment of the region is ensured by holding World Skills Championships

This assessment methodology establishes a strict correlation between the results of the tasks in relation to the development of entrepreneurial activity and the increased level of this activity due to improvements in labor resources.

3 The results of the research

The results of this integrated assessment of the models for the formation of labor resources with the necessary qualifications are presented in Figure 2.

Fig. 2: The results of the evaluation by the entrepreneurs of the models


Source: Compiled by the authors

As can be seen in the figure, most entrepreneurs estimated that the dual training organization model was the most effective for realizing the goal of increasing the professionalism of the formed labor resources.

It is necessary to note the best practices of the Republic of Tatarstan and the Tambov region when analysing the situation in the Sverdlovsk region. These best practices are designed to increase the satisfaction of entrepreneurs within the region with that regions human resources given the context of the investment climate of the region. The structure of activities in these regions of the Russian Federation involves the following areas of work.

The first of these best practices is related to managerial impacts on the regional vocational education system. In particular, the Republic of Tatarstan completed a transformation of the vocational education institutions into resource centers through a comprehensive strategy for the development of a vocational education system. This approach returns the prestige of working professions and specialties. In the Tambov region, a cluster approach is widely used in the management of the vocational education system. This includes the preparation of reasonable labor resources demand forecasts and implementation of corresponding training programs that balance the emerging demands for working professionals from across the region's industries.

In order to realize the goals; according to the criterion of reducing the time spent on the search for labor resources with the necessary qualifications, the dual model is also leading, since the search for labor resources of the necessary qualifications is carried out in training centers. The second vector that aims to increase investor satisfaction with human resources requires the creation of effective communication mechanisms between the different participants in the labor market. In the Republic of Tatarstan, this mechanism is based on the activities of the WorldSkills movement. This competition enables experts, participants, employers, representatives of vocational schools and students to meet and quickly communicate necessary professional knowledge for the development of the human resources in the region. The Tambov region uses a similar model, enabling the prestige of working professions and specialties among young people to increase while effectively building interactions between labor market participants.

Further in table 1 we present the results of the regression analysis for the tested hypotheses.

Tab. 1: Regression analysis results for tested hypotheses

| Regression Statistics | Regional strategy for the development of the vocational education system | Unified system of occupational vocational education standards | Dual education | WorldSkills Championships |
|-------------------------|--|---|----------------|---------------------------|
| Number of observations | 3420 | 3420 | 3420 | 3420 |
| Plural R | 0.656 | 0.72 | 0.87 | 0.65 |
| R2 | 0.431 | 0.28 | 0.13 | 0.35 |
| Significance F | 0.023 | 0.001 | 0.001 | 0.001 |
| P-Value | 0.0001 | 0.001 | 0.001 | 0.0012 |
| Y-intersection | 2.7400 | 0.443 | 0.712 | 0.443 |
| Variable X ₁ | 0.0858 | 0.467 | 0.238 | 0.314 |

Source: Authors' own elaboration

As can be seen in the table above, the closest connection between the models to develop labor resources with the necessary qualifications and the provision of labor resources for

entrepreneurial activity is observed for the made hypotheses. These models can be recommended to regional government bodies in order to increase the satisfaction of entrepreneurs with their region's labor resources.

The work (Frants, 2008) outlines the leading role of the state in the institutionalization process of public-private secondary education partnerships, but no recommendation models have been given. The article discusses the experience of organizing a dual scheme within the light industry sector. It suggests the formation of partnerships between the participants on the basis of contracts directly between educational institutions and enterprises (Helmer, 2014).

The most successful model being practiced in Russia currently is the dual education system. This model was implemented in accordance with the needs of the largest enterprises, whose resource capabilities make it possible to invest in their own educational production bases (Remington, 2017). Such a model is devoid of additional institutional superstructures and allows the integration of the managerial impacts of regional governments and large business on the performers of dual education programs. These impacted performers are; vocational education institutions and the personnel department of the company responsible for training the company's personnel.

Conclusion

The results of the study confirm the theoretical conclusions presented in the article. According to the surveys from the entrepreneurs, the model that most effectively produced personnel with the necessary qualifications was a public-private partnership in the organization of practice-oriented training. In our opinion, this is due to labor requirements on the part of industrial entrepreneurship and the service sector. The formed model allows solving the tasks facing partner companies and educational organizations within the framework of the dual education model. As there is a forecast of industry labor needs at the time an applicant begins their professional development it greatly simplifies career guidance. The assignment of graduates to a specific employer is determined by the parameters of attractiveness of employment. These parameters include a formed system of horizontal and vertical career paths, as well as opportunities for vocational training.

Within the framework of network interaction, the enterprise implements a significant portion of educational programs using its own resources and at its own expense up to 60% of general professional disciplines and professional modules in some Basic professional educational programs. The staff of educational centers should consist of highly qualified

teachers and masters of industrial training. All members of staff will have repeatedly confirmed their qualifications by victories in the WorldSkills professional championships. Thus, the company is directly involved in shaping the content of educational programs within the framework of the mandatory requirements of the Federal states education standards. The requirements of the employer provides a job-oriented preparation to new personnel and the ability to operate a quality management system of the educational process at the same time.

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APPLICATION OF ARTIFICIAL NEURAL NETWORKS FOR FORECASTING IN BUSINESS ECONOMY

Andrea Kolková

Abstract

Purpose: The forecasting method is now a whole lot. They are often based on the specific conditions of the given time series, and their methodology is mostly the result of research in scientific centres and universities. In recent years, Artificial Intelligence has been very much discussed (hereafter AI). Implementation of AI into enterprise decision-making brings a whole host of new opportunities and challenges. One of them is certainly the use of AI in forecasting.

Design/methodology/approach: The paper after classic models present, the AI-based model, namely the neural networks model, introduce. Subsequently, the models are applied to 166 monthly data from year 2008 to 2018. After analysing the data, forecasting ex-post is performed and evaluated according to selected accuracy indicators. After evaluating accuracy, the most accurate model for the given enterprise variables is selected and ex-ante forecasting performed.

Findings: Benefit of this paper can be seen in particular in the expansion of possible forecasting methods to ensure the most accurate results of business forecasts. The evaluation of the suitability of the models is ensured by the best values of the selected accuracy measures.

Research/practical implications: The paper confirms the possibilities of using the neural network method for business time series as the best model with RMSE 0.3134768. In the practice of specific businesses, the contribution can help with the selection of suitable methods for forecasting. In future research, I can focus on other forecasting methods, such as the use of other AI tools, chaos theory, fuzzy logic, or genetic algorithms.

Originality/value: At present, the practical use of neural networks in the corporate economy in the Czech Republic is still an outlying issue. Its wider use in practice requires exploration of the use of academic and other scientific institutions. The way in which scientific knowledge can be accessed through practice can be a wider use of this tool in practice.

Keywords: Artificial Neural Networks, Exponential Smoothing, ARIMA, BATS

JEL Codes: C53, M21

Introduction

One of the attributes given to intelligent animals is the ability to learn. At the moment of birth, one has only a few basic instincts, and a few years later he can speak, read, write, count, but also create his own creative ideas for further development. This allows us to learn, based on the hundred-billions of neural cells called neurons, which are connected by a pool of nerve joints called synapses.

An artificial neural network is also built on this learning principle. Since the creation of the first computers, people has been trying to create an algorithm that would mimic the activity of the human brain. The result of this is the concept of AI. If we forget Rabbi Löw with his Golem and Karel Čapek with R.U.R. and also the philosophical essence of machines thinking, such as Pascal, Hobbes and Descartes, we are dating the beginnings of AI in the early 1950s. The beginnings of AI are mainly associated with names such as Alan Turing, William Gray Walter, John McCarthy, but also Marvin Lee Minsky, followed by Alain Colmerauer, Frank Rosenblatt and many others.

Today, AI can be defined as a field of computer science in the field of intelligent behaviour. However, the definition of "intelligent behaviour" is still the subject of discussion. The field of AI is a very large and relatively young scientific discipline and may not only include artificial neural networks used in this paper, but also genetic algorithms, expert system, rough set theory, vector regression support, fuzzy time series methods, grey theory (Peng et al., 2014). Wang et al. (2018) adds chaos theory to the list of methods.

AI methods play an important role today in decision making where multi-criteria decision making can be used (Franek, 2016), and AI can form an AHP method. However, AI methods are foremost at the forefront of modelling economic processes, and the essential role of these methods in forecasting. Forecasting helps managers reduce uncertainty and eliminate the risks associated with decision-making and business in general, whether operating risks, financial risks (Ključnikov, 2016) or market risks. Forecasting can be labelled as a basis for a number of business processes, both strategic, tactical, and operational.

The purpose of this article is to apply the artificial neural network method to forecast revenue in the services industry and compare its results with forecasts using classical methods such as exponential smoothing, ARIMA, and BATS.

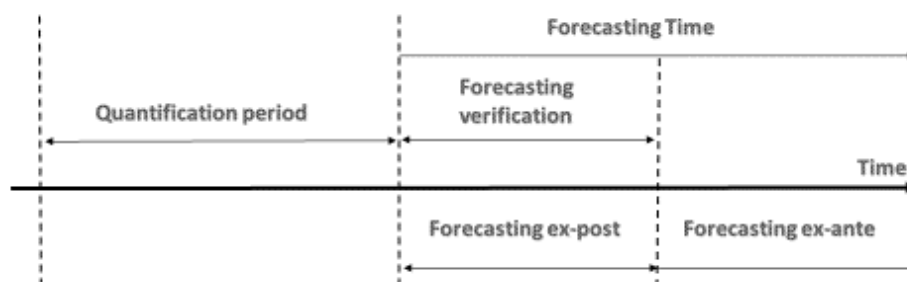
Since in Czech Republic there are still little used AI-based methods, despite their relatively high reliability, as evidenced by previous research (Kolková, 2018). According to Marček (2013), the main reasons for this are the absence of the interconnection of science with

practice, where university research is often separated from practice. Further, with the informal openness of businesses to researchers, so many studies are conducted only on simulated data, little knowledge of science and research opportunities between enterprises, and the related mistrust of business towards academics. Also, the implementation of software to work with neural networks into corporate systems costs a lot of money. And the last factor according to Marček (2013) is the lack of knowledge and ability to work with these software, as well as with neural networks as such. In particular, neural networks are used by large manufacturing companies and specialized institutions such as financial, banking or insurance institutions. This article verifies the applicability to the Czech conditions of small and medium-sized enterprises. The benefits of reading it can be especially experienced by business executives involved in the implementation of forecasting methods into management. In addition, researchers from large corporations and, last but not least, academics.

1 Methodology

For application, the ETS model ARIMA, BATS, are selected from time series models. These methods are also used in common business practice and their choice is to ensure minimum accuracy. Of course, there are a number of other classic methods and alternative approaches to forecasting methods, for example Kolková (2018a; 2018b). The timeline of Figure 1 is used for forecasting. Using the ex-post forecasting, best-accuracy models are selected. Ex-ante forecasting is built on these models.

Fig. 1: Timeline of Forecasting



Source: Marček (2016)

Methods based on artificial intelligence, i.e. learning models can be divided into supervised learning and unsupervised learning. These methods are still less used in the practice

of Czech companies, although they are already in the interest of a number of research institutions.

The calculation is carried out using the R program using the Forecast package by Hyndman and Khandakar (2008), followed by the NNAR model by Hyndman (2018). In this package, they are computing neural networks with feed-forward neural networks with a single hidden layer and lagged inputs for predicting unvitiated time series. The network is trained for one-step forecasting. For non-seasonal data that is applied in the article, the fitted model is denoted as a NNAR (p, k) model, where k is the number of hidden nodes.

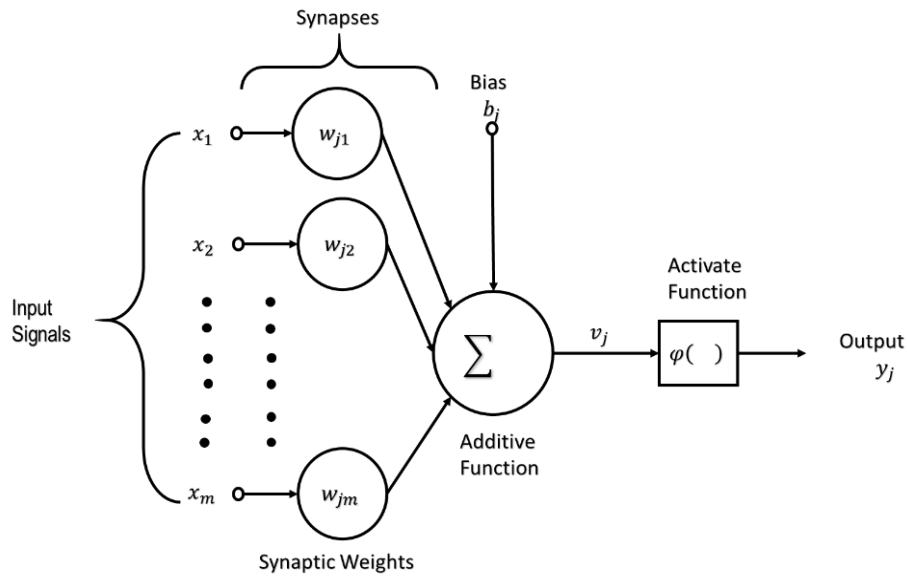
Accuracy forecasting ex-post is evaluated based on the MSE, RMSE, MAE, MPE, MAPE, and MASE parameters.

1.1 Traditional forecasting methods

We can include exponential smoothing methods (such as ETS model, Brown model, Holt-Winters model), such as ARIMA, BATS. These methods are described in professional literature, both foreign literature (Hyndman et al., 2008; DeLivera et al., 2011), and in the Czech literature (Marček, 2013).

1.2 Artificial neural network

The principle of an artificial neural network (hereafter NNAR), as stated above, is inspired by a neural network in the human brain. The use of a neural network is wherever the classical methods can provide inaccurate results. In some cases, forecasting is not even possible to find any mathematical function that would affect all the influences that affect the variability of the monitored variable.

Fig. 2: Artificial neural network


Source: Haykin (1994)

The forward signal propagation model (see Figure 2) consists of three parts: input signals (synaptic connections), output (axon) and activation function (soma). Based on weights, individual inputs can be suppressed or favoured. Activation function processes information from input and generates output. Output then brings the resulting information to the input of other neurons.

Thus, the output of the neuron is calculated when the sum of inputs to the neuron x_i multiplied by their specific weights $w_{j,i}$ exceeds a certain value, which we call bias. Neuron can be described in this way,

$$y_j = f\left(\sum_{i=1}^m x_i \cdot w_{j,i} - b_j\right), \quad (1)$$

where x_i is a specific value at i -th input, $w_{j,i}$ then the weight of this input, b_j is bias, m is the total number of inputs, f is the transformation function and y the output value, all according to logic on Figure 2.

1.3 Data analyse

The computational experiment is subjected to the data of the Czech Statistical Office, the indices of sales in services, namely services in total, expressed in current prices. Data is applied monthly from January 2005 to October 2018. The data is analysed and the outliers are resolved. The basic descriptive characteristics of the data are in Table 1.

Tab. 1: Statistical description of the data

| Min. | 1st. Qu. | Median | Mean | 3rd Qu. | Max. | N | var | sd |
|-------|----------|--------|--------|---------|--------|-----|----------|----------|
| 72.19 | 93.70 | 99.97 | 100.50 | 106.30 | 135.00 | 166 | 127.3409 | 11.28454 |

Source: Own

Subsequently, the data is divided into a training data set and data set, according to the logic shown in Figure 1. The training data optimized the parameters of NNAR, ARIMA, Bats and ETS. Optimization is performed based on the accuracy of the MSE, RMSE, MAE, MPE, MAPE, and MASE parameters.

A prediction with optimized model parameters is then performed on the data set. The prediction is based on the NNAR, ARIMA, Bats and ETS methods. The NNAR model is also applied to the data, when the model is taught on the training data set, and an ex ante prediction is created based on the relationship (1).

2 Results

The accuracy results are summarized in Table 2. It is clear that NNAR has the best accuracy in all selected indexes, which is also consistent with Kolková (2018b). Better accuracy of the model is even very pronounced. As the second most accurate model we can designate the Bats. The results are different according to the different indexes. According to ME, there is a more accurate ETS mode than ARIMA, according to other indices ARIMA models are more accurate than ETS.

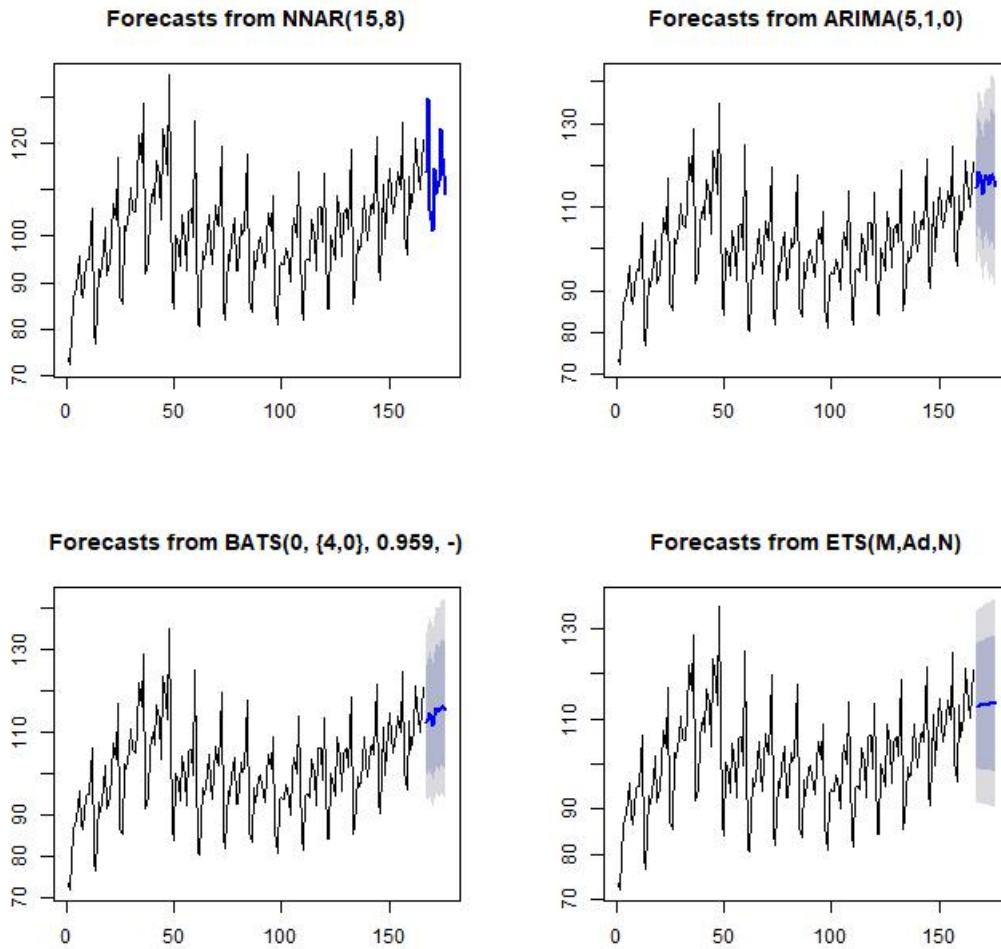
Tab. 2: Results forecast accuracy of the Services

| Services - Training Set | | | | | | | |
|-------------------------|--------------|-----------|-----------|--------------|-----------|-----------|-------------|
| | ME | RMSE | MAE | MPE | MAPE | MASE | ACF1 |
| Nnet | -0.003601199 | 0.3134768 | 0.2289137 | -0.008437015 | 0.2297231 | 0.0263753 | 0.09053187 |
| ARIMA | 0.8075248 | 8.994942 | 6.65086 | 0.1459472 | 6.773703 | 0.7663083 | 0.02058075 |
| Bats | 0.1424529 | 8.991513 | 6.549491 | -0.6264652 | 6.625386 | 0.7546287 | -0.03418048 |
| ETS | 0.2433819 | 9.888024 | 7.505509 | -0.6935607 | 7.640435 | 0.8647805 | 0.1181997 |

Source: Own

The prognosis is then carried out on models with optimized parameters NNAR(15, 8), ARIMA(5,1,0), Bats(0, {4,0}, 0,959, -) and ETS. The resulting forecasting is illustrated in Figure 3.

Fig. 3: Services Forecast



Source: Own

On the basis of accuracy, the most imprecise NNAR model is shown first on Figure 3, followed by ARIMA, BATS and ETS.

Conclusion and discussion

The article confirmed that neural networks can be an interesting and, most importantly, very accurate method of forecasting in the corporate economy. Compared to traditional forecasting methods such as ETS, BATS or ARIMA, NNAR methods are the best methods. This is based on measuring accuracy using the MSE, RMSE, MAE, MPE, MAPE, and MASE parameters.

As Marček (2016) states, however, in the Czech Republic, despite the fact that in universities this issue is already in the forefront of the interest of a number of researchers, it is minimal in comparison with abroad in the Czech Republic. Thus, the use of neural networks as

a prognostic method is still allocated, in particular, to large enterprises of a productive nature or to financial institutions.

Their broader use in enterprises prevents, according to Marček (2016), especially the distrust of entrepreneurial subjects towards the academic community and the related informational unrest, but also the separation of education from practice at universities.

A common argument against the use of AI in a business economy is its complexity. Not only in the business, but also in the academic sphere, the simplicity of prognostic models is currently being discussed. The reason is the complexity of the models, which loses the ability to be the basis for decision making by the manager. The need for simplification is given by Zellner (2001) in his KISS concept ("keep it sophisticatedly simple"), or by Green and Armstrong (2015).

KISS is a general design applicable to design solutions in a variety of industries. This idea is not new. This principle was first pronounced by the American system engineer and aeronautical engineer Kelly Johnson (1910-1990), who tried to design aircraft so simple to be able to repair every mechanic with a standard set of tools at any airport on the battlefield. The KISS principle then extended to other sectors.

With the development of computing, however, even more complicated systems can fit the principle of simplicity. The clearest example of this is the programming language R, which can now be interconnected with the commonly used SPSS to allow the use of artificial neural networks and a wider range of entrepreneurs. Simplification does not have to be at the expense of the accuracy of the model. As Nobel laureate Kenneth Arrow states: "Simplicity is a very complex subject."

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INTEGRATING THE PRINCIPLES OF RESPONSIBLE MANAGEMENT EDUCATION ACCORDING TO THE NEEDS OF CSR LEARNING

Irina Kostadinova – Svilen Kunev – Diana Antonova

Abstract

Purpose: More than ten years after the Principles of Responsible Management Education (PRME), a UN Global Compact Initiative, it is time to review what has been achieved. As a result of the cooperation among EU universities, an international study was conducted on consumer needs of Sustainability and CSR training through the integration of PRME. A Conceptual model for the educational strategy transformation in business universities is presented.

Design/methodology/approach: Descriptive statistics of the results of a study on the PRME and an Overview of Business Student Needs in CSR at three leading universities from Romania, Bulgaria and Slovenia, are presented. The Linear Modelling of Structural Equations (LISREL) has been used to establish the strength of the correlations between the six basic principles of PRME and its influential factors applied to CSR training: Purpose, Value, Method, Research, Partnership and Dialogue.

Findings: As a result of formulated study hypotheses, based on Global Compact principles, arguments have been put forward to improve the six-step Model for Transformation of the CSR educational processing in business universities (PRMS). After conducting an online study with the target groups – 153 students from University Politehnica, Bucharest (81); University of Ruse (40), and University of Maribor (32), the data obtained were systematized.

Research/practical implications: The impact assessment of university education initiatives includes, but is not limited to, impact on students - it is important to remember that PRME's main task is to educate the next generation of responsible business leaders and professionals.

Originality/value: A survey questionnaire was used on the sections of the Transformation Model for the PRME (PRMET, 2019), which identified and evaluated the opportunities for raising the results of CSR education. Through an in-depth study of student behaviour, a conceptual model and guidelines for improving university curricula for CSR and sustainability are defined.

Keywords: Sustainability, CSR, Education, PRME Implementation Model

JEL Codes: M14, M10, A2

Introduction

More than ten years after the formulation of the Principles of Responsible Management Education (PRME), the UN Global Compact initiative, it is time to review what has been achieved. Undoubtedly, business and the global economy have been dramatically transforming over the past two decades in terms of focusing on sustainable business and positive social impacts. The universities are aware of their role in educating a new generation of business leaders as key players for sustainable development and have begun to transform their education programmes. As a result of the international cooperation between three universities in Southeast Europe, a study was conducted on the relevant CSR training needs. The development of the PRME model related to the business education process is presented.

Many scientists point out that the education system in the business sphere needs to be changed as it lags behind the pace of global economic development. (Schuetze, 2013). As a result, a study was conducted to analyze students' attitudes and perceptions and to bring together relevant training needs in terms of CSR and Principles of Responsible Management Education. It is part of a Project aimed at providing a common approach to the learning needs in the area of social responsibility and civic skills, taking into account the context of the participating countries: Romania (University Politehnica, Bucharest), Slovenia (University in Maribor) and Bulgaria (University of Ruse), and more precisely their business-oriented faculties.

The study methodology will be presented, a review of the current specialized literature will be carried out and the conclusions of the study will be described. **The tasks** of this article are formulated as follows: (1) Descriptive statistics and correlation analysis of influencing factors on student learning needs in relation to CSR in three EU universities. (2) Establishment of a Model for implementing PRME tool to enhance university programmes CSR and sustainability.

1 Previous research

Changes in the curriculum have the characteristics of innovation in the educational product of universities. Students trained in these programmes are their users, and in order to assess their response to the proposed innovation, it is necessary to study and describe in detail the level of acceptance of this new service (Todorova et al, 2018). Transformation in business education should start from the inside of higher education institutions - and, of course, the driving force behind this change must be the professors themselves (Dvouletý at al., 2017). Some studies

have been made in this direction lately (Park, 2018; Shapiro & Kirkman 2018; Fleaca et al., 2014). As stated, "... business schools have to respond to changing business needs by providing relevant knowledge and skills to the communities they serve" (Deer & Zarestky, 2016). This statement is also in line with the concept of redirecting the traditional characteristics of universities into becoming entrepreneurial universities which, together with business ventures, promote the dissemination of new knowledge in society (Mihajlovic et al., 2015, Baumgartner & Winter, 2014).

On the other hand, universities need to make a change - to build an ecosystem to reward teachers applying the principles of responsible education for management not only theoretically, but also in practice. They can be partners or run independent research that responds to community problems. (Dušková & Kocmanová, 2018; Gamoran, 2018). Only by addressing the real problems of local communities, society as a whole, and other stakeholders, can universities change the public perception of the actual value that higher education offers today (Pavlov, 2014, Barber et al., 2014, Stojcheva, 2015).

Other researchers (Mihaylova et al., 2016; Sheloudko and Kirova, 2018) consider business education as a prerequisite for responsible management at a later stage, and state that "rigorous" management control systems are sometimes perceived as "an obstacle to introducing innovative ideas".

Many documents have been created in recent years. The Principles for Responsible Management of Education (PRME) began in 2007 as the first organized form of interaction between the UN and business management schools. Based on the SWOT analysis made in the final version of their strategic review, the limited participation of students in the initiative is one of its main weaknesses (PRME Strategic Review, 2016). In response, we tried to study the current situation in three European universities by asking students about their: *Knowledge about CSR Concept; Learning expectations regarding CSR and their attitude towards business responsibilities*. For the participating academic institutions it was important to realize how to incorporate social responsibility and sustainability into curricula better through studying students' values and expectations. Other documents and initiatives that have been analyzed and implemented in our research are: *PRME Strategic Review 2016; HEInnovate guide related to the Business/External relationships for knowledge exchange to create value for education and society; „Principles for Responsible Management Education (PRME)“ and Higher Education Sustainability Initiative Global Event, 2018*.

In general, they aim to report the progress of all stakeholders and to exchange effective practices related to these principles with other academic institutions. Using the six principles of

PRME (1. Purpose; 2. Values; 3. Method; 4. Research; 5. Partnership; and 6. Dialogue), we build 6 hypotheses (Table 1) that we will examine through a comprehensive questionnaire for students trained in three EU universities. This will enable us to respond to the expectations of young people related to "CSR education and civic skills" better, in order to promote their sustainable future integration into business. (unprme.org, 2018)

Tab. 1: Hypotheses of the study

| Hypothesis number | Definition |
|-------------------|---|
| H1: | The three universities develop students' ability to be future generators of sustainable value for business and society as a whole and work for an inclusive and sustainable global economy. |
| H2: | The three universities incorporate in their academic activities, curricula and organizational practices the values of global social responsibility, presented in international initiatives such as the UN Global Compact. |
| H3: | The three universities create educational frameworks, materials, processes and environments that enable effective training for responsible leadership. |
| H4: | The three universities are involved in conceptual and empirical research that contributes to a global understanding of the role, dynamics and impact of corporations in creating sustainable social, environmental and economic value. |
| H5: | The three universities interact with business corporation managers to broaden their students' understanding of the challenges of meeting social and environmental responsibilities and jointly explore effective approaches to addressing these challenges. |
| H6: | The three universities support dialogue and debate between lecturers, students, business, government and other stakeholders on important sustainability issues and CSR. |

Source: Authors' elaboration, 2018.

2 Research objectives and methodology

The survey has been conducted in two phases: the first results were collected during March 2018, the second – during May 2018. The questionnaires have been completed and submitted online by the students in March and May.

The aim is to fill the gap in PRME by presenting the students' perception of their educational needs in terms of social education. One of the challenges faced by academic institutions in the implementation of Sustainability and CSR is how to monitor and assess the impact of educational initiatives taken over a specific timeframe in terms of quantitative and qualitative measurements.

The impact assessment of university education initiatives includes, but is not limited to, impact on students - it is important to remember that PRME's main task is to educate the next generation of responsible business leaders and professionals. Therefore, the first group

whose views should be analyzed in such studies are trainees. (PRMET, 2019) Participants in the survey were 153 students from Romania (81), Bulgaria (40) and Slovenia (32).

Descriptive statistics are presented on the results of a study on the PRME and an Overview of Students Needs in CSR at the business faculties in the University of Maribor; University Politehnica of Bucharest and the University of Ruse. For the purposes of the survey, a questionnaire was used on the sections of the Transformation Model for the PRME Implementation (PRMET, 2019), which identified and evaluated the opportunities for raising the results of CSR university education. Defining the profile of the respondents in the survey (153 students) more precisely shows the geographical and educational level: 40 students from Bulgaria (36 Bachelors and 4 Master degree students), 81 students from Romania (56 Bachelors and 25 Master degree students), and 32 students from Slovenia (16 Bachelors and 16 Master degree students).

There are arguments to improve the eight-step model for transforming the educational process into business universities. After conducting online surveys with the target groups, the data received are summarized in the five steps: 1. Profile of the respondents; 2. Social values; 3. Knowledge about the Concept of CSR; 4. Expectations regarding CSR training; and 5. The students' attitudes towards CSR of business organizations.

Methods for data analysis

Linear modeling of structural equations (LISREL¹³) is used to establish the strength of the correlations between the six basic principles of the PRME (Purpose, Value, Method, Research, Partnership and Dialogue) and their influential factors applied to CSR training. LISREL provides a flawless test method for conditional models, as it can perform simulative evaluation of both indicators and conditional components in complex models. Standardized coefficients and t-values of conditional links between the elements are used to test the hypotheses set in the study.

3 Results and Discussion

The results in Table 2 demonstrate students' values towards different aspects of the social responsibility concept. To test hypothetical links a Confirmatory Factor Analysis (CFA) is used. Much of the literature on CFAs is based on LISREL terminology and modeling. The co-variant structure of

¹³ LISREL - Software for modeling structural equations, generated by the path of diagrams in an easy to use interface and syntax that is generated directly from the scheme. The calculations were performed with SSI's LISREL 8.8 licensed software for Microsoft Windows Vista.

the model consists of two parts: a measurement model and a structural model. The measurement model determines how hypothetical (latent) concepts are measured against observed variables. One-dimension is defined as the existence of a latent distinctive feature of the concept that forms the basis of a set of indicators.

Tab. 2: Students' values towards different aspects of social responsibility

| Grading scale | 1 - Not at all important | 2 - Less important | 3- Indifferent | 4 Important | 5 - Very important | Statement |
|---------------|--------------------------|--------------------|----------------|-------------|--------------------|--|
| Bulgaria | | 2 | 4 | 26 | 8 | 1. To be involved into volunteering project during faculty |
| Slovenia | 1 | 1 | 6 | 10 | 14 | |
| Romania | - | 8 | 12 | 38 | 23 | |
| Bulgaria | | 2 | 7 | 18 | 13 | 2. To earn a lot of money |
| Slovenia | 1 | 4 | 5 | 10 | 12 | |
| Romania | | 2 | 5 | 25 | 49 | |
| Bulgaria | 1 | 4 | 2 | 19 | 14 | 3. To help community and people in needs |
| Slovenia | 1 | - | 2 | 14 | 15 | |
| Romania | - | 4 | 4 | 42 | 31 | |
| Bulgaria | 1 | 2 | 3 | 10 | 24 | 4. To be successful at studies and work |
| Slovenia | - | - | - | 10 | 22 | |
| Romania | | | | 11 | 70 | |
| Bulgaria | 2 | 2 | 4 | 15 | 17 | 5. To make the world a better place |
| Slovenia | - | - | 4 | 10 | 18 | |
| Romania | - | 2 | 2 | 32 | 45 | |
| Bulgaria | 1 | 2 | 3 | 12 | 22 | 6. To have a comfortable life and well-being |
| Slovenia | 1 | 1 | 1 | 7 | 22 | |
| Romania | - | - | 2 | 31 | 48 | |

Source: Authors' elaboration, 2018.

Based on the assessment of the compliance of a one-dimensional model for each variable, iterative modifications were undertaken in the spirit of the specific study. Modifications are made to improve the model's compliance, as well as to deliver parameters that are of real importance and significance. Table 3 shows the parameters for measuring the details. The greater the loading of the factor or the coefficient, compared to its standard error and represented by the corresponding t -values, the stronger the proof that the measured variables or factors confirm the basic ideas. Generally, if these t -values are greater than 2 or 2,576, they are considered significant at a level of 0.05 to 0.01, respectively. In Table 3, it can be seen that all t -values exceed 2.576.

Consequently, all indicators are significantly related to their defined concepts. Factor loads are over 0.5, which means that all indicators have good values compared to their thresholds. The R^2 values refer to the reliability of the indicators. These values of R^2 over 0.5 mean that less than 50% of its variation will be a variation error, which provides evidence of acceptable reliability. Most of the R^2 values of the metrics are above 0.5. The values of R^2 and t -values provide evidence of convergence validity. Table 4 shows a correlation matrix for each parameter, as well as the internal consistency coefficients Cronbach Alpha in diagonal. The reliability of all metrics is over 0.80. According to similar calculations by Nunally (2013), reliability over 0.70 is considered satisfactory. Discriminant validity is

reached when the difference between a restricted and an unlimited model is significant (χ^2 of df , $\chi^2=1$). In order for standard correlations to be investigated, the data processing only covers the *General case* ($n=153$). No individual university analyses were performed because of the relatively small sample size of respondents. And the purpose of the study is to verify the validity of the PRMS model for all participants in the research project, not for a separate university. As shown in Table 3 *Chi-square* values are all at a significant level. With these results, the testing of the proposed models was conducted using LISREL. Analysis of structural equations was used to test these models. The results are shown in Table 3.

Tab. 3: Investigated model *General case*: evaluation of the parameters of the measured variables ($n=153$)

| Indicators | Factor loading | t-value | Total standard factor load | Uniqueness/term of the error | R ² -reliability |
|--|----------------|---------|----------------------------|------------------------------|-----------------------------|
| P1P: Students - generators of sustainable value for business | | | | | |
| PL3P - Knowledge about CSR Concept | 1.00 | | 0.61 | 0.62 | 0.58 |
| PL3.1- Economic responsibility | 1.36 | 8.01 | 0.75 | 0.44 | 0.56 |
| PL3.2 - Legal responsibility | 1.56 | 9.42 | 0.86 | 0.25 | 0.75 |
| PL3.3 - Ethic and Philanthropic responsibility | 1.54 | 9.10 | 0.88 | 0.20 | 0.77 |
| P2V: Inclusion in the curricula of the values of global CSR and sustainability | | | | | |
| PL4.V - Social Responsibility Standard (ISO 26000) | 1.00 | | 0.77 | 0.30 | 0.62 |
| PL4.1- Standards in Quality Management | 1.06 | 11.17 | 0.77 | 0.40 | 0.60 |
| PL4.2 - European and local regulations | 0.91 | 9.90 | 0.69 | 0.52 | 0.48 |
| PL4.3- Human rights | 1.05 | 10.81 | 0.85 | 0.44 | 0.56 |
| PL4.4 - Risk Management | 1.04 | 10.70 | 0.84 | 0.45 | 0.55 |
| P3M: Effective training for responsible leadership through educational framework, materials, processes and environment | | | | | |
| PL4.M - The preferred teaching and learning method of students | 1.00 | | 0.81 | 0.35 | 0.65 |
| PL4.1 - Face-to-face | 0.99 | 10.66 | 0.78 | 0.40 | 0.60 |
| PL4.2 - Blended learning | 0.76 | 8.52 | 0.62 | 0.62 | 0.58 |
| PL4.3 - E-learning | 0.77 | 8.05 | 0.59 | 0.65 | 0.35 |
| P4R: Involving Students in Conceptual and Empirical Studies of the Global Understanding of Sustainability and CSR | | | | | |
| PL2.1 - To be involved in volunteering project through faculty | 1.00 | 15.78 | 0.66 | 0.23 | 0.67 |
| PL2.2 - To earn a lot of money | 1.30 | 11.86 | 0.85 | 0.20 | 0.72 |
| PL2.4 - To be successful in studies and work | 0.90 | | 0.67 | 0.24 | 0.67 |
| P5P: Interaction with Business to Expand Students' Knowledge of CSR and Sustainability - Effective Approaches to Deal with these Challenges | | | | | |
| PL2.3 - To help community and people in need | 1.00 | | 0.95 | 0.09 | 0.91 |
| PL2.5 - To make the world a better place | 0.68 | 10.25 | 0.63 | 0.60 | 0.40 |
| PL2.6 - To have a comfortable life and well-being | 0.90 | 15.34 | 0.84 | 0.30 | 0.70 |
| P6D: Debate between Lecturers, Students, Business and other Stakeholders associated with Sustainability and CSR | | | | | |
| PL5.1 - CSR behaviour could be of economic benefit for shareholders | 1.00 | | 0.74 | 0.46 | 0.54 |
| PL5.2 - A company willing to build strong reputation has to display a CSR behaviour | 1.14 | 11.64 | 0.83 | 0.31 | 0.69 |
| PL5.3 - Companies have already too much social power and should not engage in other CSR activities | 1.30 | 11.53 | 0.82 | 0.32 | 0.68 |

Source: authors' elaboration, 2018.

For a complete assessment of the conformity *data-model* χ^2 , the Number of Degrees of Freedom, Compliance Index (CFI), and Bonnett Non-Shared Compliance Index (NNFI) were used. With respect to NNFI and CFI, values between 0.80 and 0.89 represent a good match *data-model*, while values of 0.90 or higher represent a very good match. This shows a range of indices of 0.0 (no match) to 1 (full match). The RMSEA (square estimate value error) of less than 0.05 is a close match *data-model*. As shown in Table 4, the structural model outputs the covariate matrix very well ($\chi^2 = 252.74$; $df = 201$; NNFI = 0.90; CFI = 0.91; RMSEA = 0.08). Due to the fact that the structural model has a reasonably matching *model-data* pattern, a study over the path of the coefficients might be done.

Table 4: Reliability, correlation, and discriminant validity of the elements – General case (n=153)

| | 1 | 2 | 3 | 4 | 5 | 6 |
|--|----------------|----------------|----------------|----------------|------|------|
| P1P: Students - generators of sustainable value for business | 0.86 | | | | | |
| P2V: Inclusion in the curricula of the values of global CSR and sustainability | 0.21 | | | | | |
| P3M: Effective training for responsible leadership through educational framework, materials, processes and environment | 347.47 0.52 | 0.82 0.44 | 0.85 | | | |
| P4R: Involving Students in Conceptual and Empirical Studies of the Global Understanding of Sustainability and CSR | 163.28 0.68 | 171.15 0.41 | 0.64 | 0.90 | | |
| P5P: Interaction with Business to Expand Students' Knowledge of CSR and Sustainability - Effective Approaches to Deal with these Challenges | 192.78 0.47 | 371.88 0.28 | 135.00 0.44 | 0.69 | 0.88 | |
| P6D: Debate between Lecturers, Students, Business and other Stakeholders associated with Sustainability and CSR | 252.74 0.54 | 282.51 0.33 | 157.79 0.51 | 171.61 0.80 | 0.55 | 0.91 |
| Mean | 3.92 | 3.10 | 3.79 | 3.52 | 3.57 | 3.77 |
| SD | 0.08 | 0.80 | 0.64 | 0.73 | 0.97 | 0.92 |

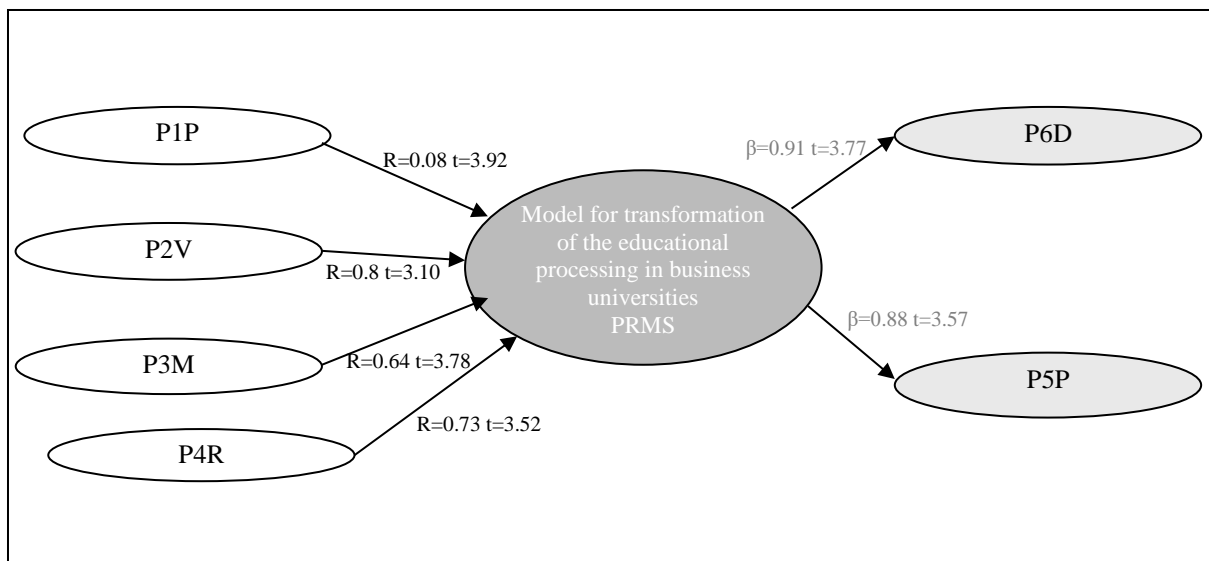
Source: Authors' elaboration, 2018.

H1 – H3 provide that P1P (Purpose), P2V (Values) and P3M (Method) will be directly related to PRMS model performance results. As can be seen in Fig. 1, the maximum probability assessed by possible influencing factors for forming the Model for Transformation of Educational Processing in Business Universities is significant and positive (standard coefficients of 0.08, 0.80, 0.64) and t-values of 3.10 to 3.92 respectively. This indicates that the learners' assessment of *Effective training for responsible leadership through educational framework, materials, processes and environment; Involving Students in Conceptual and Empirical Studies of the Global Understanding of Sustainability and CSR; Interaction with Business to Expand Students' Knowledge of CSR and Sustainability; Effective Approaches to Deal with these Challenges; and Debate between Lecturers, Students, Business and other Stakeholders associated with Sustainability and CSR* in the three universities studied confirms the assertions in the first three hypotheses and hence the applicability of the PRMS model for CSR and Sustainability training, namely: H1; H2 and

H3. The highest weight in P1P is the factor PL3.2 "Legal Responsibility" (1.56); for P2V - this is PL4.1- Studying "Standards in Quality Management" (1.06), while for P3M - the most significant is PL4.1 "Face-to-face" training (0.99).

H4 - H6 provide that P4R (Research), P5P (Partnership) and P6D (Dialogue) will be directly related to the results from introducing a PRMS model. Fig. 1 clearly shows that the maximum probability of research evaluation, partnership and dialogue with all stakeholders is significant and positive (a standard coefficient of 0.73 to 0.97 and t-values of 3.52 to 3.77 respectively). This shows that the high assessment of the trainees for the work at the three universities analyzed, connected with *Involving Students in Conceptual and Empirical Studies of the Global Understanding of Sustainability and CSR; Interaction with Business to Expand Students' Knowledge of CSR and Sustainability - Effective Approaches to Deal with these Challenges u Debate between Lecturers, Students, Business and other Stakeholders associated with Sustainability and CSR*, confirms the assertions in the fourth, fifth and sixth hypotheses (H4, H5 and H6) and hence the applicability of the PRMS model for CSR and Sustainability training. The highest weight for P4R is the PL2.2 factor: "To earn a lot of money" (0.99); in P5P - this is PL2.6 "To have a comfortable life and well-being" (0.90), while in P6D - the weight of PL5.3 factor "Companies already have too much social power and should not engage in other CSR activity" is 1.30. Figure 1 represents the testing of the proposed model by analyzing the structural equations.

Fig. 1: Conceptual model – testing the proposed model by analysing the structural equations.



Source: Authors' elaboration, 2019.

Conclusion

Analyzing the objective responses of the trainees as a major stakeholder in the CSR and Sustainability process at three leading European universities, we have received valuable insights into how successful transformation can be achieved by further integrating the PMRE model into the work of business universities. The main conclusion is that the transformation model of PRME implementation is an expected and sought form of knowledge management in university structures, especially the eighth section - PRME as an explicit part of the university's strategy. In fact, PRME, by necessity, has become part of the strategic core of curricula and external partnerships. These new requirements are the focus of those organizations who want to remain competent and competitive in the education of business executives and young leaders.

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ENTREPRENEURSHIP AS A CAREER PATH FOR PHD HOLDERS IN SLOVAKIA?

Janka Kottulová – Andrea Jaseňová

Abstract

Purpose: The main goal of this paper is to explore entrepreneurship as one of the possible career choices for doctorate holders in Slovakia. The paper also aims to identify the relevant research questions and contribute to the creation of future research agenda in the field of both academic entrepreneurship research and research focusing on career development of researchers.

Design/methodology/approach: The paper uses the exploratory approach. We started with the review of literature covering two focus areas, entrepreneurship as a career option for researchers and academic entrepreneurship, to identify the main concepts linked to the topic. In the next step, we selected set of factors related to various aspects of research environment and researchers' labour market in Slovakia and discussed their possible impact on the career and entrepreneurship opportunities of researchers. Finally, we focused on the empirical studies addressing entrepreneurship of researchers in the Visegrad region. Based on the all collected sources we suggested the set of questions to be addressed by further empirical research.

Findings: Research on entrepreneurship of researchers in Slovakia and Visegrad region is mostly limited to papers addressing "academic entrepreneurship". Nevertheless, it offers interesting insights into the motivation of researchers to become entrepreneurs in the environment which is not particularly supportive to research- and innovation-based entrepreneurial activities.

Research/practical implications: The paper provides the basic conceptual framework for further research on the topic of entrepreneurship as a possible career path for PhD holders in Slovakia.

Originality/value: The paper delivers interesting research findings from the perspective of post-communist economy.

Keywords: Researcher Career, Career Development of Researchers, Academic Entrepreneurs, Doctoral Entrepreneurs

JEL Codes: J24, J44

Introduction

While there were 0.828 new doctoral graduates per thousand Europeans aged 25-34 in 2006, this number increased to 1.342 by 2016 (European Commission, 2018). This growth reflects wider trends such as shift towards more research-oriented universities and gradual transition to the economic models in which research and innovation play an important role. Growth in the number of doctorate holders however has not been accompanied by the respective increase in the number of academic positions and ever more PhDs must search for career opportunities outside academia. As highly qualified job candidates, they usually do not have to fear unemployment, which is very low amongst the PhD holders compared to the general population. But if they do not have an opportunity to apply skills and competences acquired through their PhD training, the human and social capital they accumulated diminishes. Underutilisation of their skills is a loss not only for the individual but as well for the economy as PhD programmes require considerable public investments.

Number of policies and initiatives focusing on career development of PhD students has been introduced to address this challenge. Countries such as US and UK pioneered such activities¹⁴ and soon they also became the integral part of European Research Area policies¹⁵. One of the main goals of these initiatives is to encourage intersectoral mobility and prepare PhD candidates for the variety of career opportunities, including self-employment.

The main goal of this paper is to, based on the analysis of existing academic literature and data sources, explore entrepreneurship as one of the possible career choices for doctorate holders in Slovakia and draft the framework for further empirical research focusing on this topic. We will start with defining different modalities of entrepreneurial research careers and highlighting the factors determining inclination of researchers to such career choices. In the next step we will focus on the characteristics of research environment and researcher labour market influencing the availability of career and entrepreneurship opportunities for researchers. The last section will provide an overview of empirical studies addressing entrepreneurship of researchers in the Visegrad region.

¹⁴ See e. g. Concordat to Support the Career Development of Researchers in the UK: <https://www.vitae.ac.uk/policy/concordat-to-support-the-career-development-of-researchers>.

¹⁵ See e.g. the Background report of the EURAXESS Reflex project for the overview of ERA policies focusing on career development of researchers: <https://euraxess-reflex.saia.sk/en/main/publications>

1 Multiple modalities of entrepreneurial researchers' careers

Before we focus on the entrepreneurship as a possible career option for researchers, it might be useful to draw attention to the distinction between “career in research” and “researcher career”. While the term “career in research” refers to the series of jobs experience involving research, “researcher career” focuses on individual having a professional training as a researcher regardless of whether they use it in their jobs or not. We will refer to the “researcher career” throughout this paper.

Researchers' careers might follow variety of patterns. Three basic modalities of these pathways include (1) academic research career (2) research career outside academia and (3) total change in career direction, meaning career unrelated to researchers' PhD training, using mostly their generic employability skills. Each of these broadly defined pathways might have number of variations¹⁶. Researchers also increasingly pursue so called “portfolio careers” with affiliation to several institutions and combination of diverse work arrangements and the focus shifts from the vertical career progress (e. g stepping up the academic ladder) to the extent and variability of individuals professional background.

Entrepreneurship enters the above-mentioned career patterns in different ways. It can be linked to the academic career (“academic entrepreneurship”) as well as to the research career in other sectors or become an independent career pathway.

While entrepreneurial careers of researchers as such have not attracted much research attention yet, “academic entrepreneurship” is a widely studied phenomenon, mostly due to its link to the technology transfer and innovation management. Academic entrepreneurship refers to the efforts and activities that universities and their industry partners undertake in hopes of commercializing the outcomes of faculty research (Brennan, 2006). As a result of these efforts many academic researchers engage in entrepreneurial activities. Brennan (2006) defines two types of this engagement: there are “entrepreneurial academics” and “academic entrepreneurs”.

Entrepreneurial academics “adopt an entrepreneurial outlook through seeking opportunities to support their research and teaching objectives by engaging with commercial partners in a range of collaborative and less formal modes of engagement” (e. g. through joint projects, patents or technology transfer). In contrast academic entrepreneurs “undertake

¹⁶ See e. g. Science my IDP tool mentioning 20 common career pathways for doctorate holders in US (<http://myidp.sciencecareers.org>), or variety of different career pathways covered by the VITAE career stories (<https://www.vitae.ac.uk/researcher-careers/researcher-career-stories>).

technology commercialisation, using formal modes of engagement that capitalise on specific market opportunities” (e. g. through establishing a spin-off company). For both entrepreneurial academics and academic entrepreneurs, entrepreneurship is linked to and derived from their academic profession and literature suggests they take active steps to preserve their academic role identity (see e.g. Sanjay et al., 2009).

Entrepreneurship as a full-fledged career option without direct link to academia can also take different forms. More complex entrepreneurial projects creating further employment opportunities usually require previous experience from academic or business sector and are therefore mostly initiated by more advanced researchers. PhD graduates and early career researchers are turning to freelance opportunities and this development is also supported by the emergence of gig and platform economy.¹⁷ Baitenizov (2018) includes researchers among the typical representatives of growing creative class with high intellectual abilities working as independent professionals.

Variety of entrepreneurial career pathways for researchers is summarised in the following table.

Tab. 1: Overview of various entrepreneurial career pathways for researchers

| Career pathway | Link to academia | Use of research skills | Entrepreneurial engagement |
|---|------------------|--|--|
| Entrepreneurial academics | Yes, direct | Yes | Low to Medium |
| Academic entrepreneurs | Yes, direct | Yes | Medium to High |
| Research focused entrepreneurs outside academia | No | Yes | High |
| Non-research focused entrepreneurs outside academia | No | No, but can benefit from transferable skills | Depends on the type of business activity |
| Freelancers | Not necessarily | Not necessarily | Medium |

Source: Authors

Tracking these increasingly complex career paths is a challenging task and there are not many attempts to do it on the systematic way and on the long-term and regular basis. Career tracking studies have been carried out by organisations such as OECD or European Science Foundation (see e.g. OECD, 2016; European Science Foundation, 2018; Eurostat, 2012) and

¹⁷ Online platforms such as Kolabtree (www.kolabtree.com) or UpWork enable to match simple research requests (ranging from the statistical review of the paper to designing a clinical trial) with researchers able to deliver them. Projects in the total value of 3.5 million USD was facilitated through the platform since it was created in 2016

number of smaller studies was elaborated by mostly Dutch, UK or German universities focusing on their own PhD graduates. There are however no such data available about the PhD holders in Slovakia.

The above-mentioned studies reflect the intersectoral mobility of researchers, however, they do not reveal much about the entrepreneurship as a career choice for researchers. Only the study conducted by European Science Foundation (2018) includes “self-employment” as one of the analysed career options. The outcomes of the study show, that entrepreneurship as the main occupation remains rather rare career choice for PhD holders. The highest share of self-employed researchers was recorded in the medical and social sciences with up to 4 % of PhD holders in these groups reporting that they are self-employed. (European Science Foundation, 2018).¹⁸

2 Determinants of entrepreneurial activity vs. researchers’ characteristics

There is a rich body of literature analysing the factors determining the entrepreneurial activity of individuals. The review prepared by Simones at al. (2015) summarises the research on 12 critical determinants including basic individual characteristics; family background; (personality characteristics (risk attitude and other psychological traits); human capital (education and experience); health condition; nationality and ethnicity; and access to financial resources.

While most of these factors are very individual or depend on the external environment, the factor, majority of researchers will score very well, is human capital. Researchers are highly educated, and their PhD training provides them with the opportunity to gain considerable social capital and advanced skills necessary for entrepreneurship.

Highly educated individuals have better job opportunities in the sector of regular employment but in the same time they are more able to identify self-employment opportunities and might have better managerial skills that are a critical precondition of success in the self-employment occupations. The influence of education on self-employment is therefore far from conclusive (Simones at al., 2015). On the other hand, the effect of experience is clearly positive. Some of the latest empirical research shows, that PhD holders are indeed more prone to engage

¹⁸ Lack of data on careers of doctoral holders in Europe is in the strong contrast with the extent of available data in the USA. See e.g. Gokhberg et al. (2016). *The science and technology labor force: The value of doctorate holders and development of professional careers*. Springer.

in entrepreneurial activities than general population and they are more often involved in more complex forms of entrepreneurship such as self-employment with employees. However, this holds true mainly for the elder researchers with more years of working experience (See e.g. Dvouletý, 2018).

Relevance of the researchers' professional experience for the entrepreneurial careers reflects the fact that organization of scientific research is becoming increasingly entrepreneurial¹⁹. Lissoni and Franzoni (2009) point out researchers leading large teams or laboratories performing number of activities which are typical for the modern entrepreneurs, such as setting up and managing complex organizations and ensuring adequate funding and human capital for them. They also need to broker relationship with actors outside the universities and look for political and material support and if they want to achieve a scientific breakthrough, they need to take considerable risks.²⁰

This is also reflected in the transformation of doctoral training as such. "Traditional academics" were trained to become subject specialist who would conduct the search for knowledge for its own sake. The knowledge economics requires "research entrepreneurs" who are able to spot opportunities for the application and exploitation of research, bring expertise to solve research problem, effectively manage research projects and market the final product (Taylor, 2005).²¹

Whether researcher decides to use these skills and abilities in the entrepreneurial career is according to Bloch (2015) influenced more by the pull factors such as their internal values and motivations than by the push factors coming from the external environment such as researchers labour market situation.

However, external factors frame these decisions and are crucial to creation of career and entrepreneurship opportunities. In the next section we therefore focus on the selected characteristics of the Slovak researchers' labour market and will discuss them in the context of Visegrad region.

¹⁹ Such shift in the way how academia works is far from uncontroversial especially in Europe and "academic capitalism" faces has been a target of criticism among many academics. See e. g. Stöckelová (2009).

²⁰ The extent of similarities between research career and entrepreneurial career is nicely illustrated by the comparison of competence frameworks designed for researchers and entrepreneurs respectively. The most Research development

²¹ The proximity between both professional profiles is well illustrated e. g. by comparison between two well-known competence frameworks (VITAE Researcher Development Framework and EntreComp: The Entrepreneurship Competence Framework).

3 Factors influencing availability of career opportunities for researchers in Slovakia

When discussing external factors influencing availability of career and entrepreneurial opportunities for researchers, three areas might be of special importance: (1) structure of researchers' labour market as it determines the existing career opportunities (2) strength of business sector research as it provides an alternative for a commercialisation of research outcomes and professional experience vital for later entrepreneurial career and finally (3) state of the innovative entrepreneurship and available support as they can increase the motivation for setting up a business and facilitate the process.

Labour market for researchers in Slovakia remains predominantly academic. However, population of PhD graduates has been increasing considerably faster than number of academic positions since 1995. While there was 1 PhD graduate per 63 academic employees in 1995, this number jumped to 6.3 in 2017²². Data discussing the number of the recent PhD graduates finding employment in the academic sector is not available but developments in the number of PhD graduates and academic positions allow us to assume that majority of recent PhDs did not get a job in academia. And they might not be striving for it after all. Small scale studies focusing on the doctoral students and young researchers suggest current PhD students in Slovakia consider careers in academia and public sector as generally less attractive (Lukáč, 2017). According to the survey of Slovak Academy of Science (SAS), 75.9 % of young researchers (under 35 years) employed in public sector consider leaving their current job (cited in Kačírková, 2016).

If they turn to the business sector, they might not find many research job opportunities. Industrial research in Slovakia experienced strong decline after 1989 and has not fully recovered since then. The number of companies having their own research capacities is relatively small and less than quarter of researchers' population²³ in Slovakia is working in business enterprise sector although both number of companies and researchers is rising and R&D expenditures in the business sector already constitute more than a half of total R&D spending in Slovakia.

²² Calculated by authors based on the data from Slovak centre of scientific and technical information (2019)

²³ Statistics do not differentiate between employees with different levels of university degree it is therefore not possible to say how many of them are doctorate holders.

Tab. 2: Selected R&D indicators

| Indicator | Slovakia | Czech Republic | Hungary | Poland | EU |
|--|--------------------|--------------------|--------------------|--------------------|--------------------|
| New doctoral graduates per thousand population aged 25-34 (2016) | 1.599 | 1.134 | 0.599 | 0.492 | n/a |
| Share of researcher working in business enterprise sector (%) | 22 | 52 | 62 | 52 | 51 |
| R&D expenditures as a share of GDP (%) | 0.79 | 1.68 | 1.2 | 0.96 | 2.04 |
| R&D expenditures in business industry sector as a share of GDP (%) | 0.4 | 1.03 | 0.89 | 0.63 | 1.33 |
| Total entrepreneurial activity (%) | 10.29 | n/a | 7.93 | 9.57 | 6.61 |
| Opportunity driven entrepreneurship | 1.34 | 2.65 | 2.39 | 3.72 | 3.33 |
| PCT Patent applications | 0.506 | 0.928 | 1.343 | 0.694 | 3.533 |
| Overall Innovation Index | Moderate innovator | Moderate innovator | Moderate innovator | Moderate innovator | Moderate innovator |

Source: European Innovation Scoreboard and EU Research and Innovation Observatory

Relatively weak position of the business sector differentiates Slovakia from its Visegrad neighbour countries, where more than half of researchers work in business sectors and considerably higher funding is allocated in the industrial research. All Visegrad neighbours also generally invest more in research.

On the other hand, entrepreneurial activity in Slovakia is higher than in other V4 countries but it is mostly driven by necessity not by pursuing the opportunities and rarely has an innovative character. Lack of innovations in the entrepreneurship is also linked to the low level of commercial exploitation of research outcomes measured e. g. by number of patent applications, although all V4 countries score below the EU average in this indicator.

This corresponds with the findings of GEM 2016 study, Slovakia scores below the EU average in majority of indicators measuring the level of technology transfer including the support for researchers commercialising their ideas. Although there are different tools available, systematic, horizontal and effective concept of technology transfer from academia and public RPOs to enterprises is missing (Pilková et al., 2016). On the same time, potential of existing facilities remains underutilised. Already mentioned study of SAS (Kačírková, 2016) finds out that 43,7% of researchers at Slovak universities and SAS do not know about the availability of facilities²⁴ assisting the commercialisation of research outcomes at their institution and 38% know about them but do not use them.

²⁴ There are 13 science and technological parks in Slovakia, several of them host the business incubator (Kačírková 2016).

However, when it comes to innovations our neighbours are not doing much better. All four countries are only moderate innovators according to the EU Innovation Scoreboard. Despite it, as several of the studies presented in the following part conclude, there are many examples of vivid entrepreneurial activity of researchers in Visegrad region.

4 Researchers - entrepreneurs in Slovakia and Visegrad region

Although there are several studies about different aspects of technology transfer, innovations ecosystems and role of universities in the economy, very few address the “researchers – entrepreneurs” topic. The following table summarises some of the studies discussing this aspect. All studies focus on the researchers working at universities, two of them provide broader view on the extent of entrepreneurial activity in academia, the rest is based on the small-scale qualitative studies of the single sector

Tab 3: Selected studies on research entrepreneurship in V4 counties

| Authors and title | Year | Scope of research | Conclusions linked to researchers-entrepreneurs |
|---|------|--|---|
| Jaroš, Čorejová, and Jarošová: Zakladanie univerzitných SPIn-off spoločností zameraných na dopravu a ich spolupráca s univerzitou. | 2018 | Mapping and analysis of entrepreneurial activities of staff and PhD students at University of Žilina | Majority of companies identified in the mapping process (21 out of 25) established by university employees with an aim to generate an additional income and without direct link to the University. 4 companies. correspond with the characteristic of university spin-off. |
| Barcik, Dziwiński, and Jakubiec: The potential of academic entrepreneurship in universities of Visegrad group countries | 2017 | Survey and interviews carried out among students and staff of four universities in Visegrad region. | Only small share of respondents run their own business and generally, the experience with business sector is low but respondents expressed interest in entrepreneurial activities. |
| Novotny: The Heterogeneity of the Academic Profession: The Effect of Occupational Variables on University Scientists' Participation in Research Commercialization | 2017 | A nationwide survey in Hungary including 1,562 academics of hard sciences from 14 universities. | 22% of respondents were market-oriented and 22% academic entrepreneurs. Discipline (engineering fields), work experience with industry, scientific performance (no. of publications) and academic rank seem to outweigh the effect of the university and its research commercialisation activities. |
| Macháček and Srholec: Transfer znalostí do praxe podnikajícími akademiky v České republice | 2016 | Quantitative analysis on the scale and scope of academic entrepreneurship in the Czech Republic. | About 16% of academics acquired “doc.” or “prof.” titles at analysed universities between 2003 and 2015 were engaged in technological companies. Academic entrepreneurship thrives mainly in natural and technical sciences, focuses on the provision of professional, technical and informational services and seems to be perceived only a source of additional income for academics. |

| | | | |
|--|------|---|---|
| Novotný: Motivation and success of academic spin-offs: evidence from Hungary | 2014 | Questionnaire filled in by 80 Hungarian academic entrepreneurs. | The prospects of higher income play an important role in spinning out a company, but it is not the possibility of getting rich (pull), but rather the necessity to complement university salary and to achieve and maintain an acceptable quality of life (push). |
| Erdős and Varga: Academic entrepreneurs in post-socialist central European countries: Evidence from the Hungarian biotechnology sector. | 2012 | Qualitative research of 18 companies in biotechnology sector | “Classic” academic entrepreneurs are usually positioned in the upper segment of academic hierarchy and lead their own research groups. Motivation for starting a business is to further extend scientific activity. |
| Mroczkowski: Key Success Factors in Polish Biotech Ventures | 2010 | Interview based case studies from biopharmaceutical sector | Polish biotechnology firms search for new products through R&D projects undertaken in addition to their core income providing activities only after securing a reliable revenue stream. |
| Rehák: Akademické podnikanie a univerzitné spin off firmy. Prípadová štúdia sektora IKT v bratislavskom regióne | 2009 | Descriptive analysis of university spin-offs in the ICT sector in Bratislava and introductory network analysis of the academic – business networks. | Entrepreneurial activities of academic staff more usual phenomenon than generally perceived. Low income of academic staff identified as the main motive for academic entrepreneurship. |

Several interesting conclusions can be formulated based on these studies. First, they indicate the entrepreneurial activity of researchers in the region is not as low as generally perceived, on the contrary it is higher than in general population, especially in the natural and technical sciences. Majority of analysed entrepreneurial activities does not have a form of “classic” academic spin-offs. Researchers might use knowledge acquired through their research, but the link between their entrepreneurial activities, research and teaching activities of universities is missing.

This is reflected also in the character of entrepreneurial activities that are mostly limited to technical consultancy and professional services. The main motivation for setting up own business is a possibility to gain additional income compensating the lower wages in the academia. Contrary to the research of Bloch, external push factors seem to have stronger impact than internal pull factors. Several examples of “classic” academic entrepreneurs were as well identified, and they correspond well with a picture of “academic entrepreneurs” who are usually positioned higher in the academic hierarchy, have strong academic record, experience from industry and are motivated by the possibility to gain additional funding and extend their research activities. No study focusing on the researchers - entrepreneurs outside academia was identified.

Conclusion and suggestions for further research

Entrepreneurship as a possible career choice for researchers is multifaceted topic requiring interdisciplinary approach. Research on this topic in the context of Slovakia and wider Visegrad region is currently mostly limited to papers addressing “academic entrepreneurship”. Nevertheless, it offers interesting insights into the motivation of researchers to become entrepreneurs referring to possibility of gaining an additional income for either compensating the lower wages in academia or gaining an additional funding for the research as a key factor in making such career choices. These choices take place in the environment which is not particularly supportive to research- and innovation-based entrepreneurial activities with few opportunities to obtain research experience outside academic labour market, lack of support for technology transfer and moderate innovation activity. Despite that there are examples of highly successful researchers-entrepreneurs and such career path might be interesting for young researchers.

Further research should therefore focus on the topics such as labour market and entrepreneurship opportunities for researchers, existing entrepreneurial activities of researchers including those outside academia as well as entrepreneurial activities of early career researchers. Success and failure factors, barriers of entrepreneurial activity of researchers and tools and policies addressing them should be further explored. Finally, the focus could also be on how entrepreneurship is addressed in the training of PhD students in Slovakia.

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THE ROLE OF SOCIAL INNOVATION IN MANAGERIAL PRACTICE

Petra Krejčí – Jarmila Šebestová

Abstract

Purpose: Main goal of the paper is to explain how “business literacy” and activity in area of innovations, especially in the social type relates to the length of managers' experience. Is the business experience source of motivation to be innovative?

Design/methodology/approach: A primary research was made to get relevant opinion about innovation, innovative activities in several companies in the Czech Republic. A sample of pilot 34 interviews was provided with business owners to discuss their “business literacy” in area of innovations, especially in social innovations (September - December 2018). Key information was evaluated on Likert scale to be able to compare the results.

Findings: There were four dependent variables such as age, gender, qualification and length of business experience. A business experience was chosen in that paper in connection to being able to describe and realize innovations. It has been found that managers not to have enough knowledge of innovation and their possible classification. Secondly, their innovative activity is not based only on business experience, but it is closely connected with managerial education.

Research/practical implications: It would be appropriate to explain this issue to managers in first case, according developed matrix and original classification system based on end-user approach. Better level of innovation literacy would provide to relevant responses in a future survey.

Originality/value: A value could be seen in provided qualitative study, where an innovative literacy description and original classification of social innovations was obtained. This classification not have been used before (pure and combined) in any study. Previous study classified only types not innovation “impact” presented by pure and combined approach.

Keywords: Innovation, Social Innovation, Business Practice

JEL Codes: O35, M14, L26

Introduction

Social innovations are primarily connected with activities of social enterprises. However, it should be noted that they can be also a part of other innovative activity of enterprises such as small, medium or large “profitable” enterprises or non-profit enterprises. Social innovations are built on the opposite side of the private sector where the main goal of the enterprise is the social and economic return (Phillips et al., 2015). In line with this, social innovations focus on social value and social benefits (Adams and Hess, 2010). Their interest is not only on social innovation activities, but it is also linked with social entrepreneurship as a way of thinking of real social enterprises, which number is growing steadily in the Czech Republic. Despite this, the social pillar of the business environment is still not legally fixed. This makes the definition of social innovation, social enterprises and social entrepreneurship still non-unified in the business society.

The innovation in general is not only part of a technical process or economic mechanism, but it is primarily a social phenomenon. The importance of this social phenomenon should become a widely accepted idea in related literature (Cajaiba-Santana, 2014). Social innovations are a phenomenon of economic and social development of society and they are constantly present in the development of human societies. They refer to new ideas that work to meet social goals (Mulgan, 2007; Van Langenhove, 2001; Šebestová and Palová, 2016). Different definitions of social innovations across countries are mostly based on the needs of each research study. In most cases, definitions refer either to behaviour, process, tangible result, or to the founder of the initiative (Mair and Martí, 2006).

Generally said, a social innovation means to understand that there is a tie to the three aspects of sustainability, including the economic, social and environmental (Baker and Mehmood, 2015). It means that socially innovative activities could relate to the personality of a founder, their experience and main mission and vision of each social enterprise.

Unfortunately, records or research studies of managers' overall length of practice are not available in the Czech Republic. There are several small-scale surveys e.g. Mikschik (2018) who shows that 40.6% of managers from 277 respondents have business experience of 10 or more years and 23.2% of managers have 6 to 9-years of experience. Results confirmed, that 48.2% of respondents usually change jobs once in 8 years or more. Finally, 39.5% of managers have 6+ years of experience in the field and 77.5% of managers prefer full-time work. This numbers give us a basic insight into the behaviour of managers in business practice in the Czech Republic (long experience, full time activity, stable position). However, this is not survey

closely connected with a business experience and innovative activity or more focused on social innovations. According previous theoretical findings a research question arise: Is there any significant connection between social innovation activity and business experience?

Main goal of the paper is to explain how business literacy (a knowledge connected with the business) and activity in innovations, especially in the social type relates to the length of managers' experience. The research data from 34 interviews will be used to be able to explain that research problem in the form of case study.

1 Methodology and data description

To get relevant primary data a pilot study was realized. The focus of the study was to get overall knowledge of entrepreneurs in area of social innovations and their ability to measure them. This pilot study findings will serve us starting point for full field study in form of questionnaire. A semi-structured interview was used in this pilot study. The focus was on innovative activity, their own description of social innovation and their point of view on social innovations and other innovative activity in their business (a distribution of their innovative activity on innovation types). This approach was defined in study of Krejčí and Šebestová (2018).

A pilot study procedure was based on principles presented by Shenton (2004) to get relevant and unbiased information All interviews were based on personal visit or in cases, when the entrepreneur was agreeing the interviews was done via direct phone call. Entrepreneurs were randomly selected from database Merk, with a minimum turnover of 1 CZK in last three years to be sure, that it is an active company. Five companies per region in the Czech Republic (a minimum of 28 interviews) were selected to test questions within different regional conditions. Time limit for each interview was set to 30 minutes, we had taken notes from the interview, a matrix for innovation was used (table 3). Main procedures from this pilot study were summarized in the table 1 below.

Tab. 1: Interviews description

| Variable | Explanation |
|---|---|
| Time frame of interviews | September to December 2018 |
| This interview was completed in form | <ul style="list-style-type: none"> • One visit in face-to-face interview with one entrepreneur (35.9%) • One phone-call interview with one entrepreneur (64.1%) |
| Number of selected and contacted Entrepreneurs | 70 |
| Number of successfully completed interviews | 34 |
| Estimate duration of the whole interviews | 19 hours, 45 minutes |
| The responses to the questions regarding figures (innovations, descriptive variables) | <ul style="list-style-type: none"> • Computed with some precision from entrepreneur (64.7%) • Partially taken directly from company records (35.3%) |

Source: Own research

Data obtained from semi-structured interviews were evaluated according keywords which entrepreneurs used, when they were talking about the interview main points. A significance of qualities which people need to start-up or source of motivation for each respondent was classified on order they named those situations (a first group = strongly agree, second group = mostly agree, a negative sentiment receive answers, when respondent said “I don’t think that... or I am not sure about...”) and they were re-coded to Likert Scale 1 to 5 (1 -strongly agree, 5 - strongly disagree) and evaluated in meaning of sentiment (mostly positive or negative). This part covered their motivation to behave socially, how they support their behaviour by social innovations.

Tab. 2: Variable categorisation of entrepreneurial role

| Label | Category in semi-structured category | 1st most important from interviews | Next most important from interviews |
|-------------------------------|--|---|--|
| Being innovative | Innovative proactivity as whole | I am still not satisfied..., I need to improve... | I see that I must change.... |
| Social aspect of business | Naming social aspects in business | I care about disadvantaged employees | Products could be produced in fair price |
| | Feeling to be a social business | People on the first place | I am creating profit, but.... |
| Support of social innovations | Active role of entrepreneur to be social | I reinvested money to improve working conditions... | I am making difference in quality to be more responsible |

Source: Own research

Demographic data. Exact values as an age, experience, education and gender were re-coded to a number on the individual scale within main label (grouped by school type, years of experience, etc.).

Social innovations. In the semi-structured interview survey, social innovations were divided into two groups, based on previous secondary research (Krejčí and Šebestová, 2018). Social innovations were classified as pure and combined, because three “pure” innovation types (employee-focused innovation, product-oriented innovation and enterprise-wide innovation) weren’t enough for innovative activities classification of the Czech social enterprises.

Pure innovations were described and defined for interviews as follows:

- *Pure employee-focused innovations* are innovations which improve the lives of employees in a social enterprise.
- *Pure product-oriented innovations* relate to improvement of the quality of products or services produced by the social enterprise.
- *Pure enterprise-wide innovation* means innovations connected to environment improvement in a social enterprise and around a social enterprise.

Combined social innovations are innovation which have of two “pure” areas. In that cases social enterprise is not able to divide them into independent parts, they coexist together. That innovation has a social impact into two areas at the same time. In words of pilot study, combined innovations were defined as:

- *Combined product and employee-oriented innovation* means innovation that partially improves the production of a social enterprise and partially improves the lives of employees in a social enterprise.
- *Combined employee and enterprise wide-oriented innovation* means way how to innovate partially the life of employees in a social enterprise and partially the environment in/out a social enterprise.
- *Combined product and enterprise wide-oriented innovation* is innovation that partially improves production and partially improves the environment in a social enterprise.

Exact “sentiment” about importance of innovation activity was re-coded within a group to get a label (e.g. I am mostly doing that = 1, I am quite sure... = 2...). A division of innovation activity by examples was summed up to matrix, according the record of each interview (Table 3).

Tab. 3: Matrix example for innovation evaluation

| Criteria | | E.. | E.. | E.. | E.. | E _n |
|--------------------------|---|-----|-----|-----|-----|----------------|
| Organization description | Size | | | | | |
| | Specialization | | | | | |
| | Focus group | | | | | |
| Type of innovations | Employee-focused innovation | | | | | |
| | Product-oriented innovation | | | | | |
| | Enterprise-wide innovation | | | | | |
| | Employee and product-oriented innovations | | | | | |
| | Product and business-oriented innovations | | | | | |
| | Employee and business innovations | | | | | |

Source: Own research

1.1 Data sample description

The pilot sample consists from 58.8% male and 41.2% of female entrepreneurs. They were in the age group 41 to 55 years (35.3%) and they hold university degree in 54.7%. A significant descriptive factor was their business experience, when most of them spent more than 10 years in the business (55.9 %). A typical respondent differs from each other only in an innovative activity (presented by gender, table 4)

Tab. 4: Typical respondent

| Variable | Female (N=20) | Male (N=14) |
|---------------------|-------------------------|-------------------------|
| Age | 41-55 years (36 %) | 41-55 years (35 %) |
| Education | University degree (54%) | University degree (60%) |
| Business experience | 20+ years (71.4%) | 20+ years (55 %) |
| Status of company | Non-social (78.6%) | Non-social (75 %) |
| Innovative activity | Non-innovative (54.5%) | Innovative (50.5%) |

Source: Own research

As being confirmed, business experience will play a significant role in next step of results evaluation.

2 Key findings in the Social Innovation Activity

As being presented in the previous section, 34 respondents from various managerial positions in the Czech Republic were used for innovative activity evaluation in two logical steps. Firstly, a basic data about managerial education and length of business experience were described. Secondly, experiences with pure and combined social innovations have been identified. As being said, pure and combined innovations could be realized in social enterprises, profitable enterprises and nonprofit enterprises. The main group was represented by managers aged

26 to 55. An interesting fact was that eight managers consider their enterprise as social type. The degree of relevance between social innovations and the length of business experience is described in Table 5 below.

Tab. 5: Manager Identification – Education and Experience

| Type of education | Percent share (N=34) | Business experience | Percent share (N=34) |
|-------------------------|----------------------|---------------------|----------------------|
| High (Secondary) School | 29.41 | 1-3 years | 29.41 |
| Vocational school | 5.88 | 4-10 years | 50.00 |
| University | 64.71 | 11-20 years | 14.71 |
| --- | -- | 20 + years | 5.88 |
| Total | 100.00 | | 100.00 |

Source: Own data

The largest number of managers had a university degree. On the contrary, managers with a vocational school have the smallest share, which is 5.88 %. In line with that, an average business experience was between four to ten years.

2.1 Socially Innovative Activity Determinants

Socially innovative activity could be dependent on several factors, not only on an ability of an entrepreneur to classify and identify them. Following that matter, two variables (experience and education) were chosen to compare results. Those variables were clustered into three thematic blocks – role of entrepreneur (feelings, support of innovativeness...) and two innovation types pure and combined (Table 6). Each relationship was evaluated on sentiment (positive to negative, graphically +++ - -). Last section of the table presents a comparison, when a tick (√) means that the variable has a relationship with chosen determinant (in interviews the information was close to that or entrepreneur connected this determinant with the category).

Tab. 6: Determination of Innovation by experience and education

| Categories | Determinants | | Comparison | |
|---|--------------------------|---------------|------------|---|
| | Business experience (BE) | Education (E) | BE | E |
| Role of Entrepreneur | | | | |
| Innovative proactivity as whole | +++ -- | +++ -- | √ | √ |
| Naming social aspects in business | +++ -- | +++ -- | | |
| Feeling to be a social business | +++ -- | +++ -- | | |
| Active role of entrepreneur to be social | +++ -- | +++ -- | | |
| Pure innovations | | | | |
| Employee oriented innovations | +++ -- | +++ -- | | |
| Product oriented innovations | +++ -- | +++ -- | √ | |
| Business innovations | +++ -- | +++ -- | | |
| Combined innovations | | | | |
| Employee and product-oriented innovations | +++ -- | +++ -- | | √ |
| Product and business-oriented innovations | +++ -- | +++ -- | | |
| Employee and business innovations | +++ -- | +++ -- | | √ |
| Score | - | - | 2 | 3 |

Source: Own research.

According to those results it would be seen that employee-oriented innovations are not so much determined by business experience and education. A connection between innovativeness and experience and education was observed. The education determined their experience with combined innovations (employee and product, employee and business). On the other hand, business experience could support pure innovation activity such as product-oriented innovations.

2.2 Pure innovations and length of business experience

Key findings are presented in form of summary when each area of innovations is explained according to interviews.

Pure employee-focused innovations. Those innovations are very important in work integration social enterprises, because employees are an essential part of the work integration social enterprises, as its main objective is to employ disadvantaged people in the labour market. This research has found that managers are not interested in that type of social innovations in general (21 respondents), especially in a group of business practice one to three years (up to 27 respondents). Managers with four to ten years business practice have better opinion on that innovations (“*I designed a workplace for disabled people...*”) than other groups. Opposite to

that, managers with eleven to twenty years of business practice do not create any of these innovations. Finally, managers with more than 20 years of business practice are working with innovations the most due to their value in life (“*Maybe one day I will need this...*”).

Pure Product-oriented innovations are the most prominent innovations in for-profit enterprises. However, social enterprises are dependent on product-oriented innovations to generate economic value for donators, supporters and for reinvestments also. In that case, 19 respondents of managers do not create any product-focused innovations. In contrast to that managers with business practice from one to three years do not work with product-oriented innovations too much (they do not see any value added to that). A greater extend and enthusiasm could be found in group of managers with a business practice of four to ten years, when 10 respondents of them are generating more mentioned product-oriented innovations in interviews. Unfortunately, the innovation gap was found in group of managers with business practice from eleven to twenty years, who do not mention any product-oriented innovation activity. Opposite to that, managers with business practice of twenty years or more are more productive. The business experience plays a significant role here.

Pure Enterprise-wide innovations are important for all enterprises, in general. As an example of such innovation could be the revitalization of the enterprise's external environment. This innovation can attract more customer interest, thanks to a pleasant enterprise atmosphere. The interest of managers is so small, when 22 respondents of them do not create any enterprise-wide innovations. Managers with the business practice from one to three years are not interested in that innovation type. Following that, managers with business practice from four to ten copy that trend also (“*I can't imagine what to do...*”). As average group we could name managers with business practice from eleven to twenty years. Managers with business practice twenty years or more are also active (14 respondents) and creative.

2.3 Combined innovations and the Length of business experience

Product and employee-focused innovations are an important combination for all types of enterprises. As an example of such innovations can be mentioned a purchase of a new product, manufacturing technology that could accompanied at the same time with innovations which make employees more comfortable with day-to-day work. Due to this definition and type less than 24 respondents do not create this type of innovation. Only managers with the business practice of twenty years or more, make these innovations in a greater part, when 18 respondents of respondents mentioned their contribution to product creation to be suitable for manufacturing people who are working at the company.

Product and enterprise wide-oriented innovations can be useful and effective combination. As example of a good practice from interviews would be a project of roof revitalization, when solar panels were installed to support environmental aspects of business activity (societal impact) and to reduce costs of energy not only for production but for whole building. By contrast to that project, 22 respondents of managers do not use product and enterprise wide-oriented innovation in a practice. We distinguished two main groups. First group of managers, with less than 10 years of experience are not providing that type of innovation. Second group, from eleven and more years of experience is more active, because they are thinking in “wider context”.

Employee and enterprise wide-oriented innovations compared to the previous combination may be used in social or non-profit enterprises. An example of a good practice is the revitalization of an enterprise spaces to barrier-free, due to the possibility of recruiting a new handicapped employee in a future. When so little group of managers identified their social aspects in entrepreneurship, it is not surprising that 24 respondents do not create any innovation. Only managers with business practice of twenty years or more are active in that area (18 respondents), but sometimes isn't not so easy to differ between product and employee combination.

Limitation of the study. Interviews with managers has shown that they are not sure how to classify innovations and how they could define as social impact. A practice in the innovation area and its classification is probably not too high. Managers do not thing deeply how to address the innovation to focus group and innovative area or how they can create them in the future. Results presented in that case study were heavily limited by a small research sample that does not have a complete informative value. There were only 34 respondents who answered and discussed the questions in the interview. However, it was only a pilot research that preceded extensive research in this area. Another limitation has been found in secondary sources, the inadequate research of the length of senior management practice in the Czech Republic, when no public data, statistics, records or field studies are available. Only small scaled surveys on managers' business experience and preferences or experiences can be used but without any possibility to compare the development as it is possible in standardized observations from e.g. Global Entrepreneurship Monitor studies (GEM), Doing Business studies or European Innovation Scoreboard (2018), where different categories are presented, social innovation could relate to “internal” innovations. According presented definitions, the scoreboard covers all innovation types (pure and combined form e.g. more than 50% is on product, so it is product innovation) or different groups of social innovations defined before

(Šebestová and Palová, 2016). It will not be easy to design a proper method how to re-connect all the results together to uniform the output.

This small sample has shown that there could be a strong influence on social innovations, when the roots we found in experience and level of education. We suppose that business experience and business education will support level of innovation activity and especially in a pure form.

Conclusion

The pilot research has shown that the largest number of managers do not create innovation at any form. Generally said, managers support more pure innovations than combined innovations. Furthermore, research data has revealed that the education level can have some influence on innovation activity. Surprisingly, most managers with vocational school education create both pure and combined innovations. Compare to that, university educated managers create pure and combined innovations approximately at the same extent.

This pilot research has its limitations that affect its results. The sample of managers is very small, and therefore its result may not be generalized. It was very useful to observe, that education and business experience could positively affect innovative spirit and socially oriented innovations. The planned survey has to clarify main motives to be socially innovative and getting more examples of those innovations. This research is a pre-step of more extensive research on this topic. Follow-up research will focus on the same topic but will include a much larger group of respondents.

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TECHNOLOGICAL AND MARKET ASSESSMENT OF THE INNOVATIVE BUSINESS MODELS FOR DEMAND RESPONSE IN THE EUROPEAN BUILDINGS

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Abstract

Purpose: This paper presents innovative business model that incorporates the demand response (DR) schemes to the ESCO projects. So far, despite financial barriers, DR aggregators have not cooperated with ESCOs which offer financial support for energy renovations. Thus, the paper describes the first joint business model and assesses technological and market opportunities for its practical implementation.

Design/methodology/approach: Technological assessment of the business model was based on CANVAS model and focus group interviews (FGIs) conducted with 31 DR aggregators and ESCOs in 2016 in Portugal, Serbia, Spain and UK. Market assessment was conducted basing on quantitative study from 2015 with 112 European Energy Performance Contractors (EPC) who were asked about financial and technological aspects of the renovations.

Findings: The optimal peak demand DR scheme minimizing potential peak loads was designed, with close attention to the activities that should be taken by DR aggregators and ESCOs to jointly offer this solution on the market. Moreover, the study identified target markets (mainly Southern Europe) and found that the motivation of building owners to implement the innovative solution is influenced by the pressure to reduce energy costs.

Research/practical implications: The results show how the DR aggregator and ESCO could create joint market strategy for renovation with the implicit DR scheme. They also suggest which markets and drivers should be considered while implementing the business model.

Originality/value: This was the original study which evaluated technological and market opportunities for incorporation of the DR solutions to the ESCOs activities, including strong attention to the communication infrastructure, smart metering devices and users' behaviours.

Keywords: Demand Response, Business Models, Energy Efficiency

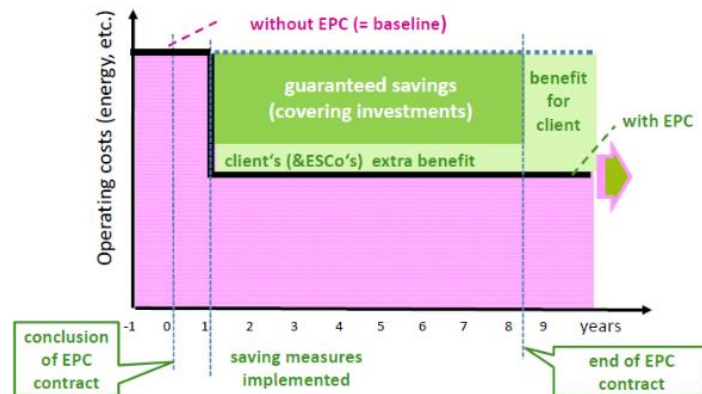
JEL Codes: O31, O32

Introduction

The improvement of energy efficiency (EE) is a strategic goal of the European Union, therefore many innovative EE-solutions regarding the energy trilemma (security, affordability and sustainability) and allowing European countries to achieve the EU targets for energy sources are being elaborated on the European energy market (EC-JRC, 2016; Zancanella et al., 2017). Among intensively promoted solutions one can find Demand Response (DR) schemes (Bertoldi, 2014) which are defined as “a tariff or programme established in order to change electric consumption patterns of end-use consumers in response to changes in the price of electricity over time“ (Zancanella et al., 2017). This way, DR “incentivises shifting energy consumption from times of the extremely high demand to other parts of a day“ (Zancanella et al., 2017). It is expected that the European DR market, which is currently worth approximately \$0.9 billion, will achieve \$3.5 billion by 2025 (Nhede, 2018).

Despite these promising perspectives, new business solutions promoting the proliferation of prosumers on the liberalized energy market are needed (Behrangrad, 2015). The main challenge is to shift focus of energy consumers from not flexible retail-based energy programs (based on contract between retailer and consumer) to more expensive, but innovative DR schemes which are integrated with smart meters responsible for quick and flexible responses from building energy systems (Ma, Billanes and Jorgensen, 2017).

Promising opportunities for the expected transformation might be brought by ESCOs which hold a distinct role in the field of energy service providers. The European market of the ESCOs services has been rising in most EU countries over the last decades. Currently, its size is estimated at above €10 billion between 2015-2016 and is expected to reach an approximate €14 billion until 2020. Services provided by ESCOs cover a full range of activities, including energy audits, project implementation and operation phase (Boza-Kiss, Bartoldi and Economidou, 2017). During 5-15 years' contract between ESCO and client, energy savings achieved due to renovation are used to partly or fully pay for the investments that were made (see Fig. 1).

Fig. 1: ESCO funding scheme


Source: Boza-Kiss, Bertoldi & Economidou (2017)

It is expected that ESCOs will increasingly use data collected by smart metering and communication infrastructure (SMCI) in order to evaluate effectiveness of the renovation process and calculate worth of payment to be made by the building users (Boza-Kiss, Bartoldi and Economidou, 2017). Integration of the ESCOs activities with SMCI – being a part of a whole renovation process – may facilitate the market expansion of the implicit DR schemes. However, there are three research questions to be considered while evaluating the possibilities for cooperation between ESCOs and DR aggregators:

1. Main question: is it possible, from technical point of view, to create business models which would integrate the DR solutions with renovation activities taken by ESCOs?
2. If yes, what would be the structure of joint commercialization strategy, according to the CANVAS methodology (Osterwalder and Pigneur, 2010)?
3. If yes, are there promising market opportunities for the integrated services in the European countries?

This paper provides an answer to these questions, using qualitative and quantitative data gathered from the main market players: Energy Performance Contract (EPC) providers, DR aggregators and representatives of ESCOs.

1 State-of-the-art: currently available DR business models

In general, currently available DR schemes can be divided into two groups: explicit and implicit DR schemes. In explicit DR schemes – also called “incentive-based” – “consumers receive a specific reward to change their consumption upon request, triggered by high electricity prices, flexibility needs of balance responsible parties or a constraint on the network”. Saved energy “is sold upfront on electricity markets, sometimes directly for large industrial consumers or

through demand response service providers”. (Zancanella et. al., 2017; UEI, 2015). The most well-established business strategy for incentive-based DR solutions is the “Contract-based reliability enhancing service” (often called “time of use pricing”), in which consumer “would sell the ability to change its demand profile (...) based on agreed conditions and circumstances” (Behrangrad, 2015). This model is very popular because of low infrastructural and communication requirements. Due to the low flexibility, the contract “determines all DR action characteristics such as action triggers, contract duration, and maximum number of hours per activation” (Behrangrad, 2015; Ma, Billanes and Jorgensen, 2017). Another explicit DR scheme, “capacity provision model”, is comprised of several tariffs (e.g. “Real Time Pricing”, “Critical Peak Pricing” and “Peak Time Rebate”) and “involves participating in auctions to commit to a demand reduction during a future peak time” (Behrangrad, 2015; Thomas et al. 2018).

There is no doubt that the above-mentioned models do not meet requirements for innovative DR solutions, such as implementation of cloud-based solutions and smart devices. As a result, DR aggregators propose the implicit DR, also called “price based” models. This category refers to consumers who “can decide – or automate the decision – to shift their electricity consumption away from times of high prices and thereby reduce their energy bill”. Time-varying prices are offered by electricity suppliers and can include highly dynamic prices, including peak hours (Zancanella et. al., 2017; UEI, 2015). The implicit DR schemes offer different level of flexibility which also affects the final price of implementation (Behrangrad, 2015). Among the most innovative and flexible solutions, “ancilliary service market participation”, “direct load control”, and “virtual power plant” can be found (Behrangrad, 2015; Thomas et al. 2018; Ma, Billanes and Jorgensen, 2017). These business models are dedicated to different types of consumers, including smaller loads with “flexibility in their electrical appliances that can be aggregated in large numbers, such as thermostatically controlled loads, air conditioners and refrigerators” (Behrangrad, 2015). Notwithstanding the type of customer, common feature of these business models is strong integration with costly smart metering, cloud based solutions and communication infrastructure, including innovative block-chain technology that is able to pay customer directly for the value of his demand-side flexibility (Pop et al., 2018). However, due to the infrastructural costs, the implicit DR schemes do not provide as promising reductions in the energy consumption as it was anticipated. As a result, a new business models are expected to make the DR innovations more available for the energy consumers (Zancanella et al., 2017).

2 Methodology

In the first step, a new DR business models were co-created during four focus group interviews (Dilshad and Latif, 2013) with 31 DR aggregators and representatives of ESCOs²⁵. The interviews were conducted within the frame of the MOEEBIUS Living Lab workshops which were organized in 2016 in Portugal, Serbia, Spain and UK. Living Lab is an environment for sharing experience and co-creation of the user-driven open innovation in order to obtain feedback from the stakeholders and create opportunities for further exploitation and replication of results (Bergvall-Kåreborn and Ståhlbröst, 2009).

To successfully elaborate the hybrid business models implementing the DR schemes to the renovation services provided by ESCOs, the Canvas methodology was applied. At the beginning of the interviews, the state-of-the-art business models related to the DR aggregators and ESCOs were presented, with particular attention to the implicit DR schemes. Then, the participants were asked to use their expertise knowledge and prepare drafts of the hybrid business models, assuming that the technical and financial conflicts could be avoided (the DR infrastructure could be applied in the ESCO renovations and jointly exploited by ESCOs and the DR aggregators). To this end, the FGI participants answered several questions which were structured in accordance with the Canvas methodology (see Tab. 1).

²⁵ In each workshop, one business model expert participated as well in order to support designing of the models.

Tab. 1: Questions answered during FGIs

| | | | | |
|--|---|---|--|--|
| Key Partners What kind of partners are needed to successfully implement DR services to ESCOs projects? | Key Activities What kind of activities should be done before, during and after installation of the SMCI to allow for cooperation between DR aggregators and ESCO? | Value Proposition What benefits will be provided to the customer by the elaborated solutions? | Customer Relationships What type of relationship with customers will be established in order to ensure that: <ul style="list-style-type: none"> • SMCI are effectively used? • business expectations of DR aggregator and ESCO are meet? | Customer Segments Who can be treated as the most promising client? |
| | Key Resources What kind of SMCI should be installed to meet expectations of both DR aggregators and ESCOs? What functionalities should be included in the systems? | | Channels Through which channels do the customers would be reached, taking into account previous experience of DR and ESCOs? | |
| Cost Structure What are the most important costs inherent from implementation of the implicit DR scheme to the ESCOs renovation project? | | Revenue Streams What kind of financial profits should be distributed from ESCOs to DR aggregators after renovation? | | |

Source: own elaboration on the base of <https://canvanizer.com>

Subsequently, the results of each FGI were compared and the final business models were designed, as shown in the Results section.

In the second step, the data collected within the frame of “Transparence – Increasing transparency of energy services market” project (Transparence, 2015) were used in order to verify market opportunities for the solutions defined in the business models. The data was collected in 2015 among Energy Performance Contract (EPC) providers who are responsible for renovation activities and often cooperate with ESCOs. Basing on the on-line survey, 112 EPC providers and facilitators from 16 countries across Europe were asked about funding sources and technologies implemented during renovation processes. Since the study included 27 different technologies, the Ward’s hierarchical clustering method (Gordon, 1999) was applied in order to reduce the number of dimensions. Two main clusters were identified and, what is worth mentioning, one of them included most of the smart measuring and communication solutions. Subsequently, the correlation coefficients between this cluster, role of ESCOs and the worth of renovation activities were calculated, according to the collected answers. Moreover, popularity of SMCI in the examined countries was evaluated. The statistical analyses were made with the use of the statistical package IBM SPSS Statistics.

3 Results: technological and business opportunities

The DR aggregators and representatives of ESCOs participating in FGIs agreed that there are good technological opportunities for implementation of the implicit DR schemes to the ESCOs renovations. One of the proposed solutions was the business model for the optimal peak demand DR scheme which minimizes potential peak loads. The service automatically (in advance) notices a potential peak load and directs energy management system to cut functionality without intruding end-users comfort (see Tab. 2).

Tab. 2: Optimal peak demand management business model

| | | | | |
|--|--|--|--|---|
| Key Partners <ul style="list-style-type: none"> • ESCO; • DR aggregator; • Building data analytics firm; • Global electric utility; • Partner with energy storage. | Key Activities <ul style="list-style-type: none"> • Obtain high resolution and high quality historical meter data; • Obtain Time-of-use prices per region and customer type; • Obtain tenant comfort requirements; • Get asset performance data and forecast its usage. | Value Proposition A solution for energy consumers to control their peak demand and reduce annual bills by 30-50% | Customer Relationships Offer customers a basket of solutions for energy management: <ul style="list-style-type: none"> • Peak demand; • Analytics (before and after renovation); • DR services to minimize consumption during peak hours. | Customer Segments <ul style="list-style-type: none"> • Energy consumers who pay high penalties on peak demand; • Customers in energy markets who offer the option for dynamic pricing schemas, such as demand charges and Time-of-use tariffs. |
| | Key Resources <ul style="list-style-type: none"> • Instant asset control technology; • Accurate forecasting; • Monitoring and automatic control tool. | | Channels <ul style="list-style-type: none"> • Utilizing utility partner's contacts; • Additional services to portfolio customers; • ESCOs' clients. | |
| Cost Structure <ul style="list-style-type: none"> • Hardware manufacturing and exploiting; • Software development costs; • Installation during renovation; • Cloud infrastructure; • Training activities; • 27/4 technical support. | | | Revenue Streams <ul style="list-style-type: none"> • Software as a service model with pricing depending on number of assets controlled; • Revenue streams by avoiding extra costs due to the optimal portfolio management during peak demand or peak pricing hours. | |

Source: Mafra & Rato, 2016

In accordance with this business model, price based DR strategies were indicated during the workshops as a way to implement time-of-use optimization. This process takes into account differences in electricity prices (usually high electricity prices are associated with peak demand) and enables customers to lower energy costs by shifting energy consumption during low price hours. Participants of the workshops emphasized that the key point of this business model is data analytics engine which constantly collects and analyses energy price data (alternative tariff selection), in order to identify how user behaviour (his energy consumption) is changing on the basis of flexible tariffs. This may allow for the definition of high-level flexibility profiles illustrating the response capacity of demand in price-based control strategies for peak-load

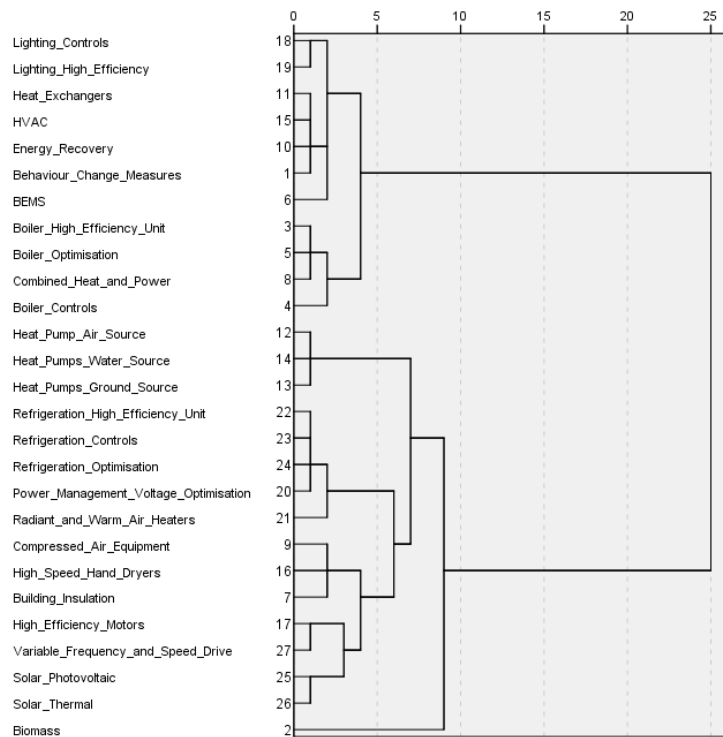
management optimization. Moreover, it may provide ESCOs with data required to assess the difference in energy consumption before and after renovation.

In the opinion of DR aggregators and representatives of ESCOs who participated in the workshops, the proposed business model not only enables the cooperation between the above-mentioned parties, but also meets their needs and takes into account installation of SMCI, including innovative and flexible implicit DR solutions. Thanks to that, the answer to the main research question is positive.

4 Results: market opportunities

There are two general renovation schemes that are implemented by the surveyed EPC providers (see Fig. 2). One of them is strongly focused on the implementation of SMCI, including building energy management systems (BEMS) and behaviour change measures. This is precisely what is needed to effectively implement DR implicit schemes in buildings. However, contrary to the technological opportunities, the market perspectives for the innovative DR schemes are not so promising and several barriers could be identified.

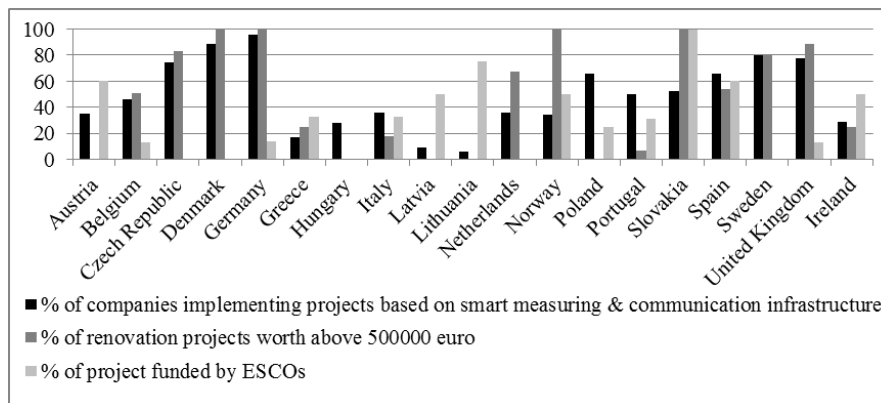
Fig. 2: The dendrogram with the use of Ward connections



Source: Own elaboration on the base of “Transparence” project

First of all, implementation of this smart scenario is usually not connected with support provided by ESCOs. The correlation between the number of EPC providers who implement innovative energy management solutions and the number of EPC providers cooperating with ESCOs is negative ($\rho = -.473$; $p < .05$). It means that many of the advanced renovation projects with SMCI are funded from other sources, such as private funds of building owners. These retrofitting activities are mainly conducted in Czech Republic, Denmark, Germany, Sweden and UK (see Fig. 3). Moreover, important driver for these renovations is the pressure to reduce energy costs (there is a positive correlation between the number of EPC providers who implement innovative energy management solutions and the number of EPC conducting renovation projects due to the pressure on the reduction of energy costs ($\rho = .614$; $p < .01$)).

Fig. 3: Overview of renovation projects in selected European countries



Source: Own elaboration on the base of “Transparence” project

Support of ESCOs is more important in countries where the renovation projects are cheaper²⁶ and do not include SMCI (e.g. in Greece, Italy, Spain). It does not mean, however, that ESCOs representing Southern Europe are asked for support because of financial obstacles, since there is no clear relationship between the number EPC providers who meet financial difficulties while implementing the renovation projects and the number of EPC providers cooperating with ESCOs ($\rho = -.135$; $p > .05$). Similarly, SMCI is not avoided due to problems with funding ($\rho = -.265$; $p > .05$). It rather suggests that in these countries ESCOs are able to measure energy savings without support of SMCI, while the building owners are not driven by

²⁶ More expensive renovation projects (worth more than 500.000 euro) are mainly conducted in Czech Republic, Denmark, Germany, Sweden and UK. They are also positively correlated with the popularity of SMCI ($\rho = .652$; $p < .01$).

high energy costs encouraging them to implement SMCI. As for now, the owners prefer “traditional” renovation schemes with optimal balance between energy savings, retrofitting costs and wide range of modernized building components. Therefore, the market potential for the elaborated business model is rather potential than real, in spite of the important market role of ESCOs in Southern European countries. Nonetheless, the commercialization opportunities in this part of Europe may increase in the future, provided that ESCOs will maintain their market position and the energy consumers from these countries will feel the pressure to reduce energy costs (analogically to the building owners from other countries, such as Czech Republic, Denmark, Germany, Sweden and UK).

5 Discussion

There were already a few studies focused on the business models for buildings’ participation in the liberalized energy market with leading role of the DR schemes. Their authors emphasized, however, that currently available strategies need further improvements because of economic barriers hindering the DR popularization on the European market (Behrangrad, 2015; Zancanella et al., 2017). The study presented in this paper evaluated whether there are technological and market opportunities for overcoming these barriers through integration of the DR solutions with renovation activities funded by ESCOs. As the participants of the workshops emphasized, the DR solutions can be successfully implemented to the ESCOs renovation strategies due to the financial capability of ESCOs and growing role of SMCI which is responsible for precisely measuring energy consumption in renovated buildings. ESCOs are likely to propose to their clients renovation projects which will include SMCI as a part of the whole renovation costs.

Although it was confirmed that there is no financial and technological conflicts between DR providers and ESCOs, the study shown that real market opportunities for the elaborated business strategy will depend on the pressure to reduce the energy costs. If the pressure increases, building owners probably will be willing to implement SMCI integrated with the implicit DR schemes. Thus, the price changes may be used to promote the elaborated business model in those countries where support of ESCOs is widely used in order to conduct overall renovations of buildings (e.g. Southern Europe). In other countries, such as Czech Republic, Denmark Germany, Sweden or UK, the market expansion of implicit DR schemes probably will not be driven by ESCOs due to the domination of other funding schemes.

Conclusion

Currently, there are several implicit DR business models ensuring high flexibility of energy consumption in buildings. However, the adoption of these flexible schemes is prevented by different barriers, among which high costs of technology implementation and lack of integration between the DR aggregators and ESCOs could be mentioned. The research provided an example of CANVAS business model which may overcome these barriers and provide new market opportunities for the implicit DR schemes with fast metering and communication infrastructure. The main innovation introduced by the proposed business model is the incorporation of the implicit DR schemes to renovation services provided by ESCOs. These companies may cover all costs related to the implementation of energy management solutions in building, including the DR infrastructure. The study found, however, that the ESCOs services are popular only in several European countries (mainly located in Southern Europe), which limits market opportunities for the business model. What is more, the commercialization success in those countries may depend on the pressure to reduce the energy costs which currently do not encourage building owners to implement the smart measuring and communication infrastructure required by the implicit DR schemes.

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ARTIFICIAL INTELLIGENCE IN THE CONTEXT OF MANAGERIAL RESPONSIBILITY

Dušan Kučera

Abstract

Purpose: The purpose of the contribution is to identify the sources of the present mostly uncritical optimism regarding the application of AI, which illuminates the old idea of robotisation and the attempt to replace a man with a machine.

Design/methodology/approach: The conceptual study aims to identify the philosophical birth of the idea that a person can be understood as a robot or a machine. This idea is subsequently analysed in the light of complex scientific interest with the question, how far the technological development of AI projects represent the separation of scientific approach and its reduction on informational and mechanical functions revealing the ethical consequences for management.

Findings: The study reveals the original philosophical foundations of AI principles and their positivist approaches. The application of AI is important for the deeper awareness of managerial responsibility and new treats for individuals and society in the future.

Research/practical implications: The impact of the study rests in the ethical dilemma that needs to question the promotion and application of AI. The current treats of possible dual use of robotic technology confirm the need for critical debate among both the academics technologists and managers. The challenges for management risks relate to personal autonomy, democratic stability and national sovereignty.

Originality/value: Critical analysis about AI in the similar anthropological, managerial, social and ethical contexts are because of technological positivism and economic expectations sporadic today, especially in the frame of complex management responsibility.

Keywords: AI, Anthropology, Ethics, Social Risks

JEL Codes: C63, O33, Z13

Introduction

Artificial Intelligence (AI) is one of four known human arts of intelligence - psychic, emotional, intelligent, and spiritual. All four intelligences relate to man. In connection with AI we speak about “artificial”, not a “natural” or “living” intelligence. The word “intelligence” is suddenly used for technology that is not living. How does one understand the managerial responsibility in the relationship between “artificial” and “intelligence” in the frame of ethical and social consequences?

In recent years, the professional literature led the positivistic discussion about almost limitless capabilities of AI and robotics in the future. The fast technologies should solve problems, manage and control many processes and systematically even replace a man. Technology of AI is increasingly used generally in engineering, self-driving cars and automation in the industry. However, plans regarding the use of AI in legal services (as a substitute for judges and lawyers in routine cases); in medicine and surgery, in banking and insurance (the system can calculate the optimal loan, repayments, interest, etc.). The people are looking for life partner according to different criteria based on computer programs. Finally, the artificial figurines are offering the “partnership” substitute for lonely men and women. We find the AI application also in the area of translations and entertainment industry etc.

Artificial intelligence is a branch of science that deals with the creation of machines that display "intelligence" today. However, we will find it difficult to see a precise definition, because of the controversy, which usually leads to broad descriptions of intelligence as such. However - in popular media magazines and media, the theme looks interesting, funny, exotic - and progressive. The latest offer was about an interview with artificial intelligence disguised as a young woman (humanoid robot Sophie), who has already acquired her first citizenship. The discussion is about the HR responsibility in management when the robot Sophia is not what it seems to be and we cannot entrust to her the same responsibility as to staff (Fitzsimmons, 2017).

For the Czechs understanding (country in CEE), is interesting that Sophia referred to Prague in an interview that she was inspired by Czech writer Karel Čapek from 1920. His term "*robot*" and the name "*Rossum's universal robot*" comes from his work by R.U.R. (Čapek, 2004). Visitors attending the Innovation conferences appreciated her convincing mimic, the ability to smile, blink with eyes, lean her head and show that she can view the audience and that she had an interest in people living in the city. But what could be her scope of responsibility in practise?

There are many funny reports about Sophia, but the concern regarding AI application in our society and companies are serious. Steven Hawking warned, “*the development of full artificial intelligence could spell the end of the human*” (Rory, 2014). The question is if we want to replace a person as a robot (A). E.g., the chip manufacturers have already invested billions of dollars in the development of AI. It means that the enthusiasm regarding AI also strongly affects the economy, strategy and management responsibility.

1 Philosophical challenges of Artificial Intelligence for management

The phenomenon of robots means for management a philosophical, technological and economic complex. It is probably part of human nature to want to simplify its life, work and decision-making process and aim to escape personal responsibility. The advantage of any developed IT system, order, law, guideline, tradition is that one can rely on and refer to whenever he gets into any trouble. Even managers and politicians have always tried to hide behind the "paper", a superior instance. Today it is AI, which we must accept according to “how it works.”

1.1 Influence of René Descartes

The modern science influenced Descartes who, after the decay of the medieval concept, outlined a rational thinking method until today. The man started by him to be especially a thinker who can find in his mind the lost certainty after the fall of the ancient power of the Catholic Church. Although he has remained a religious man, he has given human reasoning the ability to think "clearly and distinctly" (Descartes, 2007). When he wrote about nature, he dealt with natural laws and functionality of animals and their similarities with humans. The conclusion was that human thinking is so original that only people (with the so-called "soul") rule above the animals. He was Christian; however, when it came to the functioning of a human body, he compared it to the "machine.” Finally, we have not overseen that he distinguished in the 17th century why a person is not comparable to an animal or a machine.

1.2 Influence of La Mettrie

La Mettrie used quite different a person's comparison to the machine in his book: *L'homme Machine* (La Mettrie, 1958). He was an atheist and materialist of French enlightenment of the 18th century. He believed in one material essence of everything, and instead of God, the Creator introduces all the principle of motion into matter itself. He understood spiritual concept as an obstacle to natural science and human happiness. Thus, in Europe, materialistic optimism and

belief in the "*functioning of machines*," including in the form of a human organism, which people began to uncover, emerged. La Mettrie was the first mechanical materialist who saw much greater similarities in functions of the human body with animals, unlike Descartes. The fundamental shift is that "*machine worthiness*" cannot only be seen in physical functions but also in mental. E.g., he believed that even animals - like machines - could learn the human language (we refer to his research with monkeys). In addition, that is how important it is for managers to be aware about the closeness of technological strategy to the natural scientist Charles Darwin's from 19th century and other materialist evolutionists following the old assumptions resulting to the concept of "artificial intelligence" like a dynamic mechanism.

2 What should managers know about the limits of AI today

The fundamental contribution to our study came with the work of Alan Turing in the 20th century (Turing, 1950). Turing also worked with the hypothesis of whether machines are capable of thinking. Nevertheless, his conclusion is the claim that machines could work as a human mind only in some special moments if the scientists try to imitate it. Turing has been active in the area of digital logic, mathematical and mechanical analogy, a similarity in data transfer, machine speed and accuracy of the calculation, etc. But his view regarding the responsibility of special project managers in this area is obvious: Man is not a machine, and nobody can rely on any machine with assumption it would be able to entirely replace all human abilities. After World War II, Turing actually agreed with Descartes: the machine does not have a "soul." Moreover, the human soul is not subject of the same art of destruction like a body. Turing became famous for the digitisation of the Nazi Enigma encryption machine - and so influenced positively the end of the war and the rescue of many lives. However, for managerial responsibility, it is necessary to know that he had a clear experience in this dramatic story. The cryptographic machine uses the mathematical rules who invented men. It means that again only the human ability to think in rational and social contexts could succeed by the decoding of the enigma. The Enigma Encoding Machine was a human creation built on the analogy of original human thinking. Only human responsibility and human ability to think could decode it again. Even after the decoding of Enigma, the allies had to behave like responsible humans with a special strategy, not mechanically, as machines do. They could not act immediately according the information. The information obtained with Enigma was necessary to use very responsible slowly - "incongruously" because the allies would become suspicious of the German generals when they would behave as "robots".

There are today an increasing number in experts contributing to the discussion about the responsible application of AI. The AI branch itself is still at the beginning. Meanwhile, it uses mathematical modules including robotics, task solving, pattern recognition, memory development, and sentence proofing. It means that artificial intelligence is not yet capable of solving tasks as well as living organisms. Researchers have therefore focused on imitating living nature and human functions (Bourkakis, 1992). We can encounter so-called soft computing focused on neural networks (inspired by the nervous system of living organisms), representation of vague knowledge and approximate reasoning, or evolutionary algorithms. The direct comparison with a person in its full size, beauty and wealth is still a long way to go. The responsible prudence is part of the overall concept of science, which accepts that modern approaches represent only the fragmentation and regression of the whole. In the context of quantum physics, it even means that no complex phenomenon can be excluded from the universal approach and be declared separately. Philosophical consequence of quantum physics is that everything relates to everything. The philosophical implications of quantum physics also have significant ethical consequences. To the very care of "intelligence" as mentioned: managers cannot rely only on one kind of human intelligence, but four - rational, social, emotional and a spiritual. In the frame of managerial HR responsibility is open still an unexplored area of neuroscience, e.g. To evaluate the AI, we still need to distinguish the human ability of judgment, imagination, moral responsibility, not only memories and combinatory. Kant would ask management for so-called contextual "understanding" (contextual consideration) as opposed to pure logic and quote of numbers. The next step regarding the managerial responsibility by implementing AI would be the function of human conscience, which is original, individual - and inimitable.

There are also some other opinions and resources to this study, nevertheless, in order to summarise the conclusions of professionals for managerial responsibility in the time of high developed technology and AI they assure us that machines and robots can imitate only particular human functions. Machines or robots (AI) cannot replace the human (managerial) responsibility, freedom of decision, free will, and free regulated emotion, the function of conscience as relationship consciousness, the ethical dimension of human behaviour, and finally the personal accountability for other human beings, society, natural environment and future generations.

3 Consequences of AI in context of managerial responsibility

From the very beginning of AI development, we realise that we are moving not only to the field of algorithms, computerization but also touch the field of philosophy, strategy, sociology and ethics, which is the essential part of managerial responsibility. Though there are entirely different disciplines, they still relate to human life and society as well as economics or social consequences of natural sciences. It is not possible to reduce the wholeness (universalism) of science only to functional natural sciences - and even reduce them just in mathematical functions for information technology. Such a reduction would also mean a dangerous splitting of man to functional mechanisms that we would like to imitate using robots. The responsibility of researchers, producers and managers in application would be undermined. The similar consequence of AI according to Consumer trends of 2019 (ET Brand Equity, 2018) is the “*mental obesity*” of costumers who rely more on their information from smartphones and information systems than on the own mind awareness in broader and longer context.

The Visegrad conference (4 post-communist countries in CEE) called experts, professionals, researchers and practitioners together from various areas of the world with different demographic backgrounds. The participants have been directly confronted with the uptake and real application of artificial intelligence solutions with specific perspective of the V4 group: “The impacts of the AI development is not only related to industrial development as such, including new forms of business activity, but also have the significant legal, social and ethical dimension.” The political representatives and the members of Czech Academy of Science came to the conclusion that “all these challenges will require us to look deep into a number of areas which may seem distant from the purely technical side, such as social security systems or educational models including people” (TC SAC, 2018).

3.1 Direct consequences of AI for managerial responsibility

Modern science itself has quickly encountered problems, responsibility, or ethics. Responsible and ethical approach belongs to man – in the industry of finance area to managers and human society, not to a machine itself. Well, we know that inventing and producing of remote controlled weapons is one thing, the other thing is to use of weapons against any city or state. Robots in companies, energy, satellite communication, robotic arms can operate in the interest of a particular country or in contrary misused against the own country or institutions. Managers and all managers and staff in organizations are responsible for the application of AI, not robotic systems and AI alone. Let us recall the debate on the liability of a robot-controlled car that

killed a man (The Guardian, 2018). Lawyers, insurance companies, police, philosophers, ethics and the relevant institutions immediately reacted to the question of who is responsible for such car accidents.

The technological possibilities of a fully automated machine working via AI systems among living people push them to the edge of managerial process as any things managers are not responsible for. It seems that one can be seduced as Mephistopheles in Faust getting a promise that he will receive all cognition if he discards his thought (Goethe, 1942). Scientists developed some procedures of modern technology, but the question is if they know all the consequences of its application.

American writer and biochemist Isaac Asimov formulated three regulations of robotics (Asimov, 1950):

First Law – A robot may not injure a human being or, through inaction, allow a human being to come to harm.

Second Law – A robot must obey the orders given it by human beings except where such rules would conflict with the First Law.

Third Law – A robot must protect its existence as long as such protection does not conflict with the First or Second Laws.

We know these general principles of robotics, but also for AI the essence is valid: the human mind and personal responsibility of managers remain in the future as the primary security of the new technologies in practice.

3.2 Indirect consequences of AI in managerial practice

Information systems, physics, chemistry, biology and mathematics are useful for society and companies according to the accepted natural laws. However, if we talk about a man and human society, we cannot reduce it to a biological or physical pattern. The managerial responsibility must regard the universal context of life. Artificial intelligence remains "artificial". The basis of anthropology is that we cannot reduce a man to an animal, much less to an arithmetic system that can be programmed in advance and controlled only according to the invented program. Man is a free being, and the human society (company) is multifunctional, multicultural entity and a living organism. The human being has particular physical and biological functions linked to psychics, mental power of will and spirit. Even responsible manager do not behave as he is supposed to, but how he can, may, and how he wants to be responsible in the frame of any organization or society. The role of ideas, moral thinking, philosophy, culture and religious traditions play an important role. We cannot express the social relations in numbers or codes.

History gives us innumerable examples of how one decides even against his physical, social or economic needs or the meaning of majority. Today, these examples are considered from the moral point of view as heroic and exemplary

This logic brings us to the tension between the philosophical concepts that are so important for the strategic context of AI. As an example, consider the first testing of self-driving cars because it demonstrates the same mentioned ethical problems of AI: Who will be responsible for a possible car crash? Will it be a developer, manufacturer, operator, software? Who should pay for the damages? Insurance company? Who will be insured - and for what? How should this case be approached by a lawyer? How can the police evaluate the personal responsibility in a self-driving car accident? Who can return the lost life of injured pedestrian's? Do such vehicles provide a service to people, or do people become its servants and victims?

In the courses of Business ethics, we teach about a deontological school based on clear principles and rules like the Decalogue: You shall not kill, steal, lie, etc. Who is to be responsible by the system of self-driving cars, when there is not a driver he or she can change the direction or stop when there could be a situation creating a possible accident? What happens when two groups of people appear in front of a car? Which group will be the preference of a vehicle as more important and to be saved? How can the car be programmed when on the street will appear suddenly more different persons? Will the program distinguish the number of potential victims or their different education or age or nationality or religion? What if in one group are prisoners and in the other children from kindergarten? There are so many possibilities on the street and even if the car distinguishes the group of people on the street - who gives the car the right to decide that one person is more valuable than others? Can the vehicle follow the principle of purpose or any logic? There is no algorithm available. The machine itself is not capable of what the only man can do. Only the responsibility of called people and managers can "switch" between long-term value and immediate benefit. For additional reading, there are in professional literature next pointed ethical consequences of AI (Sharkey, 2012).

4 Social and managerial risks by misuse of AI

Psychologist Daniel Kahneman has expressed his *“worry about AIs dark, dystopian possibilities, despite its great potential for good”* for the human society. He pointed out the social dangers of developed AI that reduces the space for the free human decision-making process. According to his valuations, the society and companies will need responsible human judgment to save the threatened power structure in companies, and important institutions.

Authors mentioned in the study of Burrell make us focus on logical risks: “*amplifying cognitive biases, cannibalising livelihoods, disrupting businesses. Those concerns seem to be more than justified*” even when people are aware of many possible positives potentials of AI for solving challenges (Burrell, 2019). Nevertheless, we cannot forget the essential managerial responsibility and the higher standard of organisational behaviour than everyday functioning. It would be to narrow utilitarian perspective.

Finally, as an ethical consequence of AI or similar optimistic ideas of the previous neuroscience, we have to mention the current research of neuro-institutions. The neuro-scientist have no evidence for the positivistic circles of uncritical AI supporters believing that they can reduce the human brain function to a mechanical, material, predictable, programmable and deterministic system. On the contrary, the latest research proves that a man is not a machine - in the long term, he can use his functions of consistency, value orientation in a complicated and changing environment based on education and skills. It also means that a machine (AI) is not a man (Kahnt, Grueschow Speck & Haynes, 2011). The word “intelligence” is more marketing oriented than real responsible terminology. If it should contribute to company processes and social development, we will need the high level of managerial responsibility. Artificial intelligence remains a technological instrument, which must be controlled by higher values and complex understanding of managerial responsibility (function, social and environmental consequences for today and future generations). Some challenges regarding managerial responsibility are actually in two groups the following:

Regarding the limits of algorithms and unrealistic expectation to provide complex results there are threats:

Generally, because of reducing the scientific perspective on a narrow-selected points of views (see above). Such a naturally biased result cannot be perceived as a real complex, relevant and scientific issue.

Separation of statistical algorithms also mean quantitative and qualitative reduction of universal scientific knowledge. In concrete fields e.g. in the health system (e-health) such a reduction produces some threats for human health and lives. (Furmankiewicz, Sołtysik-Piorunkiewicz & Ziuziański, 2104).

The next discoveries of technological threats are discussed in the context of Chinese Company’s like Huawei and other technological institutions suspected in Western society for informational misuse of technological systems and data. Managerial responsibility must consider all ethical consequences of AI inclusive of national security and autonomy today (Fogden, 2018).

This year entailed British parliament's inquiry labelling Facebook as a "digital gangster." Facebook consciously spread fake news and manipulated personal data to increase their own profit (The Japantime, 2019). The managerial responsibility is personal and therefore the politics suggested new strict ethical norms and regulations for all tech companies.

Regarding the absence of ethical awareness and managerial responsibility in AI area are alarming the following points:

- Besides the data are also all the moral and ethical consequences of AI application.
- Relation of AI and autonomous systems to legal system of society.
- Question of personal/institutional responsibility for mistakes of AI working autonomously.
- Challenge of AI in medicine or biological clinics in context of human dignity.
- AI and dangers for state security, data security, bank security and privacy.
- AI and protection against personal intrigues, falsifications, simulation and misuse for dual agenda of third parties, etc. (Solomon, 2016).

Conclusion

The study aimed to describe the critical relationship between artificial intelligence and managerial responsibility. It turns out that technology called AI is in tension with the general and entrepreneurial human mission in society. While the philosophy of human nature (e.g. anthropology) formulates content in detail, in the case of artificial intelligence it is a very young and too ambitious application. Fashion focusing on AI leaves many open social questions and ethical doubts. The study identified the philosophical ideas of AI and attempted to justify the attitude that man is not a machine, and the machine cannot be considered absolutely as a human being. It means that the name "AI" can be considered as somewhat exaggerated and is based on the optimism started in the 18th century and on a mechanism that is not fully perceived by reality.

AI and modern technology have their merits and potential for production, trade and services. However, the management responsible for economic and social sustainability must be aware of some outlined ethical contexts, without human society is narrowing only on technologically controlled functionality. The danger is that hidden functionality can be both manipulated and abusive. Therefore, the study points to alarming ethical implications of non-critical AI promotion through marketing, which promises "intelligence," though it reduces

human originality, freedom and accountability to the automation. The analysis of the philosophical background and consequences of AI warns against threats to free managerial thinking and actions that the mission has to make responsible for all stakeholders. Responsible management must make the stakeholders aware of their corporate, social and environmental implications. Responsible management cannot narrow its perspective solely on technological functionality and futuristic vision based on robotics. Unlike AI, one has specific features and experiences that machines can only imitate in part by selecting individual assignments. Proponents of AI conceal many essential abilities of human intelligence such as consideration, ethical values like human compassion, love, friendship, freedom, moral decision-making, personal responsibility, justice, trust, experience, desires, environmental care etc. AI designs, constructs and manages a person to use AI for the benefit of the company, or to abuse the sophisticated AI systems. Keeping all these developments under control will be a near future for both private companies and state institutions. The level and quality of the future human society will depend on the level of managerial awareness and responsibility.

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FACTORS AFFECTING ENTREPRENEURIAL INTENT AMONG STUDENTS – INITIAL FINDINGS FROM INDIA

Arya Kumar – Shivam Khetan

Abstract

Purpose: Building an eco-system for promoting start-up culture has become one of the key policy thrusts of the government to enhance economic growth and create jobs. This study has attempted to identify the factors that stimulate entrepreneurial intention among students.

Design/methodology/approach: The model of this study includes the effect of demographics, contextual factors and the components of Theory of Planned Behavior (TPB) on the entrepreneurial intention of the students. A sample of 158 students participated in a survey, consisting of questions measuring attitude towards entrepreneurship, locus of control, need for achievement, willingness to take risks and entrepreneurial intention. The data was collected during three weeks in the month of April 2018.

Findings: The findings of the study reveal that need for achievement plays the most crucial role followed by entrepreneurial intentions, locus of control, willingness to take risks and entrepreneurial attitude for inculcating entrepreneurial spirit and mind-set amongst students. MBA students were more prone to entrepreneurial intent when compared to Non-MBA students. The study reveals that entrepreneurial education significantly influences students towards entrepreneurship and motivate them to become an entrepreneur.

Research/practical implication: Our initial observation suggests that formal exposure to entrepreneurship courses and informal outside class activities significantly help in creating entrepreneurial intent among students. Educational institutions need to focus on building an eco-system conducive for entrepreneurship development.

Originality/value: The study is original based on data collected from students pursuing their undergraduate and graduate studies in different years at Birla Institute of Technology & Science (BITS) Pilani. The study has focused on examining entrepreneurial intent amongst students and implications of curricula offered to promote students' interest in entrepreneurship.

Keywords: Entrepreneurship, Start-up Culture, Entrepreneurial Intention, Entrepreneurship Education

JEL Code: L26, M13, I2

Introduction

Entrepreneurship is an attitude, passion, and mind-set that reflects an individual's motivation and capability to identify an opportunity and come out with value proposition by pursuing it, to produce new value and create wealth. This attitude is crucial for competitiveness and encourages innovation. Entrepreneurship is becoming one of the key inputs for economic growth and development in different economies across the globe. It has been empirically proven that growth of micro small and medium enterprises with innovation at the back of it has great potential to create employment as also get scaled up over a period by appropriate deployment of technology (Li & Rama, 2015).

This paper attempts to understand and analyses the dynamics of the factors that influence individuals' intent to take up entrepreneurship as career option amongst students pursuing their higher studies in technical institutions with particular reference to Birla Institute of Technology & Science (BITS), Pilani. The purpose is to identify key factors as also the role that entrepreneurship education plays in inculcating a stronger intent amongst students to take up entrepreneurship as career option. The study would also help in identifying key factors that help in building an eco-system conducive for entrepreneurship development in educational institutions.

1 Literature Review

The Global Entrepreneurship Monitor (GEM) study confirms the relevance and importance of entrepreneurship as a basic tool, in the 21st century, for job creation and generation of wealth, and highlights the fact that growth and economic development are linked to entrepreneurship (Nabi, Holden, & Walmsley, 2010). In this respect, (Thurik, Carree, Van Stel, & Audretsch, 2008) confirm the close relationship between self-employment and the reduction of unemployment rates, in general, and established it more specifically for new Technology Based Companies (TBCs) in times of economic recession (Rasmussen, Mosey, & Wright, 2011). Entrepreneurial action can be understood as any innovative action that, through an organized system of human relationships and combination of resources, is directed towards the achievement of a specific goal (Liao & Gartner, 2006).

There is, however, the important question of whether entrepreneurship can be promoted and encouraged through education. The outcomes of various studies are inconsistent, as some of these studies found a positive impact of entrepreneurship education (Walter & Dohse, 2012), whereas others found evidence that the effects are statistically insignificant or even negative

(Von Graevenitz, Harhoff, & Weber, 2010). A study integrated over 30 years of human capital research in entrepreneurship through meta-analysis based on 70 studies with an overall sample size of 24,733 establishes significant relationship between human capital and entrepreneurial success. Meta-analytic results revealed that effect sizes varied depending on the type of success measure - size was more highly related to human capital than growth or profitability (Unger, Rauch, Frese, & Rosenbusch, 2011).

Certain research studies have also emphasized the difficulties of evaluating the impact and benefits of teaching entrepreneurship in higher education institutions. It was pointed out that much of the entrepreneurial research to date has provided no empirical support for the affirmation that completion of formal entrepreneurial initiative and SME (Small and Medium Enterprises) management courses increases an individual's probability of starting a business (Henry, Hill, & Leitch, 2005). In accordance with this line of thought, it was highlighted that the real contribution that these courses have on entrepreneurial activity remains unclear (Matlay, 2005). However, study has corroborated the positive contribution that entrepreneurship education can have on its participants in terms of skills, knowhow and better entrepreneurial attitude (Packham, Jones, Miller, Pickernell, & Thomas, 2010). There is no agreement on what would constitute a suitable conceptual model for assessing the effects of entrepreneurial education. The understanding of entrepreneurial intentions could enable the definition of this conceptual model and their applications (Martin, McNally, & Kay, 2013).

Entrepreneurial activity has its cognitive origin in individual motivation, and is understood to be the detonating factor, which sparks desired behaviour and obtains energy to support and steer it towards its objective (Haynie, Shepherd, Mosakowski, & Earley, 2010). A research study that has focused its efforts on drivers of entrepreneurial aspirations and the transformation from entrepreneurial aspiration to new venture creation (Shane, Locke, & Collins, 2003). There is evidence that aspiring entrepreneur do have different demographic characteristics such as age, gender, self-employment experience, family background, education background, strength of financial resources, dissatisfaction with hours of work and pay etc. (Kirkwood, 2009).

The factors that determine intentions are attitude, subjective norms, perceived behavioural control, perceived control liability of behaviour, self-efficacy, perceived desirability and feasibility (Bird, 1988). The prominent theories about entrepreneurial intentions are theory about the entrepreneurial event (Shapero & Sokol, 1982); model about entrepreneurial intentionality (Bird, 1988); and theory of planned behaviour (Ajzen, 1991).

This study attempts to identify key factors of entrepreneurial intent in the Indian context and the role of entrepreneurial education to promote business awareness and interest for entrepreneurship amongst students undergoing higher studies in technical institutions.

2 Objectives of Study and Hypotheses

The objectives of this study are to identify key factors that contribute towards entrepreneurial intent amongst students and to examine effectiveness of entrepreneurship education in higher education institutions. Following hypotheses have been developed to be tested empirically:

H1: Internal locus of control positively influences the entrepreneurial intentions amongst students

H2: Risk taking ability is a characteristics present in those who would like to become entrepreneur.

H3: Students with high degree of intent and determination are more inclined towards business activities

H4: Students having positive entrepreneurial attitude are more inclined towards business activities.

H5: Need for achievement plays an important role in determining entrepreneurial success.

H6: MBA students are more prone to entrepreneurial intent when compared to non-MBA students.

H7: Entrepreneurial education significantly influences the development of personality traits of students.

3 Methodology

A questionnaire to administer on the students studying in BITS Pilani was developed based on entrepreneurial intent models of Ajzen's theory of planned behavior (Ajzen, 1991) and model of intentions developed by (Bird, 1988) which considers that entrepreneurial intentions are based on a combination of both personal and contextual factors. The questionnaire was developed in two parts namely - the first part consisted of questions on demographic profile of the respondents and the second part consisted of questions eliciting information about entrepreneurial intent amongst respondents. The first part of the questionnaire captured details such as gender, age, branch and year of study, family business background, if any, business type – manufacturing or service, entrepreneurship courses done, if any, while pursuing their

studies, participation in entrepreneurship related clubs/activities, formation of a company, if any. While the second part of the questionnaire dealt with getting specific responses to the factors affecting overall entrepreneurial intent - locus of control, willingness to take risk, entrepreneurial intention, entrepreneurial attitude and need for achievement. The five personality traits were measured on a Likert scale with possible answers ranging from one (strongly disagree) to five (strongly agree). High scores on these scales indicate that the respondent is more willing to take risks, more creative, has a stronger need for achievement or that he or she tends to assign control to internal factors rather than to external ones. The questions framed for identifying factors affecting entrepreneurial intent are given in Table 1:

Tab. 1: Questionnaire Used to Measure Factors Affecting Entrepreneurial Intent

(For all items we used the following five-point scale: from Strongly Disagree to Strongly Agree)

| S. No. | Measures/Scale |
|--------|--|
| 1 | When things go wrong, I feel luck has no major role to play in my success. |
| 2 | I believe that some things are just the way they are and I need to do something about it |
| 3 | If I do not succeed on a task, I do not give it up. |
| 4 | I believe hard work and persistent effort can lead to success. |
| 5 | I like to try new food, new places and totally new experiences. |
| 6 | I have taken enough risks in the last six months. |
| 7 | I need to know that's been done already before I am willing to try it. |
| 8 | If I am frightened of something, I will try to conquer the fear. |
| 9 | I want to be my own boss. |
| 10 | I want the freedom to express myself in my own business. |
| 11 | I am determined to create a firm in the future. |
| 12 | My professional goal is to become an entrepreneur. |
| 13 | I would rather be my own boss rather than have a secure job. |
| 14 | I believe that one can make big money only if he/she is self-employed. |
| 15 | I greatly enjoy the challenge of creating a new business. |
| 16 | I would rather form a new company than become a manager of an existing firm. |
| 17 | I want to be the best at everything I do. |
| 18 | I will try hard to improve on my past work performance. |
| 19 | I will seek added responsibilities in job assigned to me. |
| 20 | I want to develop myself professionally and personally. |

Scale: 1 – Strongly Disagree, 2 – Disagree, 3 – Undecided, 4 – Agree, 5 – Strongly Agree

The questionnaire was administered over a period of 3 weeks through online method as well as by dropping the hard copy in rooms of the target population in a random manner. In all 400 respondents were approached - 200 through physical mode and another 200 through online mails. 158 i.e. 39.5% of the respondents responded by filling in the questionnaire. Of 158 responses received, 74 responses were received through online survey while remaining 84 were collected physically. While administering the questionnaire; 110 respondents each were picked from 2nd year, 3rd year and 4th year respectively and remaining 70 were picked up pursuing their Master of Business Administration programme (MBA).

The survey contains the mixture of male and female respondents. Students of B.E. 2nd, 3rd and 4th year took part in survey. The students pursuing their MBA programme were in their first year of studies. While picking up randomly the respondents, 15% were females and 85% were males i.e. in proportion to overall female male ratio in the institute. Of the total number of respondents, 86.2% were male and remaining 13.8 % were females, which were in line with overall male female proportion as also the ratio in which male females were approached for responding to the questionnaire.

3.1 Reliability of Data

IBM SPSS statistics version 22 was used to analyse the data. A reliability test of the data obtained from the respondents was undertaken by using Cronbach's Alpha test to measure the internal consistency of a scale. It was found that all variables were found to be reliable, having a **Cronbach's α** of more than 0.70 for entrepreneurial intention, entrepreneurial attitude and need for achievement while it was more than 0.525 after dropping one item in case of locus of control and willingness to take risk.

4 Data Analysis

4.1 Respondents Profile - Gender, Age, Year of Study and Family Background

A total of 21 females and 137 males took part in the survey. Eight out of 21 females i.e. 38.1% who responded to the questionnaire were not at all interested to start their own venture eventually. However amongst males it was 39 out of 137 i.e. 28.5%. Thus, more than 71.5% males and 61.9% females had an intent to enter into a journey of entrepreneurship at some stage or the other.

Of the total respondents, 80.9% were in the age group of 19 to 22 years while remaining 19.1% respondents were in the age group of 23 to 28 years. Respondents below the age of 22 years mainly pursuing their engineering undergraduate studies while respondents above 23 years were pursuing their MBA programme (higher degree programme). Of the students pursuing their undergraduate studies, 46.7% were in the 3rd year of studies out of four or five-year programme while another 25.7% were in their second year followed by 19.7% in first year and 7.9% in fourth year. As per age profile - 123 respondents between 19-22 age group i.e. 67.48% had indicated their intent to start a venture within five years of their completion of studies, while 18 respondents out of 23 i.e. 78.3% in the age group of 23-25 years had indicated their intent to start a venture within five years of their degree completion. The four respondents out of six in the age group of 26-28 years indicated their intent to start a venture. Thus, it appears that because of a big budge about entrepreneurship amongst youngsters and the success stories that are being covered regularly in the media - print and audio visuals; youngsters have been impacted to think in terms of starting their own ventures; irrespective of whether they are prepared to face the upcoming challenges in this journey or have a concrete idea that could be converted into an opportunity. This impact of entrepreneurship budge is also evident from declining proportion of students as they move to 2nd, 3rd or 4th year of undergraduate studies. It was 84.6% respondents from 2nd year of their studies, 60.6% from third year of their studies and only 58.3% from 4th year of their undergraduate studies who expressed their intent to start a venture sooner or later within a period of five years or beyond after completion of their studies.

Of the total 158 respondents, 31.6% had a parental business background and remaining 68.4 % did not had any business family background. Of the total 158 respondents, 111 (70%) respondents had indicated their intent to start a business; implying that majority of respondents seems to be having no business background and still had an intent to start a business.

4.2 Factors contributing to Entrepreneurial Intent

The analysis responses received from 158 respondents are presented in Table 2 and 3. It may be observed that highest mean score of 4.42 was for Need for Achievement which contributes towards success as an entrepreneur. However highest need for achievement was coupled with least mean score of 3.36 for entrepreneurial attitude followed by willingness to take risk at 3.54, locus of control 3.78 and entrepreneurial intention 3.82. All the five factors were found to be significant with 95% confidence interval. Thus, above five hypotheses H1 to H5 were accepted based on statistical results arising from the sample and need for achievement contributes most

important role in determining entrepreneurial success followed by entrepreneurial intent and locus of control. One of the key factor that could be responsible for having favorable intent of the group towards entrepreneurship could be the flexibility that educational system provides to take courses that a student loves and enjoys as well as outside the class room opportunities that these students get through participation in different clubs managed by the students from conceiving an idea, planning to execute it and effectively execute it by building a harmonious team.

Tab. 2: Significant Factors Affecting Entrepreneurial Intent

| Variable | Mean | Standard Deviation | 95 % CI* |
|---------------------------|------|--------------------|-----------|
| Locus of Control | 3.78 | 0.64 | 3.43-4.42 |
| Willingness to take risk | 3.54 | 0.60 | 3.52-3.96 |
| Entrepreneurial Intention | 3.82 | 0.87 | 3.08-4.66 |
| Entrepreneurial Attitude | 3.36 | 0.96 | 2.63-4.20 |
| Need for achievement | 4.42 | 0.55 | 4.10-4.91 |
| | | | |

* Values at 95% confidence interval

Tab. 3 - Difference Entrepreneurial Intent between MBA and Non-MBA Students

| Variables | Mean | | T- value** | P value |
|---------------------------|------|---------|------------|---------|
| | MBA | Non-MBA | | |
| Locus of Control | 3.00 | 2.99 | 0.70 | 0.4850 |
| Willingness to take risk | 3.78 | 3.48 | 6.63 | 0.0010* |
| Entrepreneurial Intention | 4.01 | 3.77 | 4.64 | 0.0010* |
| Entrepreneurial Attitude | 3.41 | 3.35 | 0.91 | 0.3643 |
| Need for Achievement | 4.53 | 4.40 | 3.52 | 0.0005* |

* p<.05 , ** T values at 95% confidence interval

The hypothesis H: 6 was accepted, implying that MBA students are more prone to entrepreneurial intent when compared to Non-MBA students; in general as evident from difference in means under five factors. However, the difference in the mean score between MBA and Non-MBA students for locus of control and entrepreneurial attitude were found to be very low and p values were above .05; thus do not significantly affect their intent to become entrepreneur as compared to Non-MBA. However, MBA students are found to have more risk taking ability, more entrepreneurial intention and attitude towards entrepreneurship that had

p values of less than .05 also. In addition, the need for achievement is more in MBA students as compared to Non MBA students. This reveals that pursuing an MBA after graduation or after spending a few years in job gives greater confidence in an individual to plunge into taking risk for venture creation. Further MBA education also equips an individual with multiple behavioral and financial knowledge as well as skills that helps in systematically executing a business plan into reality.

It is observed over years that in a batch of around 800 students passing out each year from BITS Pilani; it is only 25-30 students that is around 3.1% -3.75% students who are very clear headed to start their venture and hence opt for not sitting in campus placements. This is also a group of students who avail multiple opportunities on campus to prepare themselves to plunge into a journey of entrepreneurship; including a course titled “New Venture Creation” wherein a group of 2-4 students undertake a specific idea and go through the course under different modules along with mentoring support to take it to prototype, design, or launching a venture stage. The outcome of analysis of data on entrepreneurial intent with or without formal education/training on entrepreneurship is presented in Table 4.

Tab. 4: Entrepreneurial Intent with or without formal education /training about entrepreneurship

| Factors | Mean | | T- value** | P- value |
|---------------------------|---|-----------|------------|----------|
| | Took courses and partici-pated CEL activities | No course | | |
| Locus of Control | 3.09 | 2.99 | 2.47 | 0.0146* |
| Willingness to take risk | 3.89 | 3.52 | 4.74 | 0.0010* |
| Entrepreneurial Intention | 3.93 | 3.81 | 1.27 | 0.2060 |
| Entrepreneurial Attitude | 3.68 | 3.34 | 3.63 | 0.0004* |
| Need for Achievement | 4.45 | 4.44 | 1.95 | 0.0500* |

* p<.05, T values at 95% confidence interval.

The study reveals that entrepreneurial education significantly influences the development of the personality traits of students and motivates them to become entrepreneurs in general. The p value in case of entrepreneurial intention was greater than .05; implying that this factor is not much influenced by entrepreneurship education and therefore does not significantly contribute to entrepreneurship development. However, mean score for the need for achievement was found to be almost the same amongst both groups of students namely the ones who have undergone entrepreneurship courses and programmes and those who did not.

This indicates general characteristics of students who are admitted in BITS purely through merit and have to be extraordinary lot to get through admission process of BITS. Those who took courses on entrepreneurship and/or participated in Center for Entrepreneurial Leadership (CEL) activities on campus had higher mean score under all factors compared to the ones who did not. BITS had set up a CEL in the year 2002-3, which was recognized as one amongst top five institutions as founding institution of National Entrepreneurship Network (NEN) picked up out of more than 200 institutions who competed for the same. The vision of CEL is “To create Entrepreneurial Leadership in all spheres of life”. This center formally worked for creating an eco-system on campus to inculcate entrepreneurial spirit amongst students and faculty.

The Center for Entrepreneurial Leadership is involved in a variety of activities and programs within the ambit of leveraging BITS strengths. The activities are focused on key deliverables of the center by an integrated approach to entrepreneurship development. Various activities and programs for development of entrepreneurship eco-system constituting mainly six pillars - Entrepreneurial Education and Research, Entrepreneurship Education Development Programmes, Entrepreneurial Student Activities, Publications on Entrepreneurship, Technology Business Incubator and Alumni Networking Events. The institute has set up Technology Business Incubator that supports budding entrepreneurs in developing their product, services or process ideas that can be taken to market. It provides office and lab space equipment, seed funding, intellectual property management services, financial and advisory services, and mentorship from an international network of successful business leaders and alumni entrepreneurs to nurture and improve success rate of start-ups.

Conclusion

This study attempted to identify critical factors that contribute to entrepreneurial mind-set such as their attitudes, beliefs and achievement motivation amongst students studying in BITS Pilani at undergraduate level and pursuing their Master of Business Administration (MBA). The study reveals that intent seems to be relatively higher amongst males as compared to females to start their own venture. All the five factors were found to be significant contributing to entrepreneurial intent namely locus of control, willingness to take risk, entrepreneurial intention and attitude and need for achievement. The general tendency to become entrepreneur among MBA students was found to be more than non-MBA students were. The most dominant factor was found to be the need for achievement for entrepreneurial spirit and intent. Those who took courses on entrepreneurship and/or participated in the Center for Entrepreneurial Leadership

activities on campus had higher mean score under all factors compared to those who did not. It is only 25-30 students that is around 3.1% -3.75% of total strength who are very clear headed to start their venture and hence opt for not sitting in campus placements.

The study reveals that students' participation in entrepreneurial courses and events on entrepreneurship organized by the CEL lead to a significant increase in their positive attitude towards entrepreneurship and intent to become an entrepreneur. This is also corroborated that attitude towards entrepreneurship partly derives from prior exposure to entrepreneurial activity and affects intentions through changing attitude (Shapero & Sokol, 1982).

Thus, the study reveals that educational systems need to come out with innovative courses, programmes on a continuous basis that helps in strengthening entrepreneurial intent, and improvises success of a venture by minimizing the risks.

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THE SOCIAL RESPONSIBILITY OF PROFESSIONAL FOOTBALL CLUBS IN THE CZECH REPUBLIC

Vilém Kunz – Michal Tomčík

Abstract

Purpose: The purpose of this article is to provide a description of the situation regarding the application of CSR principles in professional football, whereby particular attention will be paid to the most significant European league competitions. In addition, the authors have also focused on ascertaining the current situation in this area with regard to the participants in the Czech premier football league.

Design/methodology/approach: The authors have based this article on the combination of the conclusions of a secondary data analysis, a website content analysis and an empirical investigation based on a series of semi-structured interviews. The main analytical categories involved the areas of focus for the CSR activities and the methods of CSR communication on the websites.

Findings: It is apparent that significant differences exist between the degree to which the application of CSR principles has been included in the management practices of the clubs in the most significant European league competitions and in the Czech football league. In most Czech clubs, however, this currently mainly involves the realisation of some partial CSR activities in the area of charity, but without any links to the clubs' key management systems.

Research/practical implications: The achieved findings may constitute a valuable reflection on the further targeting of CSR initiatives, not only on the part of the managers of clubs which are active in the top domestic football league, but also on the part of the representatives of the football governing bodies in the Czech Republic

Originality/value: The article's added value not only lies in the acquisition of the first comprehensive overview of the current status of CSR engagement in Czech football, but also in the partial comparison with the situation in the Western European football environment.

Keywords: Social Responsibility in Sport, Football, Premier League, Fortuna League

JEL Codes: M14, Z29

Introduction

The area of social responsibility in sport has come to the forefront of interest of not only sports entities (the clubs, the executive bodies, the league competitions, etc.), but also theoreticians and researchers. A number of them (Walters & Tacon, 2010; Babiak & Trendafilova, 2011; Kunz, 2018) are of the opinion that professional sports clubs nowadays should consider social responsibility (Corporate Social Responsibility, hereafter simply referred to as CSR) as an integral part of their management and one of the effective paths towards developing their relationship with their stakeholders, just like companies in other branches of industry.

Top-flight sports clubs in particular are exposed to intensive interest and inspection on the part of the mass media or the wider public, which constantly receives information from the mass media about almost everything associated with the clubs' activities. In practice, this involves a wide range of associated questions, no matter whether they take the form of increased attention with regard to any possible unethical practices or the strong interest of the fans in the social aspects of sports organisations' operations, which the management of said sport organisations must currently concern themselves with to a much greater degree. According to experts (Levermore & Moore, 2015; Kulczycki, Mikas & Koenigstorfer, 2017), there are many rational reasons for the close integration of sport and CSR or for the use of sport as a suitable means for CSR. One such reason is the highly significant role which sport plays in today's post-modern society, which may also be put to effective use when resolving various social problems (Levermore & Moore, 2015). Moreover, very strong affective links are often created between sports organisations and their fans, from which not only sponsors can benefit, but also the surrounding society. Smith and Westerbeek (2007) have identified some unique characteristics of sport from the point of view of its use as a suitable CSR tool, which include, for example, the interest of the mass media, the attractiveness of sport for young people, the positive health impacts of sport or the fact that sport contributes to improved cultural understanding and integration. Many other significant international studies have also endeavoured to identify other possible motives for the inclusion of sports organisations in CSR activities.

For example, this may involve efforts to (Babiak & Trendafilova, 2011; Kunz, 2018):

- offer added value to existing sponsors or increase the chances of attracting new long-term sponsors,
- acquire new financing options,
- save on operating and energy costs,
- better manage any potential risks,
- differentiate themselves from other sports organisations or to endeavour to acquire significant competitive advantages.

Most local teams in the most significant professional league competitions on the American continent (for example, the NBA, NHL or MLB) have been involved in some CSR areas for many decades. This especially involves various philanthropic and community activities (for example, the NBA Cares initiative or the NHL Hockey Fights Cancer program). In European professional sport, CSR initiatives have mostly been developed in the football environment due to the game's enormous popularity and they have involved activities undertaken by the European football governing organisation, UEFA, the most significant league competition in England (the Premier League) or in Germany (the Bundesliga) and also by independent Western European football clubs. In recent years, some CSR initiatives have also come to light in Czech football, specifically as a result of the activities of the League Football Association and some of the domestic professional football clubs.

1 CSR in professional football

Various CSR activities have mainly been developed with increasing intensity in the professional football environment since the beginning of the new millennium. A number of significant problems and scandals in professional football (for example racism in football, football hooligans and violence at stadiums, the increasing indebtedness at some clubs and a lack of transparent management, corruption or match fixing) on the one hand and a growing need to take into account the interests of all the participating parties (for example, the sponsors, the fans or the municipalities) during the strategic management of football clubs on the other hand have given rise to the impulse to take a far greater initiative in this area (Baena, 2018; Kulczycki, Mikas & Koenigstorfer, 2017).

1.1 International football governing bodies and CSR

Increased efforts in the area of CSR initiatives have mainly become apparent in recent years on the part the main international football governing bodies, FIFA and UEFA.

FIFA is one of the largest international sports federations in the world. It currently encompasses more than 200 national football associations. FIFA's mission rests on three main pillars, one of which (Building a better future) concerns initiatives associated with CSR. FIFA's activities in the area of CSR are being continually developed in the following key programs (FIFA, 2018):

- Football for Hope – this initiative endeavours to utilise the potential of football while eliminating obstacles to social development by supporting community projects throughout the entire world.
- Football for the Planet – this is FIFA's environmental program, whose main goal is to alleviate the negative impact of any realised activities on the environment
- Fair play – a program which endeavours to promote the worldwide development of football in the spirit of fair play.
- The fight against racism and discrimination – FIFA's efforts to fight against racism and all forms of discrimination.
- UEFA's CSR programs mainly focus on the fight against racism and discrimination, especially the promotion of peace and diversity, on solidarity programs and social integration, support for health and a healthy lifestyle, the development of a dialogue with fans or support for environmental protection. UEFA has also gradually created its own committee for justice and social responsibility which falls directly under the jurisdiction of the executive committee and it has also made a long-term commitment to set aside 0.7% of its annual earnings for CSR projects every year (UEFA, 2018).

UEFA also tries to monitor the situation in this area with regard to its members. One such example is the comprehensive research project realised in 2011, which 43 national European football federations and 112 European football clubs were involved in (Walters & Tacon, 2010).

The research results showed that:

- Even though the majority of the national federations contribute to a number of CSR initiatives with various involved parties, less than half of them have drawn up a formal CSR strategy (39%).
- There are a number of significant differences between the individual clubs with regard to the types of CSR activities which have been implemented.
- CSR initiatives are mainly used to support social projects, which are most frequently targeted at local communities, children and young people or cooperation with schools.

1.2 Support for CSR initiatives in European football

A number of initiatives are helping to spread CSR ideas in European football. One such initiative is the Responsiball project which is based on the philosophy that professional football clubs are more than just business units. They are significant cultural institutions, which often have a unique standing within the community and at the same time have great potential to bring social value (Responsiball, 2018). This initiative has been realised by the Swiss Schwery Consulting Company which has evaluated the CSR in selected top, professional football competitions every year since 2011. As such, it compiles a ranking of the best league competitions in the area of CSR. The evaluation of the degree of the football clubs' engagement in the area of social responsibility focuses on three main areas, which are (Responsiball, 2018):

- The club management and executive – the evaluation especially takes into account the compliance with the principles of responsible management and administration.
- Engagement in the community and cooperation with communities – including the evaluation of the cooperation with the fan communities.
- Environmental protection.

The table below shows the top ten Responsiball rankings for the 2016/2017 season, including the order in the individual CSR areas (Responsiball, 2018):

Tab. 1: Responsiball Ranking Table, Season 2016/17

| Position | Country | League | Score | Score for Governance (Subposition) | Score for Community (Subposition) | Score for Environment (Subposition) |
|----------|----------------|----------------|--------|------------------------------------|-----------------------------------|-------------------------------------|
| 1 | Denmark | Superliga | 46,88% | 60% (1) | 70% (1) | 11% (5) |
| 2 | England | Premier League | 41,01% | 45% (3) | 66% (2) | 12% (4) |
| 3 | Germany | Bundesliga | 37,74% | 28% (7) | 57% (3) | 28% (1) |
| 4 | Scotland | Premiership | 32,71% | 41% (4) | 54% (4) | 3% (12) |
| 5 | USA | MLS | 31,87% | 25% (10) | 52% (5) | 22% (2) |
| 6 | Spain | La Liga | 29,49% | 45% (2) | 39% (8) | 5% (9) |
| 7 | Netherlands | Eredivisie | 28,74% | 33% (6) | 45% (7) | 8% (7) |
| 8 | Japan | J-League | 28,29% | 15% (18) | 49% (6) | 21% (3) |
| 9 | Brazil | Série A | 21,67% | 40% (5) | 20% (18) | 5% (8) |
| 10 | Austria | Bundesliga | 21,47% | 25% (9) | 37% (9) | 1% (16) |
| 23 | Czech Republic | First League | 9,95% | 13% (23) | 16% (20) | 0% (20) |

Source: Responsiball, 2018.

The Czech premier football competition last appeared in the Responsiball rankings in the 2013/2014 and 2014/2015 seasons, when it occupied the penultimate position in both seasons.

The European Football for Development Network (EFDN) constitutes yet another significant CSR initiative linked to the European football environment. The idea at the heart of this initiative, which was established in the Netherlands in 2014, involves enabling football clubs from all countries in Europe to be able to work together or to share their knowledge and experiences in the area of CSR (emphasis is especially placed on the area of assisting in the resolution of social questions and the problems of local communities). The EFDN members include one Czech representative, namely Sparta Prague.

1.3 CSR in English and German football

The following section provides more detail pertaining to the application of CSR in the English Premier League and the German Bundesliga, which are currently two of the most significant football leagues on the European continent and at the same time have long been engaged in the area of CSR (Anagnostopoulos, Byers & Kolyperas, 2017).

The wave of hooliganism and violence in English football stadiums at the beginning of the 1980s became a very fundamental impulse for the wider expansion of CSR in English football. (Walters & Tacon, 2010). At the same time, it forced football's executive bodies and

the football clubs in England to implement much more comprehensive solutions to these problems, including the need to foster a generation of responsible fans by means of government programs supporting fellowship between the clubs and their surrounding communities (this especially involved the *Football in the Community* program).

English football clubs have long had one of the most developed CSR programs in European sport, especially in the area of community. This has also been borne out by the results of research analysing the CSR programs of English Premier League clubs (Rosca, 2011; Walters & Tacon, 2010; Kolyperas, Morrow & Sparks, 2015). Almost 600 CSR programs were realised in the Premier League in the 2016/2017 season, whereby the top five clubs with the greatest number of CSR programs included four clubs from London (Chelsea, Arsenal, Tottenham, Fulham). The size of the city and the scope of the surrounding communities may be one of the explanations for such a strong involvement of these London clubs in cooperation with their surrounding communities. A further significant factor may be the role which the clubs play in their communities. The financial strength of the clubs is also a significant factor: after all, Arsenal and Chelsea, which are the most active in the area of CSR in England, have been ranked among the richest Premier League teams in recent years. The focus of the clubs' CSR projects on community areas can be categorised in seven main types which are: educational programs, sports programs, charity programs, social inclusion programs, programs for families, health programs, cultural integration programs (Rosca, 2011).

The English Football Association (FA), which is the supreme executive body for English football, is also endeavouring to utilise the fact that football has a unique place in British society which means that it may be used as a driving force in support of "good". Moreover, commercial organisations in England have also begun to increasingly recognise the advantages which inclusion in CSR partnerships in the area of football can offer them. For example, the well-known British Barclays bank has significantly developed its cooperation with the Football Foundation, which is one of the biggest sports foundations in England (Kolyperas, Morrow & Sparks, 2015).

As far as the situation in the area of CSR in German football is concerned, a number of leading German football clubs also participated in charity matches in support of the needy in the relatively distant past. This usually involved classic one-off fundraising events in response to current problems or which endeavoured to assist the surrounding communities. Similar charity events can admittedly also be seen in some Bundesliga clubs today, but in recent years the majority of them have begun to approach the questions of social responsibility in a much more strategic manner. German clubs usually have clearly defined main priorities and goals for

their CSR, they systematically evaluate how these goals have been met and they undertake regular CSR reporting (Hildebrandt, 2014).

The majority of CSR activities undertaken by German clubs can especially be found in the social area. Most Bundesliga clubs have established independent legal entities to support these activities. This involves foundations in most cases. The oldest of them is the Fritz Walter Foundation, named after a legendary player of the local 1. FC Kaiserslautern team, which was established in 1999. Most of the foundations are mainly involved in regional projects. A large part of the CSR projects undertaken by German clubs focuses on working with children and young people. Support is given to education and school projects, where the clubs cooperate with various types of schools, or to other extracurricular projects which support physical activity in children. German clubs are endeavouring, for example, to develop projects, which try to help children and their families in emergency situations, including the integration of minorities, or projects aimed at the prevention of violence (Reiche, 2013).

German football clubs have long endeavoured to support projects associated with renewable energy, while SC Freiburg, for example, was the first Bundesliga club to install photovoltaic equipment on its stadium roof as early as in 1995. A number of clubs deliberately purchase green electricity (for example VFL Wolfsburg).

In addition to the activities of the individual German clubs, social responsibility is also supported by the German Football League (DFL) and the German Football Association (DFB). In 2009, the DFL established the Bundesliga Foundation (Bundesliga Stiftung) which, like the English Football Foundation, not only endeavours to help the clubs during the application of their CSR principles, but also realises its own CSR projects, usually at a national level. The German Football Association (DFB) has also established several foundations in support of CSR projects, the most significant of which include the DFB Sepp Herberger Foundation (Hildebrandt, 2014).

1.4 CSR in Czech professional football

The websites of the League Football Association (LFA) and the sites of all sixteen teams in the premier football league in the Czech Republic have been analysed in order to ascertain the area of support for social responsibility projects in Czech football. Main categories of the content analysis were: existence of a separate CSR section on the website (yes/ no), CSR focus (social, environmental, economic), amount of carried CSR activities (number of individual projects), thematic focus of the presented projects (e.g. areas of sport, education, cultural events), CSR

target groups, CSR manager in the club (yes/ no) and existence of CSR strategy implementation (yes/no).

As far as the LFA, which is the association of professional football clubs in the Czech Republic, is concerned, its engagement in the area of CSR or its initiatives in this area have only been apparent in recent years. The first CSR initiative of the LFA was a program launched in 2013 under the name Green Life, which is still operating in the current 2018/19 league season. Its main goals not only include providing information about the charitable activities of the participants in the premier football competition in the Czech Republic, but also generating funds for good causes.

As far as the CSR involvement of the top-flight football clubs in the Czech Republic is concerned, our analysis has shown that only some of them are systematically involved in CSR initiatives. Nine of the sixteen top-league clubs in the Czech Republic have information about their CSR activities on their websites, while this is most commonly found under the “about the club” tab or in one of its sections (FK Zlín, FK Jablonec, Sigma Olomouc, Dukla Prague, Sparta Prague and FK Plzeň). Only two clubs (FK Teplice and Fastav Zlín) have created an independent tab on their website’s homepage which is dedicated to their CSR activities. The naming of these tabs or sections, which provide information about the clubs’ CSR, corresponds to the main contents of their given CSR activities. They are most frequently labelled as “We are helping” (FK Zlín, FK Jablonec, FK Plzeň, Olomouc), which also corresponds to the results of a number of undertaken research projects which found that professional football clubs most frequently involve themselves in charity projects in the area of CSR. SFC Opava has a section on its website called “a transparent club”, which has most probably been determined by the fact that the majority stakeholder in the club is the City of Opava. It includes a summary of how the grants provided to the Opava club by the city have been put to use. The section devoted to the area of CSR on the FK Dukla Prague website bears the name “Dukla passes the ball” and it especially presents the CSR activities realised in cooperation with non-profit partner organisations. The CSR section on the website of FK Teplice is called “More than football” and according to our findings it presents the most comprehensive picture in this Czech Republic of not only the club’s own activities in this area, but also, for example, the CSR initiatives of the FIFA and UEFA.

As far as the target groups of the football clubs’ CSR activities are concerned, the majority of the CSR programs are focused on key stakeholders. The programs most frequently focus on the target group of children and young people from the surrounding communities. In addition, the majority of clubs which are involved in the area of CSR have also developed

activities focused on supporting the ill and the handicapped, cooperating with preschool and school organisations or focusing on the target group of senior citizens. An analysis of the focus of the clubs' CSR programs has shown that clubs have so far been most involved in charitable projects, which can be ascribed to the fact that they represent one of the simplest ways for the clubs to financially or materially support their surrounding communities. In addition, a number of clubs are also involved in sports programs in the area of CSR. This is probably determined by the fact that their realisation is often easier for football clubs, because they own the necessary resources and skills to support these programs, especially if they involve football.

In comparison, for example, with the football clubs from the English Premier League, football clubs in the Czech Republic have yet to realise any cultural integration programs focused on the integration of citizens of different nationalities. Similarly, none of the Czech clubs has yet become involved in any social integration programs which would endeavour, for example, to assist individuals who have difficulties when looking for employment or to integrate some groups of individuals who have been excluded from. Unlike Western European football clubs, which have created independent foundations to support their CSR activities in the majority of cases, only AC Sparta Prague has so far created an independent foundation in the Czech Republic.

An analysis of the CSR engagement of the individual clubs in the Czech Republic's top football league has shown that this is currently only a marginal area for the majority of clubs. It is possible to characterise the CSR policy at FK Teplice as being the most systematic and comprehensive approach to CSR which clearly shows that this area has become an integral part of the club's strategic management. Closer attention has therefore been devoted to the presentation of this approach to CSR in the following sub-chapter, while the results of our own research undertaken among selected representatives of this club will also be presented there.

1.5 The approach to CSR at FK Teplice

In order to clarify the CSR activities undertaken at FK Teplice, we performed a content analysis on the club's website and on the results of our own empirical research based on a series of semi-structured interviews. In the content analysis, we had focused on the same criteria which were mentioned in section 1.4 of this paper. Our questions concerning CSR implementation were answered by the club's board of directors, club management (club manager, marketing manager, sales manager, sports manager, head of the youth section, A-team coaches, PR and marketing specialist, economic manager). Altogether, our questions were answered by 15 men and 1 woman. The interviews were focused on awareness of the carried out activities, opinions

on their focus, their evaluation and possibilities of future utilization of CSR in the life of the club.

The club's top management (all of the members of the Board of Directors), the club management (for example the club manager, the marketing manager, the sales manager, the sports manager, the head of the youth section, the club's marketing and PR specialist and the club's economic manager) answered our questions concerning the implementation and application of CSR at the club. A total of 15 men and 1 woman answered our questions.

Their average age was 39 and two thirds of the respondents had completed tertiary education, while one third had completed their secondary school education with the school leaving exam. 13 of the respondents have been working with the club for more than 3 years.

Only half of the respondents knew for sure that FK Teplice had a formulated club mission and goal. This involved the representatives of the club management, while the regular employees were unaware of this. Similarly, only the representatives of the club management knew the contents of the CSR strategy. In comparison with other football clubs in the league, they were admittedly aware of their club being called the most active in the area of CSR, but the employees' awareness of the specific club activities which fell under CSR was not 100%. Only 7 of the 16 respondents were able to give a specific example of a project which was currently being realised in Teplice. In the opinion of the respondents, the value of the professional club's brand was mainly influenced by several circumstances which are: the level of work with young people, the current sports results, credibility (reputation), the transparency of the club.

On the contrary, the respondents were of the opinion that the CSR activities and assistance provided to the surrounding communities had the lowest impact on the value of the club's brand. It is interesting that we found these attitudes in a club which has been involved in CSR projects for a number of years and which ranks as one of the most active organisations in the Czech football league in this regard. Even though the club representatives were of the opinion that the realisation of CSR had no significant influence on the value of the club's brand, almost half of the respondents considered the activities undertaken in the field of CSR to be of strategic importance for the further activities in the club.

The contacted representatives were very realistic when evaluating the benefits of CSR. They ranked the improvement in the relations with the municipalities, the improved reputation of the club and the option of acquiring further sponsors via CSR among the main benefits of realising CSR for a sports club. On the other hand, they were restrained when evaluating the effects of CSR for the club in areas such as the players' judgement of the club, increasing

the loyalty to the club on the part of the existing fans or increasing spectator loyalty. Therefore, the club representatives were of the opinion that the public tended not to appreciate or perceive the realisation of the CSR. On the other hand, despite the apparent scepticism (realism) in the perception of the effects from realising CSR for a football club, all of the respondents were of the opinion that FK Teplice should utilise its privileged position in the region and should support (realise) socially responsible or charitable projects. It seemed that the respondents were of the opinion that the most ideal projects were those with an exclusively regional focus. According to the respondents, the target groups which would be deserving of attention during the realisation of any club CSR projects unequivocally included young people, children from children's homes, senior citizens, the handicapped and former sportspeople who were in need of assistance. The focus of any realised CSR projects should also be unequivocally associated with the purpose of the sports club's existence. As such, programs supporting health and a healthy lifestyle encountered the most significant support from the representatives of FK Teplice with whom we spoke. On the other hand, the target groups with whom the club's projects should not be associated included the socially weak, ethnic minorities and at-risk groups in the population.

The clear majority of the club's representatives preferred the realisation of projects undertaken in association with organisations and not with specific individuals, because they were of the opinion that this type of project would be of greater social benefit. Similarly, the majority of the club's employees were able to conceive of the club's jerseys including the logo of a foundation. As such, the club would be able to provide both financial and material support for any such foundation's activities, as well as promotional support, during the realisation of any further CSR projects. In the opinion of the respondents, the A team players should especially be much more involved in any future projects and they were also of the opinion that the greater involvement of the fans would also be a challenge for the future.

The aforementioned results of our own research, as well as the analysis of the CSR activities at FK Teplice, a stable participant in the top football league, have shown that the club is endeavouring to make a long-term commitment to a wide range of CSR initiatives.

This fact has also apparently been strongly determined by the philosophy of the club's majority shareholder, the Japanese AGC glass group. The group has declared that it perceives its support for football in Teplice as an integral part of its regional social responsibility. The increasing involvement of the club in the area of CSR has also been gradually projected into its organisational structures and in 2018 FK Teplice not only became the first football club, but also the very first professional sports club in the Czech Republic to establish the position of

a CSR manager. In addition to its support for individual CSR initiatives, FK Teplice especially strives to ensure that its finances remain sustainably in the black, which it perceives as a fundamental pillar of its responsibility. The club endeavours to ensure maximum transparency and as such it was the first club in the Czech Republic to publish its players' salaries in 2017.

The way this club communicates the problems associated with CSR to its key stakeholders can also be considered to have been very well worked out. FK Teplice systematically communicates its CSR programs and individual CSR activities not only on its website, but also through social networks or at lectures which focus on both the internal and the external stakeholders.

Conclusion

Social responsibility in sport has become a significant and highly interesting topic in recent years which is beginning to be subjected to increased attention not only on the part of the academic sphere, but also in actual sports practice. It can be expected that this area will also provide many new perspectives for further study in future and opportunities for the further effective application of CSR principles in the practice of sports organisations due to the role which sport plays in today's post-modern society.

The focus of the clubs' CSR projects on community areas can be categorised in seven main types which are: educational programs, sports programs, charity programs, social inclusion programs, programs for families, health programs, cultural integration programs (Rosca, 2011).

In the opinion of the respondents, the value of the professional club's brand was mainly influenced by several circumstances which are the level of work with young people, the current sports results, credibility (reputation), the transparency of the club.

CSR activities of Czech football clubs are implemented especially in the social area namely on charity projects which – on the contrary to western European football environment – are not carried out by independent club foundations. So far, very occasionally, CSR projects requiring higher demand on knowledge and skills in this area or development of stronger social partnerships (be it educational projects or social inclusion) have been found. In Czech professional football, projects against violence, vandalism or racism have not been included yet compared to their common occurrence in the English football league or UEFA. Only a minimum of CSR activities in the environmental field have been implemented at Czech clubs in comparison to neighbouring Germany. To name several green activities organized by Czech

clubs: e.g. introduction of a combined ticket (entrance and public transport on the day of the match) or reusable drinks cups for fans. None of the Czech first league clubs has started to report about their CSR activities in coherence with the International reporting standards (GRI); nevertheless, the opposite would help them significantly with streamlining their CSR activities.

The authors are fully aware of certain limitations of the presented results. That is the reason why they would like to investigate the issues based on interviews in all first league clubs in the Czech Republic in the future. Especially, with those not yet implementing, it will be interesting to verify the rationale for the situation.

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PRODUCT MANAGERS FOR THE DIGITAL AND COLLABORATIVE AGE

Georgy Laptev – Dmitry Shaytan

Abstract

Purpose: The objectives of the research are (1) to identify the key universal competencies (qualities, personal characteristics and abilities to carry out professional activities successfully) of product managers to work in digital and collaborative environment successfully, as well as to (2) create effective training program based on human-centered design and project based learning approaches for development of these competencies.

Design/methodology/approach: The key universal competencies were identified and validated with the means of in-depth interviews and working day observation of 57 experienced product managers and using content analysis and expert assessment. The training program based on design thinking and project based learning approaches to develop such competencies of nascent product managers was created. To evaluate the effectiveness of the program the pre- and post-surveys of the 20 nascent product managers were administered with 95% response rate. The data was analysed using statistical method, i.e. calculation of the mean, standard deviation, mean difference and a paired t-test. The research was held in 2018 and took 5 months for all stages.

Findings: Empirical research revealed the key universal competencies of product managers involved in innovative product development and working in digital and collaborative environment. The design thinking, project based learning in combination of usage of a digital rapid prototyping technique have proven to be effective tools to develop these competencies.

Research/practical implications: The competencies identified in our initial research can be used in Assessment Centre method for (1) identifying people who are potentially capable for professional activity in the field of management of innovative product development, and for (2) assessment of existing product managers to evaluate their effectiveness.

Originality/value: Presented study demonstrates the set of key universal competencies of product managers and contributes to identify, assess and train people for professional activity in management of innovative product development using agile, lean and system design thinking formats and modern digital rapid prototyping technique.

Keywords: Product Management, Competencies, Digital, Collaboration and Design Approach

JEL Codes: O32, M11, M53

Introduction

Successfully created innovative products help companies to be relevant to customers, create long-term loyalty and, thus, ensure profitability and business growth. Modern consumers (27%) demonstrate a growing “appetite” for innovative products that simplify their lives and more than half (57%) say they purchased a new product during their last trip to the store (The Nielsen Company, 2018; The Nielsen Company, 2015). However, despite the customers/users interest in innovation and carefully conducted marketing, 80% out of more than 30,000 new consumer products launched every year is failed (Christensen, Cook, & Hall, 2005). According to the Nielsen study, the failure rate is about 80-85% (Malek & Melgarejo, 2018). The study of the Product Development and Management Association (PDMA) showed that the number of failures varies by industry, but even in the best case it is no less than 35%. Among the dozens of reasons why a particular product fails (high price, poor design, etc.), a high level of failures of innovative products comes down to misunderstanding who are users/customers/clients and what they really want. In reality asking customer about new product not always result in the desired results, in particular when a radically new (breakthrough) product is created (Un, Cuervo-Cazurra, & Asakawa, 2010). The main reason for the failures is associated with problems in management of innovative product development, in particular, managing at its initial stage of complete uncertainty, called *fuzzy front end of innovation* (Gassmann & Schweitzer, 2013; Koen, Bertels, & Kleinschmidt, 2014; Pereira , Ferreira , & Lopes , 2017). This is the most crucial stage in the creation of an innovative product where its main features and functionality are set. Successful product management at this stage is the issue for entrepreneurial companies. Possession of modern product management approaches and the right competencies become decisive essences for success in innovative product development. For this reason the purpose of this paper is identification of key universal (inter-industry) competencies of product managers (PMs) directly involved in innovative product development, working in digital and collaborative environment, as well as creation of effective training program for development of these competencies.

Our paper is structured as follows: we describe briefly the features of management of innovative product development (IPD); then we introduce research method and results of the study of the key universal competencies of PMs to work for IPD in digital and collaborative age; next there is presented the training approach and results of statistical analysis of development of the key universal competencies of nascent product managers; finally, we draw conclusions and discuss suggestion for future research.

1 Product Management with Agile, Lean and Design Approaches

1.1 Management of Innovative Product Development

Modern products are more and more often just one element in an environment of related businesses, other products and services. Product life cycles become more complex having frequent improvements, emerging of new features and upgrades after purchase. The linear product development cycle that proceeds from ideation to research then to development and to production linearly is no longer applicable. Entrepreneurial companies forced to develop capabilities to pilot new products quickly, add new features in the process of use, learn what works and accepted by customers. Management of IPD is characterized as a network of interrelated and cross-functional activities in order to transform a market opportunity into an innovative product that meets the customer's pain/needs/wants and the strategic goals of an entrepreneurial company (Browning & Ramasesh, 2007; Krishnan & Ulrich, 2001). Management of IPD incorporates customer experience and usage patterns, rapid iteration with using digital techniques for rapid prototyping, feedback collection and analysis at every step of the development process. Unlike product managers (PMs) of the past, who guided linear product development process with primarily focus on engineering part, the modern PMs focus on delivering value for customer through the collection, analysis and synthesis of human experience. Collaboration activities are one of the key essences for modern PMs. PMs collaborate constantly with cross-function teams (engineers, designers, marketers, sellers, etc), iterate with users/customers or even involving them in the co-creation process to develop and test the value to use/customer of every product concepts/minimum feature set products. 2D- and 3D- digital prototyping techniques help modern PMs to make IPD process more agile and lean. It reduces time to market and increase innovative product success. Digital technologies and collaboration approach open new opportunities for PMs in IPD and at the same time require new management tools and relevant competencies.

Research in a range of disciplines demonstrated that proficiency in particular competencies is associated with higher level of performance/productivity (Brophy & Keily, 2002; Hayton & Kelley, 2006; Shook et al., 2003). Dynamic competencies are subject to developmental process and can be improved with training and enhanced with practice (Garman & Johnson, 2006). Competency approach is widespread in general and entrepreneurial management (Martin & Staines, 2003; Mitchelmore & Rowley, 2010; Morris et al., 2013) but less attention has been devoted to specific skills and abilities necessary for product management.

Product management is an organizational function with a wide range of activities guides the steps of a product's life cycle from ideation to marketing and sales. In addition to the previous studies (Tyagi & Sawhney, 2010; Gorchels, 2015; Austin, 2017), where competencies were discussed but a specific area of activity of PMs was not specified precisely, in our research we focus on management of IPD and in particular on its initial (fuzzy front end) stage with the aim to identify and improve the key universal competencies of PMs working in digital and collaborative environment.

1.2 Product Manager Competencies for Digital and Collaborative Age

As a research method for identification of product manager (PM) competencies we used two-stage approach (Bazarov & Ladionenko, 2013). At the first stage the job analysis was performed to identify key tasks and to describe key professional activities of PMs directly involved in IPD. Authors used the following approaches to make a job analysis: review of documents (literature, guidelines, job descriptions, etc.), in-depth interviews with successful PMs directly involved in IPD, and observation of PMs activities during work day ("workday image method"). Content analysis was used to rank the identified professional tasks based on how often it mentioned by respondents, taking into account time spent on implementation, and importance. At the second stage, the transition from the analysis of the key professional tasks of PMs directly involved in IPD to the analysis of psychological component of their implementation, namely - to the competencies that were realized by individual, and group expert assessment. The main question of this stage is: "What are personal qualities and characteristics, abilities and skills required to carry out PM professional activities successfully?" Content analysis helps to rank the identified competencies based on the frequency of their mention by respondents. 47 product managers involved in IPD were selected and took part in our research for identification of the key universal (inter-industry) PM competencies. The following criteria were taken into account for selection PMs as respondents: no less than 4 years of experience in IPD; innovative products have "hard" and "soft" components; they represent entrepreneurial companies which use modern managerial practices (agile, lean, customer development, design thinking) and digital techniques in IPD; entrepreneurial companies, where PMs work belongs to different industries (that to have opportunity for identification of universal/inter-industry PM competencies). 10 experienced product managers were invited additionally for interviewing in order to verify the obtained competencies. The experimental error did not exceed 4%. The whole process of identification of the key universal competencies took us 2.5 months, since February 2018.

Wordings of key universal (inter-industry) PM competencies and their description are represented in Table 1 below.

Tab. 1: The key universal product managers' competencies

| Competencies/Skills & Abilities | Sub-competencies (with definition/description) |
|---|--|
| <p>Sociability – the ability to establish and maintain social ties, as well as high activity in this process, due to:</p> | <p>Customer focus – ability to focus on the other party in the interaction, to show attention to his needs and states.</p> <p>Communication skills – the ability and willingness to quickly establish and maintain direct contact "here and now", the ability to speak easily and well, skills of self-presentation, public speaking, friendliness and charm.</p> |
| <p>Innovative thinking – the ability to find radically new, innovative ways to solve problems by:</p> | <p>Creativity – striving for high variability of decisions, generating a large number of ideas.</p> <p>Analyticity – the ability to organize information, identify key inconsistencies, errors or problem areas, identifying cause-and-effect relationships and trends.</p> <p>Flexibility of thinking – the ability to rebuild quickly integrating newly arrived information in their proposals, the ability to offer different solutions to the same task, susceptibility and tolerance for different ideas.</p> |
| <p>Leadership (teamwork) – the ability to form a team and manage it through:</p> | <p>Organizational leadership – the ability to fill vacant roles and apply different leadership styles.</p> <p>Influence – the ability to engage in work, motivate, energize others, ability to influence, charisma.</p> <p>Insight – the ability to see and feel other people's strengths, needs and motivations.</p> |
| <p>Project imagination – the ability to distinguish and describe the sequence of steps required to achieve a certain result, due to:</p> | <p>Strategic attitude – the ability to determine prospects of ideas and make decisions for the future and long-term forecasts;</p> <p>Forethought – the ability to anticipate possible scenarios and emerging issues, to assess the likelihood of occurrence of foreseeable events and think over specific ways to act.</p> |
| <p>Decisiveness in uncertainty - the ability to act and ability to make decisions under uncertainty, courage in decision-making, due to:</p> | <p>Risk tolerance – tolerance to the situation of chaos, disorder and uncertainty.</p> <p>Decision-making – the ability to make quick decisions.</p> |
| <p>Focus on change and development - the ability and striving for constant development and change, due to:</p> | <p>Learnability – the ability to accept large amounts of new information, learn quickly and continuously.</p> <p>Adaptability – the ability to change the strategy of behavior depending on the changing conditions, to integrate in own strategy models of the behavior of others.</p> <p>Reflexivity – the ability to analyze their actions, errors and manifestations, give adequate self-esteem.</p> |

| | |
|---|--|
| Contingency/situational planning | <i>ility to calculate and allocate resources (material, finance, human, etc), and the project in time, taking into account the probability of changes in the situation, as well as the ability to flexibly and quickly rebuild plan and scheme of resources use.</i> |
| Special professional abilities | <ul style="list-style-type: none"> <i>– the ability to manage a cross-disciplinary distributed team using methodologies agile and lean, taking into account the iteration in IPD, dynamic formation of requirements for it, with using digital technologies;</i> <i>– the ability to work (analyze and synthesize) with poorly structured and non-parameterized information presented at the level of unclearly defined concepts, including using digital data processing technologies;</i> <i>– the ability to prototype (quickly) and test the created solutions in the format of MFP to identify and verify future users/consumers using digital technologies and equipment.</i> |

Source: Author’s elaboration

The interesting fact is that the respondents, successful PMs, regardless of the industry and development stage of the company, indicated own key (most important) competencies from the cognitive, organizational, emotional-communicative and personal blocks respectively. Note again that in the Table.1 there are shown only the key (most important) universal (inter-industry) competencies of PMs identified in the research. The following section of the paper presents the results of using combination of design thinking, project based learning and digital prototyping techniques the development of key competencies of nascent PMs.

2 Design thinking and project based learning in development of nascent product managers' competencies

In a framework of cross-disciplinary project based learning initiative – training program “Design Innovative Product” organized by Innovation Business & Entrepreneurship Lab at Lomonosov Moscow State University, 20 nascent PMs with different background (science, engineering, business and design) were selected on a competitive basis and worked in cross-disciplinary teams of five members. In April 2018 we immersed the teams in "do it yourself" design research based “making” experience at the rapid prototyping lab equipped with clay modeling, 3D printers, and embedded electronics for 8 weeks. The teams were required to carry their projects through all the steps of the creative problem-solving model (design process) with a goal to develop a product concepts/minimum feature set product and a business model. The "making" experience program, we created, was a harmonious combination of “hard” (a set of equipment for rapid prototyping and creative space for team/project work) and “soft” modern management methods and tools such as Design Thinking (Brown, 2008), Lean Startup (Blank, 2013), Business Model Generation) for creating a successful innovative products. The training

program consisted of workshops with experts, instructors and users, and "do it yourself" activities. Program instructors are both from the university staff and industry representatives from our partners in design, manufacturing and electronics. The original solutions of program participants in most crucial stage fuzzy front end (Markham, 2013) pointed out the development of relevant competences of nascent PMs.

Carrying out the training program activities we also studied the improvement of nascent project manager's (PM's) competencies. To clarify the impact of design and project based learning approaches the statistical analysis was carried out in order to determine the effects of the training program on nascent PM's competencies. Two surveys in the form of questionnaire were administered to training program participants, one at the beginning of the program "Design Innovative Product" and another after the completion of the product design project. Participants (20 nascent product managers) were asked to rate their key competencies (Table 1) on a scale of 1 to 5 where 1 = poor, 2 = basic, 3 = medium, 4 = advanced and 5 = expert level. The response rate was 95%. 8 participants, 2 from each team, were randomly selected and interviewed after the completion of the training program. The purpose of the interview was to determine their perceptions regarding effects of the program, accepted value and interest towards PM career, and further personal development this way. Table 2 shows the mean difference between competencies pre-survey (after introduction of the topic) and post-survey (after completion of the program).

Tab. 2: The results from the pre- and post-surveys for participants of “Design Innovative Product” who used design thinking, project based learning and digital prototyping techniques

| Competencies/Skills & Abilities | Pre-survey | | Post-survey | | Mean difference | Paired t-test | |
|--|------------|------|-------------|------|-----------------|---------------|----------|
| | Mean | SD | Mean | SD | | t-value | p-value |
| Sociability | 2.59 | 0.41 | 3.5 | 0.51 | 0.91 | 13.08 | < .00001 |
| Innovative thinking | 2.17 | 0.49 | 3.39 | 0.33 | 1.22 | 12.58 | < .00001 |
| Leadership (teamwork) | 2.29 | 0.46 | 3.28 | 0.35 | 0.99 | 7.96 | < .00001 |
| Project imagination | 2.12 | 0.59 | 3.37 | 0.39 | 1.25 | 13.08 | < .00001 |
| Decisiveness in uncertainty | 2.19 | 0.61 | 3.11 | 0.44 | 0.92 | 7.28 | < .00001 |
| Focus on change and development | 2.37 | 0.48 | 3.29 | 0.37 | 0.92 | 7.02 | < .00001 |
| Contingency/situational planning | 2.52 | 0.47 | 3.38 | 0.31 | 0.86 | 5.11 | < .00001 |
| Special professional abilities: ability to work (analyze and synthesize) with poorly structured and non-parameterized information presented at the level of unclearly defined concepts, including using digital data processing technologies; | 2.16 | 0.47 | 3.23 | 0.43 | 1.07 | 11.00 | < .00001 |
| Special professional abilities: the ability to prototype (quickly) and test the created solutions in the format of MFP to identify and verify future users/consumers using digital technologies and equipment. | 2.17 | 0.6 | 3.46 | 0.41 | 1.29 | 10.18 | < .00001 |

Source: Author’s elaboration. Number of observation is 19 for both pre- and post-surveys.

We evaluated the effectiveness of the “Design Innovative Product” activities: measured the values of the ranks before and after completing the training program and analyzed the differences using a paired sample t-test. This is a statistical procedure used to determine whether the mean difference between pre- and post- survey sets of observations is zero (null hypothesis). Columns “t-values” and “p-values” in Table 2 present the results of the paired sample t-test for each competencies category. The p-value gives the probability of obtaining the values those were observed if the null hypothesis was true. As a cutoff value for determining statistical significance we chose a value of 0.05. The results of the paired t-test show that the p-value for each of the category is less the 0.0001, which indicates that there is the difference between pre- and post- values for each category of competencies. Thus, we observe that the results of the “Design Innovative Product” activities were rather successful. The results of the statistical analysis presented in Table 2 demonstrate an increase in the mean values for all competencies of the training program participants (nascent PMs). Based on the change in the standard

deviation (SD) it can be concluded that the group of program participants after going through the training becomes more homogeneous.

Conclusion

In this paper, we reveal the key universal competencies of product managers directly involved in innovative product development process. The knowledge of these competencies has important practical implication since we can use them both to identify people, who are potentially capable of professional activity in innovative product development process management, and to assess existing product managers and evaluate their effectiveness. We developed the special training program, which is the combination of design, project based learning approaches and usage of a modern digital rapid prototyping technique. The program provides a good positive dynamics in the development of the revealed key competencies. However it has its limitation in spreading and wide use due to the necessity of high-quality cross-disciplinary expertise and modern digital rapid prototyping infrastructure within reach. The next stage of our research will have focus on the study the effectiveness of implementation of other design approaches, in particular, co-creation and participatory design, to develop the identified key universal competencies.

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EU LAW ON THE CSR REPORTING – PUZZLING MAZE?

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Abstract

Purpose: Despite a decades-long discussion about corporate social responsibility (“CSR”), there is not much known about the exact evolution and meaning of the current EU law on CSR reporting. The two objectives of this paper are identifying and critically assessing this evolution and then to recognize and address interpretation challenges. Its satisfaction is critical for the understanding, interpretation and application of the EU law on CSR reporting.

Design/methodology/approach: The authors have recognized a myriad of perceptions of CSR and CSR reporting duty. They have conducted a holistic and interdisciplinary research and teleological interpretation of legislative sources, including the official EU database Eur-Lex, and have indentified key law instruments, namely ten critical Directives, and their provisions and juxtaposed them. They have pointed out overlooked discrepancies, attempted to resolve them, and discussed the implied dynamics and their impact.

Findings: The perception of CSR reporting has been evolving in a more complex and piecemeal manner than is generally assumed. Due to the lack of the permanent consent on the CSR reporting duty, instruments of the current EU law are fragmental and inconsistent. Circumstances have shaped them while bringing different priorities and terminology.

Research/practical implications: Our critical and comparative review of the evolution and *status quo* of the EU law on CSR reporting shows discrepancies and a lack of common denominators. The legal framework is unclear; consequently EU businesses have to fumble.

Originality/value: The presented overview and assessment is a pioneering attempt to help, in a unique manner, to assess the legislative will and the meaning of the CSR reporting duty.

Keywords: Corporate Social Responsibility (CSR), EU Law, Annual Report, Sustainability

JEL Codes: K20, M14, Q01

Introduction

The current concept of sustainability based on environmental, social and economic pillars and focusing on the reconciliation of available resources and an increasing world population emerged in the USA in the 1960s (Meadows et al., 1972). Later on, it was incorporated in international law by two key instruments representing the inspiration, if not directly the foundation, for the EU law and EU member state's laws. The first instrument was the Report of the World Commission on Environment and Development Report: Our Common Future prepared by the Brundtland Commission (WCED, 1987), published as the UN Annex to document A/42/427 in 1987 ("Brundtland Report 1987"). The second instrument was the UN General Assembly resolution A/RES/60/1 adopted via World Summit 2005 ("UN Resolution 2005"). Brundtland Report 1987 and UN Resolution 2005 proclaim values such as solidarity, tolerance and respect for nature and shared responsibility.

The classic international law subjects, states and government organizations, have considered these two key public law instruments and have demonstrated various levels and intensities in their commitments. The original distinction between (i) sustainability in the narrow sense, with rather systematic and visionary features and designed for soft law and self-regulation, and (ii) corporate responsibility, with rather normative and moral features and designed for national law regulation, have converged in the CSR (Bansal & Song, 2017). Thus, for the EU and EU member states, the sustainability in the large sense, aka CSR, represents a current multi-stakeholder relationship of virtually all members of society and even the society itself (Pakšiová, 2017), which is only partially covered by mandatory national law provisions. Hence, the accountability of EU businesses with respect to the sustainability is fragmentally regulated by constantly evolving EU laws and national laws (Jindřichovská & Purcarea, 2011).

Modern European integration is based upon the doctrine of the famous four freedoms of movement in the single internal market, and strategic priorities for 2010-2020 are proclaimed in Europe 2020: A strategy for smart, sustainable and inclusive growth ("Europe 2020") (MacGregor Pelikánová, 2017). Europe 2020 was issued in the aftermath of crises in 2007 and 2008 (MacGregor Pelikánová & Beneš, 2017) to address chronic deficiencies (Balcerzak, 2015), including aspects of the failed Lisbon Strategy and shortcomings in financial regulation and management responsibilities in corporate governance (Bavoso, 2013). Europe 2020 entails the CSR demands, see the Green Paper: Promoting a European Framework for CSR (Matuszak & Różanska, 2017). Pursuant to Europe 2020, the CSR represents a transparent dialogue and interaction between businesses and other stakeholders which should be materialized, among

others, by publicly available financial reporting and non-financial reporting, aka CSR reporting (Matuszak & Różanska, 2017).

However, what are the exact mandatory dimensions of the CSR reporting duty of EU businesses? Due to the dynamics of the interaction between the EU and EU member state's law, including the compulsory transposition and implementation of the EU law, this question needs to be primarily answered based on the critical study of the evolution and *status quo* of EU law on CSR reporting. Firstly, the evolution of the EU law needs to be researched and critical law instruments identified. Secondly, the provisions currently in force have to be identified, interpreted and critically assessed. The incurred law inconsistencies are to be used as implied indications for a deeper study of the current law on CSR reporting in the EU.

1 The complex evolution of the EU law on CSR reporting

Since international law is oriented toward international law subjects and its enforceability is problematic, the international law instruments regarding CSR, such as the Brundtland Report 1987 and UN Resolution 2005, do not have a direct impact on the CSR reporting of EU businesses. In contrast, this is determined by the EU law and national laws, which implement the EU law and need to be in compliance with the EU. Hence the CSR reporting of businesses anywhere in the EU is predominantly determined by norms generated by the EU law. Although the evolution of these norms has been complex and has a direct impact on the current *status quo*, its study is generally omitted and provisions in force are often presented in an incomplete and superficial *fait accompli* manner. It is key to overview the evolution of the EU on the CSR reporting, especially its milestones Directives, before the current provisions are cited, contextually discussed, juxtaposed and teleologically interpreted.

The primary EU law has always provided general principles to be projected in the light of the applicable strategy, such as Europe 2020, in instruments of the secondary EU law, namely in Regulations and Directives. Currently, two Directives set the legal framework for the CSR reporting in the EU and are to be transposed and implemented in national laws of all EU member states, including the Czech national law. These two Directives are Directive 2013/34/EU of 26 June 2013 on annual financial statements, consolidated financial statements and related reports of certain types of undertakings as amended by Directive 2014/95/EU and Council Directive 2014/102/EU ("Directive 2013") and Directive (EU) 2017/1132 of 14 June 2017 relating to certain aspects of company law ("Directive 2017").

The legislative way to the currently applicable provisions from the Directive 2013 and Directive 2017 is built by a set of legislative instruments, i.e. Directives shown in Table 1.

Tab. 1: Overview of the EU legislative evolution regarding CSR reporting

| Legislative instrument <i>(its status)</i> | Key effect and CSR reporting declarations |
|---|---|
| Directive 78/660/EEC <i>(repealed)</i> | 4 th Directive on the annual accounts of certain types of companies |
| Directive 82/891/EEC <i>(repealed)</i> | 6 th Directive concerning the division of public limited liability companies |
| Directive 83/349/EEC <i>(repealed)</i> | 7 th Directive on consolidated accounts |
| Directive 84/253/EEC <i>(still in force)</i> | 8 th Directive on the approval of persons responsible for carrying out the statutory audits of accounting documents |
| Directive 2006/43/EC on statutory audits of annual accounts and consolidated accounts <i>(still in force)</i> | Amended Directives 78/660/EEC and 83/349/EEC - to render the relationship between the statutory auditor or audit firm and the audited entity more transparent, i.e. to require disclosure of the audit fee and the fee paid for non-audit services in the notes to the ..accounts Repealed Directive 84/253/EEC - because it lacked a comprehensive set of rules to ensure an appropriate audit infrastructure |
| Directive 2009/101/EC <i>(repealed)</i> | Directive as regards the interconnection of central, commercial and companies registers <i>Art.2 Member States shall take the measures required to ensure compulsory disclosure by companies as referred to in Article 1 of at least the following documents and particulars:</i> <i>(f)the accounting documents for each financial year which are required to be published in accordance with Council Directives 78/660/EEC, 83/349/EEC, 86/635/EEC and 91/674/EEC;</i> <i>Art.3</i> <i>3. All documents and particulars which must be disclosed pursuant to Article 2 shall be kept in the file, or entered in the register; the subject matter of the entries in the register must in every case appear in the file.</i> <i>5. Disclosure of the documents and particulars referred to in paragraph 3 shall be effected by publication in the national gazette designated for that purpose by the Member State, , ...</i> |
| Directive 2013/34/EU on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings <i>(still in force)</i> | Amended Directive 2006/43/EC - added Art.28 audit reporting (its content) Repealed Directives 78/660/EEC and 83/349/EEC - replaced Directives 78/660/EEC and 83/349/EEC. <i>Preamble (15)In such cases, the obligation laid down in this Directive to publish any accounting document in accordance with Article 3(5) of Directive 2009/101/EC ..</i> <i>Preamble (38). The annual financial statements of all undertakings to which this Directive applies should be published in accordance with Directive 2009/101/EC. It is, however, appropriate to provide that certain derogations may be granted in this area for small and medium-sized undertakings.</i> |
| Directive 2014/95/EU as regards disclosure of non-financial and diversity information by certain large undertakings <i>(still in force)</i> | Amended Directive 2013/34/EU - added Art.19a non-financial statements, Art.29a consolidated non-financial statements... <i>Preamble (14) The scope of those non-financial disclosure requirements should be defined by reference to the average number of employees, balance sheet total and net turnover. SMEs should be exempted from additional</i> |

| | |
|---|--|
| | <i>requirements, and the obligation to disclose a non-financial statement should apply only to those large undertakings which are public-interest entities having an average number of employees in excess of 500... Art.2 Guidance on reporting The Commission shall prepare non-binding guidelines on methodology for reporting non-financial information, ..</i> |
| Directive 2014/102/EU (still in force) | Amended Directive 2013/34/EU - Accession of the Croatia to EU and thus additions to the Annex I and Annex II of the Directive 2013/34/EU |
| Directive (EU) 2017/1132 relating to certain aspects of company law (still in force) | Repealed Directives 82/891/EEC and 2009/101/EC Preamble (1) <i>Council Directives Directives 82/891/EEC ... 2009/101/EC ... have been substantially amended several times. In the interests of clarity and rationality those Directives should be codified.</i> |

Source: Prepared by authors

The overview provided by Table 1 denotes the Byzantine complexity leading to *prima facia* clear results, i.e. the CSR reporting in the EU is now determined by the updated, aka consolidated, version of the Directive 2013 and 2017. This points to a tempting simplification suggesting that a literary approach to these Directives and plain readings of their provisions leads to the identification, description and understanding of the CSR reporting in the EU. However, the citation and study of them paints a dramatically different picture.

2 The even more complex current EU law on CSR reporting

Studies on CSR and CSR reporting in the EU generally skip the indicated legislative evolution and move to Directive 2013, as updated in 2014, to state that large public-interest entities with more than 500 employees must include in the management report a non-financial statement linked to the CSR and/or cite Art.19 and Art.19a (Strouhal, 2015). However, it is instrumental to analyze Art.19 and Art.19a in the context of the entire Directive 2013 to see who and what (Table 2), to move to the Directive 2017 to see how (Table 3) and to recognize that a plain reading brings more questions than answers about the CSR reporting in the EU.

Tab. 2: Selected key provisions CSR reporting – Directive 2013 (consolidated version)

| | |
|------------------------------------|---|
| Art.1 Scope | 1. <i>The coordination measures prescribed by this Directive shall apply to the laws, regulations and administrative provisions of the Member States relating to the types of <u>undertakings listed: (a) in Annex I; ...</u></i> |
| Art.2 Definitions | <p><i>For the purposes of this Directive, the following definitions shall apply:</i></p> <p><i>(1) ‘public-interest entities’ means undertakings within the scope of Article 1 which are:</i></p> <p><i>(a) governed by the law of a Member State and whose transferable securities are admitted to trading on a regulated market of any Member ...;</i></p> <p><i>(b) credit institutions as defined in point (1) of Article 4 of Directive 2006/48/EC ...;</i></p> <p><i>(c) insurance undertakings within the meaning of Article 2(1) of Council Directive 91/674/EEC ...;</i> <i>or</i></p> <p><i>(d) designated by Member States as public-interest entities, for instance undertakings that are of significant public relevance because of the nature of their business, their size or the number of their employees;</i></p> |
| Art. 19 Management report | 1. <i>The management report shall include a fair review of the development and performance of the undertaking's business and of its position, together with a description of the principal risks and uncertainties that it faces.</i> |
| Art.19a Non-financial statement | <p>1. <i>Large undertakings which are public-interest entities exceeding on their balance sheet dates the criterion of the average number of 500 employees during the financial year shall include in the management report a non-financial statement containing information to the extent necessary for an understanding of the undertaking's development, performance, position and impact of its activity, relating to, as a minimum, environmental, social and employee matters, respect for human rights, anti-corruption and bribery matters, including:</i></p> <p><i>(a) a brief description of the undertaking's business model;</i></p> <p><i>(b) a description of the policies pursued by the undertaking in relation to those matters, including due diligence processes implemented;</i></p> <p><i>(c) the outcome of those policies;</i></p> <p><i>(d) the principal risks related to those matters linked to the undertaking's...;</i></p> <p><i>(e) non-financial key performance indicators relevant to the particular business.</i></p> |
| Annex I Types of undertaking .. | <p>— <i>the Czech Republic: společnost s ručením omezeným, akciová společnost;</i></p> <p>— <i>Germany: die Aktiengesellschaft, die Kommanditgesellschaft auf Aktien, die Gesellschaft mit beschränkter Haftung;</i></p> |

Source: Prepared by authors.

Table 2 reveals that Directive 2013 uses a different terminology and is ambiguous or vague. Hence, both the identification of the subject of the CSR reporting duty and the very extent of this duty are challenging. Namely, Directive 2013 deals with *undertakings* (Art.1), which are *private limited companies, aka limited liability companies, and public limited companies, aka shareholder companies* (Annex I), but imposes the duty to include non-financial statements in the management report upon *large undertakings which are public-interest entities on their balance sheet dates as the criterion of the average number of 500 employees* (Art.19a). This leads to the burning question about who *public-interest entities* are, which is only partially answered by the indication that these are entities with *transferable securities, credit institutions, insurance undertakings and undertakings designated by Member States as public-interest entities, for instance undertakings that are of a significant public relevance because of the nature of their business, their size or the number of their employees*

(Art.2). This implies unanswered questions about how this designation occurs, what the criteria are and, ultimately, who are these *undertakings designated by Member States as public-interest entities*. Similarly, citation of Art.19a in Table 2 demonstrates that the content of the non-financial statements to be included in the management report CSR is described vaguely, and only the minimal threshold is indicated, i.e. *environmental, social and employee matters, respect for human rights, anti-corruption and bribery matter* (Art.19a). Perhaps the most puzzling identification demands *(e) non-financial key performance indicators relevant to the particular business*. It is unclear, both, which businesses with more than 500 employees have to include a non-financial statement in their management report, and what exact information this non-financial statement has to include. Even worse, Directive 2017 generates further confusion about the publication of this information, see Table 3.

Tab. 3: Selected key provisions of CSR reporting – Directive 2017 (consolidated version)

| | |
|--|---|
| Art.13 Scope | <i>The coordination measures prescribed by this Section shall apply to the laws, relating to the types of company listed in Annex II.</i> |
| Art.14 Documents to be disclosed | <i>Member States shall take the measures required to ensure compulsory disclosure by companies of at least the following documents and particulars: (a) the instrument of constitution, and the statutes if they are contained in a separate instrument; (f) the accounting documents for each financial year which are required to be published in accordance with Council Directives 86/635/EEC (1) and 91/674/EEC (2) and Directive 2013/34/EU of the European Parliament and of the Council (3); ...</i> |
| Art.16 Disclosure in the register | <i>1.In each Member State, a file shall be opened in a central, commercial or companies register ('the register'), for each of the companies registered therein...3.All documents and particulars which are required to be disclosed pursuant to Article 14 shall be kept in the file, or entered in the register; the subject matter of the entries in the register shall in every case appear in the file.</i> |
| Art.18 Availability of electronic copies of documents | <i>1.Electronic copies of the documents and particulars referred to in Article 14 shall also be made publicly available through the system of interconnection of registers. 2.Member States shall ensure that the documents and particulars referred to in Article 14 are available through the system of interconnection of registers in a standard message format and accessible by electronic means...</i> |
| Annex II Types of companies .. in Art. 13 | <i>— Czech Republic: společnost s ručením omezeným, akciová společnost; — Denmark: aktieselskab, kommanditaktieselskab, anpartsselskab; — Germany: die Aktiengesellschaft, die Kommanditgesellschaft auf Aktien, die Gesellschaft mit beschränkter Haftung;</i> |

Source: Prepared by authors.

Table 3 reveals that Directive 2017 deals only with *companies* (Art.13), as a matter of fact only with certain companies - namely *private limited companies, aka limited liability companies, and public limited companies, aka shareholder companies* (Annex II), regardless of their size, turnover or number of employees. For the interpretation and application purposes, this is good news as it allows a clear conclusion that *public-interest entities* with over 500 employees from Directive 2013 fit in, i.e. they must disclose *the accounting documents for each financial year which are required to be published in accordance with ...Directives*

86/635/EEC and 91/674/EEC and ..2013/34/EU (Art.14), submit them to *be kept in the file* by the central register (Art.16) in *electronic copies* (Art.18) and basically to be available to the public-at-large. Here comes the bad news, i.e. the burning question in re what are these *accounting documents* and specifically do they include non-financial statements included in the management reports by the operation of Directive 2013?

Directive 86/635/EEC on the annual accounts and consolidated accounts of banks and other financial institutions deals with the layout of their balance sheets (Art.4) and Directive 91/674/EEC on the annual accounts and consolidated accounts of insurance undertakings deals with general provisions concerning the balance sheet and the profit and loss account (Art.5). Consequently, these two Directives cover coordination measures for financial and insurance undertakings as set three decades ago, and hence are partially obsolete. Directive 2013 tells as little in this respect, see above. However, a definition of *accounting documents* is included in Directive 2009/101/EC, but, as already mentioned, this Directive was replaced by Directive 2017, i.e. we are turning in a circle without reaching a clear definition. The only clarity emerged in 2017 when the European Commission, based on the power conferred by Art.2 of the Directive 2014/95/EU, issued Guidance on reporting, i.e. Communication from the Commission 2017/C 215 01 Guidelines on non-financial reporting (methodology for reporting non-financial information). However, it must be emphasized that these Guidelines are not binding (Art.1) and focus only on the content (what), but not on improvement of the identification of the subjects of the duty (who) or on the manner of the publication (how).

Conclusion

For over five decades, various European Directives have been issued in order to harmonize the accounting of European businesses. During the last decade, this trend focusing on financial statements has been expanded to non-financial statements, aka CSR statements, including its public disclosure via online registers, and Directive 2013 and Directive 2017 are perceived as clear and conclusive sources for this legal backbone.

Regarding the first objective, a summary of the evolution of the EU law both confirms the correctness to refer to these two Directives, and reveals a significant complexity. Regarding the second objective, a study of pertinent provisions of these two Directives reveals their inconsistency and not their inter-relation, i.e. they develop independently without considering each other and without using the same approach or terminology.

Although the CSR means very little if not made transparent and public, it remains unclear who exactly is the subject of the duty to do CSR reporting, due to the hesitant harmonization drive of Directive 2013. Interestingly, Directive 2017 demonstrates a much better determination and easily moves to clearly identify who has to file such information and documents, i.e. basically all limited companies. Not only subjects of the duty, but even the content of this duty remains hidden in obscurity. The novelization in 2014 of Directive 2013 attempted to address it by delegating the power to the Commission, which used it in 2017 to issue non-binding guidelines. Hence, there are some hints but not final law instructions. To complete this threesome of uncertainty, the doubts about the who and what are complemented by hesitations about the how. Namely, Directive 2017 provides some indices about the publication and available access, but is silent about the details and realization.

Well, what is the strategic and legislative will of the EU regarding CSR reporting? Does the EU want to regulate it or at least harmonize it and, if yes, should we go at least for a full harmonization or should EU member states have a free hand? Or does the CSR reporting belong to the sphere of the soft law? The evolution and current status quo of the EU law on the CSR reporting suggests that, despite the best intentions, the EU lacks the vision and/or courage to go ahead for it. This is deplorable and needs to be resolved, because, without any clear understanding of the legal framework for the CSR reporting, hardly any CSR reporting studies in the EU could be properly appreciated.

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EVALUATION OF TEMPORAL GROWTH OF RUSSIAN CITIES

Inna Manaeva

Abstract

Purpose: The development of a regional policy framework shifted the topic of the role of cities to the focus of the current scientific and political agenda. The purpose of the article is to analyze the stability of the urban system of Russia using the Zipf's law and assess the growth of Russian cities using the Gibrat's law.

Design/methodology/approach: Zipf's law, Gibrat's law were used as methodological tools; the exponential function was estimated using the ordinary least squares method. We used official statistics and archival materials.

Findings: For the analyzed period 1897–2014, the value of the Zipf coefficient increased from 0.64 to 1.2. Consequently, the urban system of Russia can be considered as stable, the population is unevenly dispersed in small and medium cities. The process of urban growth over the period 1897-2002 was ambiguous: until 1970, small cities grew faster than large ones, as the population migrated from the village to small cities within the region's borders. Since 1989, large cities have been growing faster than small ones, since the process of population migration from small to large cities has been taking place. The development of urban systems is influenced by external factors, which makes it possible to manage their sustainable development with the help of political and economic instruments.

Research/practical implications: The results will serve as the basis for the formation of political recommendations and allow us to evaluate the correctness and effectiveness of government regulation measures aimed at achieving a balanced and sustainable development of Russia's urban systems and the development of program-design mechanisms for managing urban structures.

Originality/value: The analysis used archival census data of the XIX century in Russia. A comparative analysis of demographic dynamics in the context of federal districts for the cities of Russia has not been conducted before; the Gibrat's law is empirically analyzed using non-parametric methods for the first time and is directly related to the results of estimates of the cities' size.

Keywords: Spatial Economics, Urban Growth, Zipf's Law, Gibrat's Law, Cities of Russia, Sustainable Development

JEL Codes: R11, R15

Introduction

The development of regional policy frameworks and a country's spatial development strategy towards sustainable development shifted the theme of the role of cities to the current scientific and political agenda. The discussions put forward arguments both in support and against measures aimed at managing the proportions of the urban system, the range of which is extremely wide: from the priority of the largest agglomerations to stimulating the growth of small cities. To assess the adequacy and feasibility of government decisions, it is useful to understand the mechanisms and factors underlying the formation and evolution of a city. The relevance and timeliness of this study is determined by the need to develop evidence-based recommendations for the socio-economic policy of municipal and regional authorities on the sustainable development of the territory. The purpose of the article is to analyze the stability of the urban system of Russia using the Zipf's law and assess the growth of Russian cities using the Gibrat's law.

Literature review

To carry out this study, we will analyze the literature in two areas: sustainable urban development strategies and the application of Zipf's law and Gibrat's law in studying urban systems.

Strategies for sustainable urban development. Local governments have to identify the best combination between urban sustainability challenges and needs of digital development to facilitate the development of mobility strategy (Behrendt 2016; Ben Lataifa, 2015). The smartinability is an approach combining different alternatives of sustainable and smart visions to facilitate the deployment of smart technologies in sustainable actions (Pierpaolo and Temporeli, 2017). Urban mobility strategies are determined by sustainable (environmental), social and economic components (Meekan et al., 2017). A sustainable city is associated to walkable, competitive and intelligent; a smart one is associated to digital, open and integrated for social, economic and governance issues (Eremia, Toma and Sanduleac, 2017). The "smartainable" mobility refers to participative initiatives developed by successful top-down and bottom-up collaborations to face mobility issues. A mobility strategy which is both smart and sustainable brings behavioural changes on dynamic signalisations, traffic management systems, urban control driving and on eco-driving (Chen, Ardila-Gomez and Frame, 2017). The development of an adapted "smartainable" mobility strategy requires to be supported by coordinated data and information, monitoring and evaluating

system. These components facilitate how mobility strategy is planned, administrated and controlled. They refer to indicators developed in Sustainable Mobility Plans, (Kesselring and Tschoerner, 2016).

Zipf's Law and Gibrat's Law in the study of urban systems. Zipf's law in the urban planning distribution of the city is considered an important empirical pattern.

Ye and Xie (2012) investigated the dynamics of China's urban system using Zipf's law at the regional and national levels. Scientists have identified significant regional differences in the development of urban systems. Differences reflect the dissimilarity in the heritage of urban and regional development mechanisms between the regions of China, which is embedded in the socio-economic environment of individual regions. Evolutionary trajectories are used to identify three groups of regions and clearly illustrate the dominance of state power in the size distribution of cities (Ye and Xie, 2012).

Gabaix (1999) establishes Zipf's law. He argues that we should count on, and then we should expect (Gabaix, 1999). Giesen and Südekum (2010) empirically tested this hypothesis. Scientists have estimated the growth of cities using the Gibrat's law at the regional level in Germany and analyzed the distribution of cities by size in the regions of Germany using Zipf's law. The study resulted in two main findings. The first - the growth rate of large cities does not depend on their scale in West Germany. The Gibrat's law is enforced not only in the national population, but also in each of the different types of regions. The second is the distribution of cities by size in economically significant regions demonstrates a linear ratio of rank-size, Zipf's law seems to be a universal phenomenon regardless of the various concepts of "region" (Giesen and Ödekumy, 2010).

Desmet and Rappaport (2017) studied the long-term development of the territory in the United States, the growth of human settlements using the Gibrat's law. The results of the analysis showed that population growth deviates from the Gibrat's law. In small settlements, growth strongly negatively correlated with the original population during the nineteenth and early twentieth centuries. This strong convergence was replaced by a moderate divergence that began in the middle of the twentieth century. In medium and large settlements, growth has become moderately positively correlated with the original population since the end of the nineteenth century (Desmet and Rappaport, 2017).

Valbuena and Roca (2013) investigated the dynamics of the urban hierarchy at the national and regional levels in Colombia for the period 1835-2005 through the empirical laws of the Digrap's law and the Gibrat's law (Valbuena and Roca, 2013). Scientists concluded that at the beginning of the 19th century and the first half of the 20th century, small towns in

Colombia grew at different rates from medium to large, Zipf's law and Gibrat's law were not fulfilled. Demographic dynamics depended on the location of the productive sectors. Since the 1930s, the growth of cities has resisted a new model: cities began to grow at the same pace, independent of the original size, i.e. observation of the Gibrat's law is occurred. Analyzing the distribution of the size of cities at the regional and national level of Colombia, scientists have identified a clear linear dependence of the size in each of the regions separately and at the national level.

Data and methods

Zipf's law is the formulation of a power law. "In the empirical literature, the least-squares method is used to estimate the exponent of a power function" (Gabaix and Ioannides, 2014). The choice of this method is dictated by the fact that it gives visual criteria in accordance with the law:

$$\ln rank = A - K \ln size \quad (1)$$

where:

In rank - the logarithm of the rank of the city;

In size - the population of the city;

K – Zipf's estimated coefficient (distribution parameter), gives the slope of the linear relationship between the size of a city and the city rank. The condition for the fulfillment of Zipf's law is $K = 1$, the largest city in terms of population is k times the size of the largest city. When $K < 1$ - there is a concentration of population in large cities; when $K > 1$ - the population is disproportionately strongly dispersed in small and medium cities.

When conducting research using Zipf's law, it is important to determine the sample size:

- use a fixed number of cities (for example, 100 cities in the sample);
- determine the threshold level of the indicator (for example, the city's population is more than 100 thousand people).

In accordance with Zipf's law, the population ratio of two cities ranked in descending order (i.e., the leading city in terms of population is $R = 1$, the second is $R = 2$, etc.) inversely proportional to the ratio of their ranks.

To identify the characteristics of urban growth in terms of population size, the study used the Gibrat's law. The logarithmic specification of the Gibrat's law is represented by the formula

$$\ln r_{i,t} = \beta_0 + \gamma_1 \ln r_{i,t-1} \quad (2)$$

where:

β_0 is a constant;

$r_{i,t}$ – the population of the city i , per year t ;

$r_{i,t-1}$ – the population of the city i , in the year $t-1$;

if γ_1 is 1, then the growth rate of the city and the initial size are independent (the Gibrat's law is fulfilled) [0].

In the studies conducted by A. Chesher, the following characteristics of the coefficient γ_1 were established:

$\gamma_1 < 1$ – small cities grow faster than large ones;

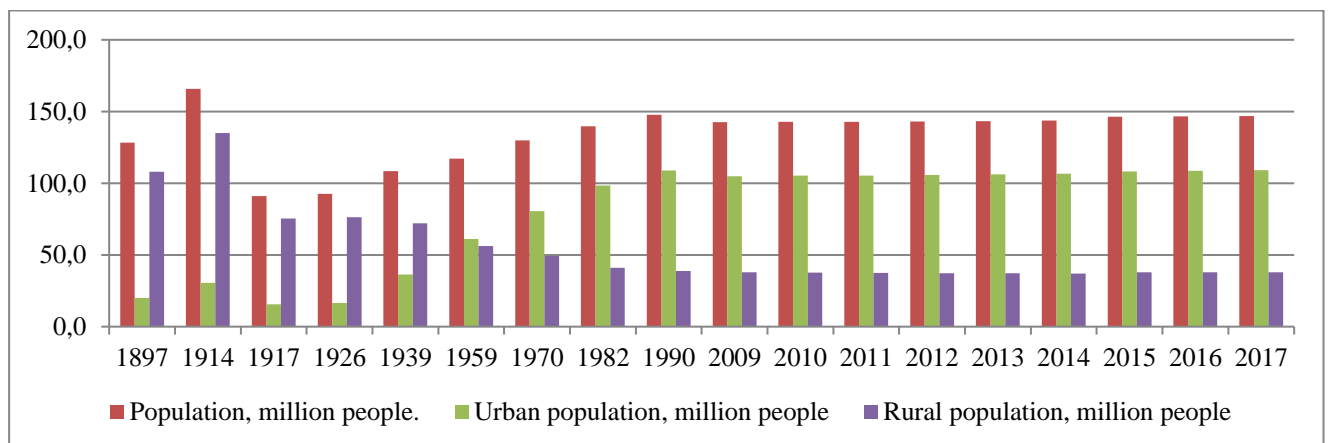
$\gamma_1 > 1$ – major cities grow faster than small (Chesher, 1979)

The source of information was given by the Federal State Statistics Service and archival materials for the early research period.

Results

Russia is a country with a high level of urbanization. Figure 1 shows the dynamics of the population of Russia in 1897-2017.

Fig. 1 Population dynamics in Russia in 1897–2017

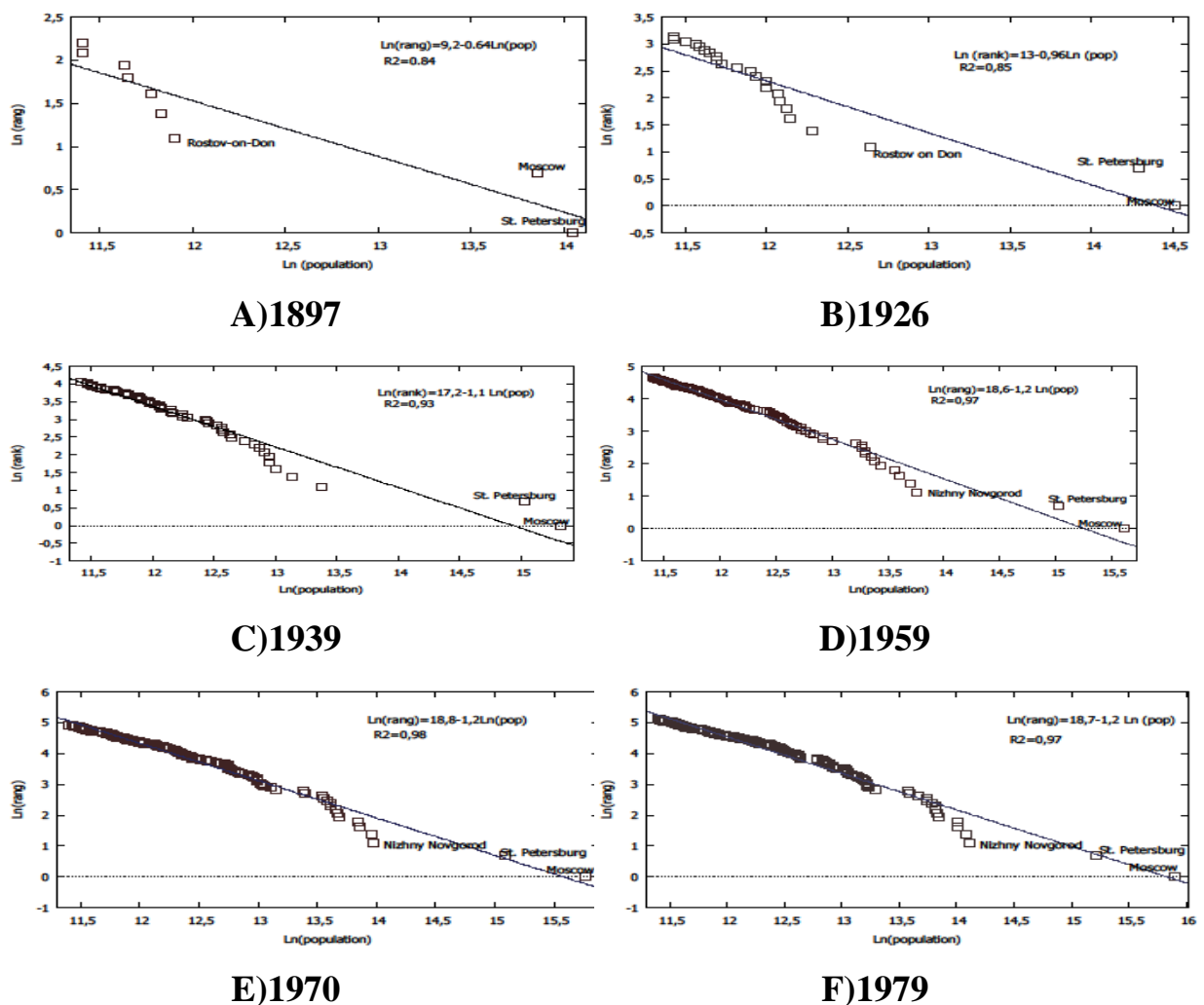


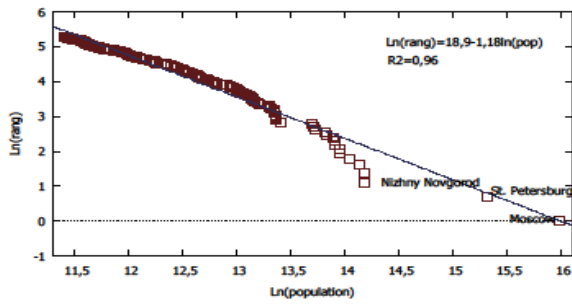
Source: Calculated by the author according to the Federal State Statistics Service and archival data.

Thus, in 1917 there was a significant decrease in the population in Russia, due to the political shock of the revolution. The number of rural population significantly exceeded the urban population until 1939. In the period from 1897–2017. The level of urbanization has grown (in modern borders) from 15% to 74%. Factors of rapid urban growth in the period 1926-1959. Migration growth and administrative-territorial resources (creation of new industries, cities) appear, as a result, the level of urbanization has increased from 18% to 52%.

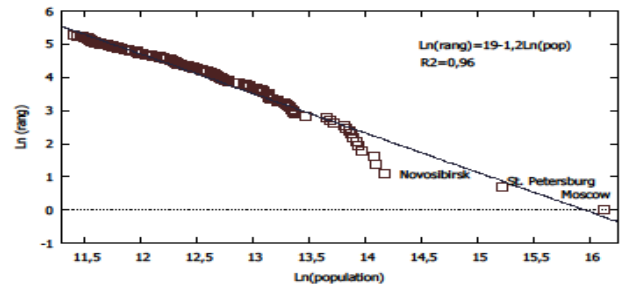
Figure 2 and Table 1 present the results of the distribution by size of Russian cities in the period 1897 - 2014. The evaluation was carried out using Zipf's law (formula 1). For each study period, a sample was formed using census data (1897, 1929, 1939, 1959, 1970, 1979 and 1989) and data from the Federal State Statistics Service (2002-2014). The composition of the samples included cities with a population of more than 90 thousand people.

Fig. 2 “Rank-size” dependence in terms of population size, calculated for Russian cities in 1897–2014

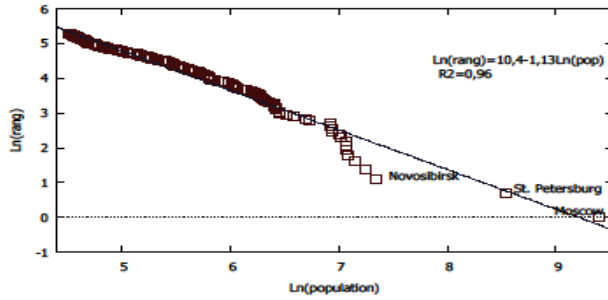




G)1989



H)2002



I)2014

Source: Calculated by the author according to the Federal State Statistics Service and archival data.

Table 1. The coefficients of the linear equation for estimating the «rank-size» relationship in terms of population in Russian cities in 1897-2014.

| Indicator | 1897 | 1926 | 1939 | 1959 | 1970 | 1979 | 1989 | 2002 | 2014 |
|-------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------|-------------------|
| Constant | 9,27 (0,26)*** | 13 (0,18)*** | 17,1 (0,14)*** | 18,6 (0,25)*** | 18,8 (0,17)*** | 18,7 (0,17)*** | 18,9(0,06)*** | 19 (0,06)*** | 10,4 (0,05)*** |
| K-estimated coefficient | 0,64 (0,03)*** | 0,96 (0,02)*** | 1,14 (0,02)*** | 1,2 (0,01)*** | 1,2 (0,09)*** | 1,2 (0,16)*** | 1,18 (0,01)*** | 1,2 (0,06)*** | 1,13 (0,15)*** |
| R ² | 0,84 | 0,85 | 0,93 | 0,97 | 0,97 | 0,97 | 0,96 | 0,96 | 0,96 |
| Std model error | 0,29 | 0,32 | 0,22 | 0,13 | 0,14 | 0,15 | 0,17 | 0,16 | 0,17 |
| Number of observations | 9 | 23 | 57 | 105 | 138 | 195 | 195 | 195 | 195 |

Source: Calculated by the author according to the Federal State Statistics Service and archival data.

Standard errors are shown in parentheses.

*** - error level of significance 1%

** - the level of significance of the error is 5%

* - level of significance of error 10%.

The size distribution of cities reflects certain aspects of complex system dynamics, such as the emergence of new cities, the growth in the number of existing ones. In 1897, St. Petersburg was the leader in terms of population. Pa the data of schedule A and the estimated coefficient K obtained, we can conclude that in 1897 Zipf's law was not fulfilled in the urban system of Russia. This conclusion is expected, since the main population lived in rural areas, the cities were few and concentrated in the central and southern part of Russia. In 1918, the capital of Russia was moved to the city of Moscow, subsequently the growth rate of the population of Moscow increased significantly. As the graph B shows in 1926, there is a separation of Moscow from the rest of the cities. Because of the calculations, the estimated coefficient K 0.96 was obtained, which indicates the process of population concentration in large cities. In 1939, Moscow and St. Petersburg are located above the Zipf curve. The remaining group of cities is located on the graph, the estimated coefficient K 1.1 indicates that the population is disproportionately dispersed in an average and small city (Graph C). A similar situation is observed in 1959 (Graph D). In 1970 1979 and 1989 between Moscow (7063 thousand people, 8072 thousand people, 8769 thousand people) and St. Petersburg (3552 thousand people, 4072 thousand people, 4460 thousand people) is performed Zipf's law (charts E, F, G), also under the action of this law are the cities whose population is in the range in 1970 from 821 thousand people up to 90 thousand people (schedule E); in 1979 from 782 thousand people up to 90 thousand people (graph F); in 1989 from 912 thousand people up to 90 thousand people (graph G); in 2002 from 1042 thousand people up to 90 thousand people (schedule H); in 2014 from 1026 thousand people to 90 thousand people (Schedule I). At the next stage of the study we will assess the growth of Russian cities. To identify the features of urban growth in terms of population size, samples were taken for the analyzed years, which included settlements with the status of a city. The analysis was carried out using the Gibrat's law by means of the formula 2 (Table 2).

Table 2. Modeling urban growth based on Gibrat's law in Russia in 1897-2002.

| № п/п | Period | Number of observations | β_0 | γ_1 | R^2 |
|-------|-----------|------------------------|---------------------|--------------------|-------|
| 1 | 1897–1926 | 489 | 0,87 (0,269)*** | 0,94 (0,028)*** | 0,79 |
| 2 | 1926–1939 | 536 | 2,33 (0,301)*** | 0,81 (0,03)*** | 0,67 |
| 3 | 1939–1959 | 641 | 0,75 (0,18)*** | 0,97 (0,02)*** | 0,84 |
| 4 | 1959–1970 | 736 | 0,94 (0,295)*** | 0,93 (0,09)*** | 0,89 |
| 5 | 1970–1979 | 751 | 0,15 (0,15)*** | 1 (0,01)*** | 0,95 |
| 6 | 1979–1989 | 756 | 0,037 (0,064)*** | 1 (0,01)*** | 0,98 |
| 7 | 1989–2002 | 878 | -0,39 (0,094)*** | 1,1 (0,01)*** | 0,97 |

Source: Calculated by the author according to the Federal State Statistics Service and archival data.

*** - the level of significance of the error is 1%;

** - the level of significance of the error - 5%;

In Russia in the period 1897–1970 small cities grew faster than large ones; this can be explained by the migration of the able-bodied population from the village to small cities within the region's borders for the purpose of vocational training and employment. In the period 1970–1989 The Gibrat's law is fulfilled, i.e. urban growth rates do not depend on the initial size. The coefficient $\gamma = 1.1$ obtained in the calculations for the period 1989–2002 suggests that the population of large cities increased faster than the population of small cities. The reasons for this situation are political and economic reforms that provoked the process of natural population decline (death rate is higher than the birth rate), migration of the able-bodied population from small cities to large and metropolitan regions, and the migration process from village to small regional cities was significantly less. In view of the federal form of the device of Russia, it is advisable to supplement the study with an assessment of the growth of cities within the borders of federal districts in modern conditions. For the calculations, a sample was drawn for each federal district, which included settlements with city status (Table 3)

Table 3. Modeling of urban growth based on the Gibrat's law in the Russian Federation, 2003-2014

| № п/п | Federal District | Number of observations | Urban population, thousand people | | β_0 | γ_1 | R^2 |
|----------|------------------|------------------------|-----------------------------------|----------|---------------------|---------------------|-------|
| | | | 2003 | 2014 | | | |
| 1 | Central | 306 | 27606,5 | 29935,3 | -0,19 (0,021)*** | 1,04 (0,005)*** | 0,98 |
| 2 | North-western | 147 | 10654,5 | 10929 | -0,15 (0,043)*** | 1,02 (0,017) | 0,96 |
| 3 | Southern | 79 | 8043,8 | 8335,3 | -0,1 (0,031)*** | 1,02 (0,007)*** | 0,99 |
| 4 | North Caucasian | 56 | 3990 | 4376,3 | 2,5 (0,448)*** | 0,35 (0,14)** | 0,16 |
| 5 | Volga | 198 | 19653,1 | 19678,07 | -0,16 (0,015)*** | 1,02 (0,0035)*** | 0,99 |
| 6 | Ural | 139 | 10483,1 | 11088,1 | -0,18 (0,038)*** | 1,04 (0,010)*** | 0,98 |
| 7 | Siberian | 130 | 12386,3 | 12635,1 | -0,21 (0,027)*** | 1,04 (0,007)*** | 0,99 |
| 8 | Far Eastern | 66 | 5041,4 | 4069,3 | 0,03 (0,19)*** | 0,93 (0,069)*** | 0,89 |

Source: Calculated by the author according to the Federal State Statistics Service and archival data.

*** - the level of significance of the error is 1%;

** - the level of significance of the error - 5%;

The North Caucasus Federal District was established in 2010 by isolating regions from the Southern Federal District. For calculations for 2003, regions were taken that in 2014 were within the boundaries of the North Caucasus Federal District. The coefficient of determination obtained for settlements in the cities of the North Caucasus Federal District ($R^2 = 0.16$) and $\gamma_1 = 0.35$ indicates that there is no relationship between the size of the city and the population growth rate in the territory of this federal district. On the territory of the Far Eastern Federal District, the growth rates of small cities are higher than those of large cities ($\gamma_1 = 0.93$), which can be explained by the absence of million-plus cities in its composition, and the widespread distraction of cities in space, which makes it difficult for the migration process to take long distances. In the remaining federal districts of Russia, the growth rates of large cities are higher than the growth rates of small cities, due to the migration of the population to the capitals of the regions and to the city of one million people. . The development of urban systems is influenced by external factors, which makes it possible to manage their sustainable development with the help of political and economic instruments.

Conclusion

The assessment of the growth of Russian cities leads to a number of conclusions.

1. For the analyzed period 1897–2014 the estimated K ratio increases from 0.64 to 1.2. Consequently, the urban system of Russia can be considered as stable, the population is unevenly dispersed in small and medium cities.

2. The process of urban growth over the period 1897-2002 is ambiguous: until 1970, small cities grew faster than large ones, as the population migrated from the village to small cities within the region's borders. Since 1989, large cities have been growing faster than small ones, as the process of population migration from small to large cities has been going on.

3. There is no connection between the size of a city and the rate of population growth in the North Caucasian Federal District. The growth rates of small ones are higher than those of large cities ($\gamma_1 = 0.93$) on the territory of the Far Eastern Federal District. In the remaining federal districts of Russia, the growth rates of large cities are higher than the growth rates of small cities, due to the migration of the population to the capitals of the regions and to the city of one million people.

4. This study will contribute to the scientific literature in a number of areas. First, archival census data of the XIX century in Russia are used in the analysis. A comparative analysis of demographic dynamics in the context of federal districts has not been conducted before for the cities of Russia, the Gibrat's law is empirically analyzed using non-parametric methods for the first time and is directly related to the results of estimates of the size of cities.

6. The results will serve as the basis for the formation of political recommendations and allow us to evaluate the correctness and effectiveness of government regulation measures aimed at achieving balanced and sustainable development of Russia's urban systems and the development of program-design mechanisms for managing city structures.

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ELEMENTS OF ORGANIZATIONAL STRUCTURE SUPPORTING ETHICAL MANAGEMENT OF ORGANIZATIONS

Radim Maňák – Vendula Fialová

Abstract

Purpose: The paper focuses on the usage of the elements of organizational structure supporting the ethical management of organizations in the Czech entrepreneurial environment. The aim of the paper is to perform a pilot study in order to identify the range of these elements of organizational structure used in companies in the Czech Republic and to verify conditions for further research.

Design/methodology/approach: To fulfill the aim of the paper a questionnaire form was applied among the respondents (N=54) with a response rate of 71.25 %. The data were collected between the 1st of November and the 20th of December 2018. The acquired empirical data regarding the use of the organizational structure elements in the Czech Republic were confronted with theoretical premises from Czech and Slovak literature.

Findings: Most of the examined elements of organizational structure supporting ethical management rarely occur in the Czech entrepreneurial environment. The ombudsman and code of ethics are the only elements found in the researched environment. Further, it was found that the number of employees has an impact on the results. Finally, the opportunities and conditions for further research projects were verified.

Research/practical implications: The research shows that the elements of organizational structure supporting ethical management are established in the Czech entrepreneurial environment, especially code of ethics and ombudsman. But there is still a substantial deficit in using these elements in the Czech entrepreneurial environment compared to their theoretical description in Czech and Slovak scholarly literature. As regards companies, it implies that the use of these elements can bring them an advantage as their importance felt by participants is relatively high. Also the pilot study verified that the research intention was well designed for further research projects.

Originality/value: The main contribution of the paper consists in gaining empirical data about the usage of organizational structure supporting ethical management in the Czech entrepreneurial environment.

Keywords: Business Ethics, Tools of Business Ethics, Ethics Program

JEL Codes: M12, M14

Introduction

The soft aspects of entrepreneurial environment are very important even in the age of technological progress and strong automation and digitalization tendencies such as Industry 4.0. One of these soft aspects with crucial importance for entrepreneurship is business ethics. It seems that the principles and tools of business ethics are increasing in importance with the growing level of technological and economic possibilities of the society.

This paper focuses on the elements of organizational structure that can be used for supporting ethical management in the companies. The goal of the paper is to perform a pilot study in order to identify the range of elements of organizational structure used in companies in the Czech Republic and to verify the conditions for further research.

As the elements of organizational structure supporting ethical management are for this purpose understood the tools of business ethics that are at the same time parts of organizational structure, such as ethics director, ethics officer, ethics ombudsman, ethics committee, ethics advisory center, ethics hotline, ethics round tables and ethics discussion forums on social networks. The code of ethics is discussed as a special element as it is not a typical element of organizational structure, but holds a strong position among the tools of business ethics.

1 Theoretical and research background

The interest in the topic of business ethics and its tools can be demonstrated with a set of monographs that have been published in recent years (Rolný, 2014; Weiss, 2014; Remišová, 2015; Crane, Matten, 2016; Seknička & Putnová, 2016).

Even the area of research papers regarding the tools and elements is very well covered. Following two studies are interesting from the geographical point of view. Calaghan and Wood (2014) examined the engagement with business ethics in Australia over the period 1995–2010 with focus on code of ethics, ethics committee, ethics education, ethical audits and ethics ombudsman. Erasmus and Wordsworth (2006) conducted a survey in South Africa regarding code of ethics, ethics training and ethics office/ombudsman.

The elements analyzed in this paper are in the center of interest in previous studies. Treviño et al (2014) dealt with the role of ethics and compliance officers in the organizations and Oladinrin and Man-Fong Ho (2015) discussed the implementation of codes of ethics and they mention forums to discuss ethical dilemmas or ethics ombudsman among other things as a form of mechanisms ensuring the value enactment.

The above mentioned papers dealt mostly with individual tools and elements. Martineau, Johnson and Pauchant (2016) presented a more complex view with emphasis on the role of structural elements of ethical management. They proposed a model of ethics program of six empirically observed orientations. One of the most important for this paper is structural orientation using structural practices such as offices, personnel, a coaching program and other.

The question of impact of business ethics and its tools at companies is a very productive area of research, too. Kaptein's (2014) research was focused on the extent to which the ethics program and the number of its components (for example code of ethics or ethics officer) influence occurrence of unethical behavior. McKinney and Moore (2008) examined the role of code of ethics with the finding that „in business firms having a written code of ethics, respondents were significantly less likely to be accepting of international bribery.” (p. 109) Similarly, Remišová, Lašáková and Kirchmayer (2018) examined the components of ethics programs and their effectiveness for improving ethical behavior of managers. They state that code of ethics is in this context the most efficient tool. However, other instruments such as ethics officer or ethics roundtables are important, too.

These studies show that the research mostly focuses on the influence of business ethics and its tools on soft, qualitative factors, such as behavior of employees. As an example of researching more quantitative, financial aspects in the context of business ethics, Choi and Pae (2011) should be mentioned. They examined the relationship between the commitment of companies to business ethics and financial reporting quality.

Studies with similar concept as this paper from recent years from Czech Republic were not found. As a study, work of Lörinczy and Formánková (2015), that focuses on the business ethics and some of its tools (code of ethics) in the Czech Republic can be mentioned.

This paper concentrates on the elements of organizational structure supporting ethical management. The following text examines such elements as ethics director, ethics officer, ethics ombudsman, ethics committee, ethics advisory center, ethics hotline, ethics round tables, ethics discussion forums on social networks and code of ethics (also known as the code of conduct).

Varied classification of these elements of organizational structure can be found in expert literature. Seknička and Putnová (2016, p. 146, 152) place code of ethics in the group of traditional tools and ethics ombudsman in the group of modern tools. However, Bláha et al (2013, p. 226) classify both of them, the code of ethics and ethics ombudsman, together with ethics committee, and hotlines as basic tools of the implementation of ethics into business.

A more detailed classification is described by Remišová (2015). The elements of organizational structure supporting ethical management can be found in more areas: code of ethics in the group of documents and written materials; ethics director, ethics officer, ethics ombudsman, ethics committee and ethics advisory center in the area of entities and bodies as forms of ethics institutionalization, and finally ethics hotlines, ethics roundtables and ethics discussion forums on social networks as channels of information transfer.

A brief description of these elements is presented in the following text.

Ethics director is a position in an organization that cares for the development of ethics in all departments and branches of the company and its subsidiaries (Remišová, 2015, p. 103).

Ethics officer is responsible for managing ethics activities and keeping ethics structure in smaller organizational department, independent organizational unit or subsidiary. It should be held by a trustworthy person with experience in creating and implementing code of ethics (Remišová, 2015, p. 104).

Ethics ombudsman has the right to decide if the code of ethics has not been adhered to. This position should be held by a person with natural authority who can withstand different pressures in an organization and is independent of organization management (Remišová, 2015, p. 105–106). The main task of ombudsman is to protect the interests of people with asymmetric, disadvantaged position toward the company (Seknička & Putnová, 2016, p. 152). The goal of ombudsman is to defend the rights of customers, clients, consumers and patients and to find the best solutions for all involved parties (Horváthová, Bláha & Čopíková, 2016, p. 123). The public institute of ombudsman was also established in the Czech Republic.

Ethics committee is a qualified, respected collective body which is authorized by the organization management to ensure that the code of ethics is upheld solve ethical conflicts, propose measures for ethics development etc. (Remišová, 2015, p. 106). It usually has five members some of whom can be academics (Horváthová, Bláha & Čopíková, 2016, p. 123).

Ethics advisory center has been established to prevent breaking the code of ethics. The holder of this position is from external environment to ensure his/her independence and freedom in decision making (Remišová, 2015, p. 108).

Ethics hotline has extraordinary importance in ethics infrastructure. Through the hotline, employees can contact ethics committee or ethics director to report behavior which is, in their opinion, illegal or constitutes a breach of the code of ethics. Employees can ask for advice in ethically problematic situations (Remišová, 2015, p. 123).

Ethics round tables fulfill two functions; they educate present persons and serve as a source of information for relevant departments. They are organized regularly to gain

information about employees' opinions regarding a specific situation or question (Remišová, 2015, p. 124).

Ethics discussion forums on social networks can be arranged separately for internal and external stakeholders. They should respond to real problems emerging from company's activities or problems emerging from relations to external stakeholders (Remišová, 2015, p. 124).

Code of ethics was examined in an earlier work of one of the authors of this paper (Maňák et al., 2017), where further information can be found.

2 Methodical procedure of the research

The theoretical background shows that a large variety of elements of organizational structure supporting ethical management in organizations is available. Even Czech and Slovak scholarly literature discusses these elements as an important part of ethics program in organizations. The authors of this paper were interested if these elements well covered in Czech and Slovak scholarly literature are really used in the Czech entrepreneurial environment. It is this interest that led to the main research question:

At what range do the elements of organizational structure support ethical management used in the Czech environment?

To answer this research question, specific empirical research was carried out. This research is designed as a pilot study for verification of further larger research projects. On the basis of theoretical background, a questionnaire was applied. The above mentioned and the defined elements of organizational structure supporting ethical management of organizations are the backbone of the questionnaire. The questionnaire is divided into four areas. In the first part, respondents are asked about their encounter with the examined elements and the context of this encounter. In the second part of the form, it is the use of the ethics elements in the respondents' organizations and their feeling about the importance of these elements that is asked. The basic difference between encounter and use is as follows. Encounter means that the respondent has met the elements out of the company he now works for, e.g. earlier job etc. Use means the usage of the element in the current employment of respondents'. The last part consists of identification questions.

The data was gained from 54 respondents who were part time students and participants of highly specialized courses of management and entrepreneurship at university. The authors of this paper consider their insight into theoretical and practical aspects of management and

entrepreneurship to be a significant advantage for the research. A total number of 80 forms were personally distributed between the 1st of November and the 20th of December 2018; out of these, 57 forms were completed by the respondents. The response rate is 71.25 %. Some of the forms (3) had to be rejected due to incompleteness. The demographic characteristics of respondents were not asked as they were considered irrelevant for the research. However, the characteristics about companies of respondents were collected. As for the number of employees, the companies with 251 and more employees are represented the most (20), followed by companies with 11–50 employees (12), 51–250 employees (11) and 10 and less employees (9). Other possibilities were chosen by 2 respondents. The division by economic sectors is as follows: tertiary (40), secondary (9), quaternary (4) and primary sector (1). The strongest legal form among respondents is LTD (26), PLC (14), other (12) and self-employed (2).

Gained data was analyzed with help of usual descriptive tools and compared with theoretical background. Also, the conditions for further research are discussed.

3 Analysis or results

Firstly, the answers to the question how often respondents encounter the elements of organizational structure supporting ethical management were analyzed. The results are presented in Table 1.

Tab. 1: Encounter with elements

| Elements | in total | | as customer | as employee | as public |
|---|----------|----------|-------------|-------------|-----------|
| | absolute | per cent | | | |
| code of ethics | 46 | 85.2 | 10 | 32 | 22 |
| ethics ombudsman | 23 | 42.6 | 6 | 16 | 12 |
| ethics discussion forums on social networks | 14 | 25.9 | 5 | 9 | 8 |
| ethics committee | 8 | 14.8 | 1 | 7 | 2 |
| ethics officer | 7 | 13.0 | 1 | 5 | 3 |
| ethics advisory center | 6 | 11.1 | 4 | 5 | 2 |
| ethics round tables | 6 | 11.1 | 3 | 4 | 3 |
| ethics director | 4 | 7.4 | 2 | 2 | 3 |
| ethics hotline | 4 | 7.4 | 0 | 4 | 0 |

Source: Research of the authors of the paper

As can be seen, the most encountered elements are code of ethics, ethics ombudsman and ethics discussion forum on social networks. The results of the last mentioned element are quite interesting as discussion forums proved to be a relatively high encountered element by respondents mostly in their role as employee and public. As expected, code of ethics confirms

its strong status within the tools of business ethics. The encounter with the ombudsman can be partially explained by the established public institution of ombudsman. But as the results show, the respondents have met this element very often as customers and employees, too.

In the next step, the usage of examined elements in the organization of respondents' was evaluated as is shown in the Table 2.

Tab. 2: Usage of elements in organization of respondent

| Elements | Absolute (n = 54) | per cent |
|---|----------------------|----------|
| code of ethics | 36 | 66.7 |
| ethics discussion forums on social networks | 9 | 16.7 |
| ethics ombudsman | 8 | 14.8 |
| ethics hotline | 7 | 13.0 |
| ethics committee | 6 | 11.1 |
| ethics officer | 4 | 7.4 |
| ethics advisory center | 4 | 7.4 |
| ethics round tables | 3 | 5.6 |
| ethics director | 0 | 0.0 |

Source: Research of the authors of the paper

Code of ethics, discussion forums and ombudsman are the most used elements in the organizations of respondents'. The ethics hotline and committee also hold a reasonably strong position in the respondents' companies. On the other hand, the position of ethics director was not established in any of the respondent's companies. However, table 1 shows that some respondents encountered ethics director as customers, members of the public or in earlier employment.

Code of ethics proved as the most encountered and used element in the Czech environment. In terms of this the research, it was further interesting who in the organizational structure is responsible for the code of ethics. As is shown in Table 3, it is the organization representatives and HR personnel who are mostly responsible for the code. There were only two cases in which it is the element of organizational structure supporting the ethical management as ethics officer, committee or ombudsman.

Tab. 3: Responsibility for code of ethics

| Responsible person for code of ethics | Absolute (n = 29) | per cent |
|--|----------------------|----------|
| organization representative | 11 | 37.9 |
| person from HR area | 10 | 34.5 |
| other manager | 3 | 10.3 |
| Other | 3 | 10.3 |
| ethics officer, committee or ombudsman | 2 | 6.9 |

Source: Research of the authors of the paper

In the next part of the questionnaire, respondents were asked to evaluate the perceived importance of the elements of organizational structure supporting ethical management as strongly important, important, not important, and strongly not important. These values are coded into 1–4, where 4 is associated with strong importance and 1 with weak importance.

Tab. 4: Importance of elements

| Element | average value |
|---|---------------|
| code of ethics | 3.52 |
| ethics advisory center | 2.83 |
| ethics officer | 2.72 |
| ethics ombudsman | 2.72 |
| ethics committee | 2.70 |
| ethics hotline | 2.44 |
| ethics round tables | 2.39 |
| ethics director | 2.37 |
| ethics discussion forums on social networks | 2.33 |

Source: Research of the authors of the paper

It is quite interesting that the ethics discussion forums on social networks are evaluated as the least important elements despite its relatively high usage in organizations. The question is where this discrepancy comes from. Organizations should therefore analyze the effectiveness of this element in order to improve its evaluation by employees.

Pearson Correlation Coefficient and Spearman's rho were calculated for the importance of elements and the number of employees in the organization with help of SPSS Statistics program. No significant dependence between the number of employees and the importance of individual elements at 5% significance level was found, whereby the highest value of coefficient is -0.159. After evaluating the correlation coefficients for the dependence between the levels of importance of individual elements it can be stated that some show significant dependencies. The strongest dependencies are seen in the levels of importance of ethics director

and ethics officer with the values of 0.604 for Pearson Coefficient, or of 0.582 for Spearman's rho and the levels of importance of ethics advisory center and ethics round tables with the values of 0.634 for Pearson Coefficient, or 0.606 for Spearman's rho. The dependencies in these cases are direct and relatively strong.

Finally, one-sample t-test for the levels of importance of the individual elements in SPSS was run. The t-levels lie between 17.925 and 32.31. When compared to the value 2.004879 of TINV function calculated in MS Excel, it can be stated that the parameters of the model are on the basis of t-test statistically significant.

Discussion and conclusion

The study presented an empirical insight into the topic of the use of elements of organizational structure supporting ethical management. It was proved that considering the Czech environment, these elements are not only theoretical constructs but also real parts of management in companies. It needs to be accentuated that the extent of use of individual elements is different. These are two most commonly used elements: code of ethics and ombudsman. Surprisingly, ethics discussion forums on social networks yielded quite corresponding results.

Thanks to the good coverage of the topic of business ethics in Czech and Slovak expert literature, the empirical data from the Czech environment can be compared with the academic view in the Czech and Slovak expert texts.

As Remišová (2015, p. 103) states, the position of ethics director does not exist in the Slovak environment. The research results show that this element of organizational structure is scarcely present in the Czech environment, too. No respondent confirmed its existence in their organization and only four respondents encountered it outside their organization.

Remišová (2015, p. 104) further reminds that the position of ethics officer can also be recommended for small and middle sized companies. It is quite a challenge for the companies as this position is established only in one small and one middle sized company of the respondent set.

According to Seknička and Putnová (2016, p. 152) the position of ombudsman is present in about 20 % of big American companies. It is interesting that 35 % of companies with 251 and more employees in which the respondents work have an ethics ombudsman. The authors further mention that in the case of the Czech Republic, ombudsman is established in big

hospitals, banks and universities (p. 153). This statement was confirmed; ombudsman is, according to research, most established in the tertiary sector.

Remišová (2015, p. 108) states that she did not visit any ethics advisory center in Slovakia and abroad. It can be partially confirmed for the Czech environment where this element has a very low coverage.

The research restrictions can be seen in the number of respondents. However, the study is meant as a pilot study to verify the conditions for further research. Despite the lower number of respondents, this pilot study brought very inspiring results. In the context of the verification, the questionnaire was well accepted by the respondents, the rate of eliminated forms was acceptable and the scale for answers was adequate. It can be useful for future, more extensive research studies which could bring more accurate and detailed data.

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THE IMPACT OF INNOVATIONS ON ENTERPRISE PRODUCTIVITY IN RUSSIA

Oleg Mariev – Natalia Davidson – Karina Nagieva

Abstract

Purpose: Innovations are a source of long term economic growth for the countries. Innovations define competitiveness of business, and in a broader sense, they can solve a great number of social and economic problems. Therefore the issue of innovations and their role in the economy is highly important. The aim of our work is to estimate the impact of innovations on productivity of enterprises in Russia and to reveal the determinants of innovative activity.

Design/methodology/approach: Our research is based on Business Environment and Enterprise Performance Survey (BEEPS) for the years 2012-2014 and covering 1564 Russian enterprises. CDM model applied in our research involves three steps of estimation and allows to take into consideration various groups of factors affecting investment into R&D, and then implementation of innovations.

Findings: The results of econometric analysis show positive significant returns innovations for productivity of all firms. Positive impact of obstacles associated with investment into R&D probably arise because firms involved in innovative activities face greater difficulties due to specific features of institutional environment. Besides, practically all ways of collaboration facilitate increase in innovative sales relatively more than firms' own ideas.

Research/practical implications: Our research contributes to understanding firms' innovative activities. The role of various groups of factors on the firm and regional level is studied. Results provide useful information both for improvement of management activities at the firm level and for designing economic policy measures for innovative environment in the regions and in the country overall.

Originality/value: To the best of our knowledge, CDM model allowing to deal with endogeneity of innovations has not been applied to study innovations and their results for the Russian enterprises of different technological groups yet.

Keywords: Innovations, Productivity, R&D, Firms, Economic Policy

JEL Codes: O31, O32, O38

Introduction

Innovations are a source of long term economic growth for the countries. Innovations define competitiveness of business, and in a broader sense, they can solve a great number of social and economic problems. Therefore the issue of innovations and their role in the economy is highly important. The aim of our work is to estimate the impact of innovations on productivity of enterprises in Russia and to reveal determinants of innovative activity.

Both firms and government play an important role in innovative development. Firms generate ideas or implement those already developed by other businesses or by universities. Governments can create business environment where ideas would flourish and could be successfully implemented to improve peoples' lives. Indeed, it is knowledge economy, strong science, technology, incentives to create and disseminate ideas that can drive prosperity. High educational standards and fundamental science require a reasonably designed state intervention, and the same time they are essential for economic success. For business, especially for small enterprises, a balance between economic freedom and state support in certain areas where market does not succeed is needed.

We employ data from Business Enterprise Performance Survey for the years 2012-2014. A three-stage CDM model is estimated, in order to study the role of firms' characteristics, business climate, human capital and a number of external factors reflected in BEEPS. The existing literature is expanded with a fresh view on the current situation with innovations in Russia.

The rest of the work is structured as follows. In the next section, a brief review of research papers on firms' innovative activities is provided. Following section is devoted to description of data and methodology. Then we present and discuss the results of econometric analysis. The last section concludes and discusses possible policy implications.

1 Background and the Existing Research

Interconnection between innovations and productivity has been well discussed over the past decades. One of the papers fundamental for our study is contribution of the French researchers Crépon, Duguet and Mairesse (Crépon et al., 1998) to the studies of firms' innovative activities. They have developed a CDM-model (Crépon-Duguet-Mairesse model), which links the intensity of R&D, introduction of innovations and productivity in a single chain. The main idea of the model is to study the channels through which the decision to invest in development affects

the innovation activities, which, in turn, affect productivity. As a result, Crépon et al. reveal positive effect of R&D activities and innovations on value added per employee of French firms.

There is a number of works that employ CDM model for various purposes. They vary in terms of the number of equations and an innovations indicator. Lööf et al. (2003) and Janz et al. (2004) consider innovative sales per employee, while Hall et al. (2008) and Duguet (2006) use probability of implementation of various types of innovations (product, process etc.). Teplykh (2018) uses dummy-variable reflecting firm's external reward for its new product as an innovative indicator and studies the period from 2004 to 2011, i.e. before and after economic crises.

Dabla-Norris et al. (2012) explore the impact of innovation on firm performance, as well as the role of the financial sector in helping improve performance, using data from the survey WBES (World Bank Enterprise Survey), conducted between 2005 and 2007 covering 63 developed and developing countries. The dependent variable was logarithm of total sales per employee. Innovations were measured by new products, new technologies, etc. To solve the problem of endogeneity related to the cause-effect relationship between innovation and productivity, the authors calculated the average values of innovation by firms in a similar-sized location within a country. Separately, the interaction effect between the financial development of the country and the innovations of firms was investigated. The results showed that innovation was crucial to the performance of firms, while firms derived maximum benefit from innovation in the countries with a well-developed financial sector.

An alternative method for the study of productivity factors is the Levinson-Petrin method developed in 2003. This method uses the Cobb-Douglas production function. When a function is logarithmized, a log-linear model is formed in which the dependent variable is the logarithm of value added or revenue. The regressors are the logarithm of labor as a freely varying variable, the logarithm of capital as a constant variable. In addition an independent variable is introduced, such as the logarithm of intermediate resources, which act as a proxy, because while maximizing profits firms respond to positive productivity shocks by increasing output by mobilizing intermediate costs. The Levinson-Petrin method is one of the tools for correcting biased estimates that the OLS can give in such cases.

In this model, any freely varying variable can be included along with labor, such as innovation. Zhukov et al. (2017) assessed the impact of regional innovations on the productivity of Russian enterprises. In testing the hypothesis, a model with fixed effects was applied to eliminate the problem of endogeneity associated with missing variables, a model with random effects and the Levinson-Petrin method. The results showed that an increase in the use of

advanced production technologies in the region leads to an increase in the revenues of firms, which suggests the need for special attention to a number of factors that may affect innovative activities of firms. In this case, the signs of the coefficients for both fixed and random models effects, and for the Levinson-Petrin method are the same.

Cirera (2015) analyzes economy of Kenya using CDM model and concludes that firms' investments into R&D do not always result into innovative results. Hashi and Stojcic (2012) study the impact of innovative activity on firms' productivity in CIS and European countries and find that while making decisions to innovate, firms rely on knowledge accumulated during previous innovation research that was not implemented and on the resources of the other members of their group, colleagues and partners. Large firms are found to have better opportunities for investment into innovative activities, however, innovative results are found to decrease with firm's size. National and European subsidies that firms received appeared to be among the factors facilitating implementation of innovations.

Bozic and Botric (2011) define factors behind propensity of firms to innovate based on data on transition countries from BEEPS for the year 2009 and find that subsidies, pressure from consumers and foreign competitors, political instability, tax rates and inadequate education of employees affect firms' propensity to innovate. Firm's size and country level factors are found to be important as well.

Dvouletý & Blažková (2019) provide a valuable review of the methods that could be used to analyze firms' productivity and innovations. In their study the authors applied the method of counterfactual impact evaluation, which aims to study the effects of the policy on a specific group of interest. Moreover, the group that has experienced the intervention is compared with a group similar in all characteristics that has not been subjected to this program. In this case, these were firms operating in the Czech food processing industry, some of which were supported by the investment subsidy. The results showed that subsidies had a positive effect on labor productivity of supported firms.

From the papers considered above we see that CDM model allows to analyze innovative process, taking into account firms' decisions to invest in R&D, expenditures on investments, innovative output and firm's performance.

2 Data and Methods

While estimating the impact of innovations on enterprise productivity it is important to take into account that innovations are not exogenous as they are affected by various determinants. Therefore CDM model described above is applied (Crépon et al., 1998).

We employ data from the BEEPS – Business Environment and Enterprise Performance Survey by the World Bank and the European Bank for Reconstruction and Development for 2012-2014 on Russian companies. In this survey firms reveal information on their performance indicators, the number and quality of their personnel, and the impact of external factors on their activity. Data covers 1564 enterprises, which is 37% of the total number of respondents in BEEPS, from 37 regions of the Russian Federation. The rest of the firms belong to the services sector, which is still underdeveloped in Russia, and therefore was not included in the sample. Firms were subdivided into 3 technological groups – high-, medium- and low-tech.

The division of industries is based on the OECD classification, which relies on differences in the intensity of firms' expenditures on R&D, i.e. share of expenditures on R&D in value added (Hatzichronoglou, 1997). This survey involves 532 firms in low-tech industries, 390 firms in medium-tech industries and 642 firms in high-tech industries. For classification of industries across these groups see Table 1 below.

Tab. 1: Distribution of firms by technology groups

| Group name | Industries |
|------------------------|---|
| Low-tech industries | Food industry |
| | Tobacco products |
| | Textile |
| | Clothing |
| | Tanning and leather |
| | Wood (forest industry) |
| | Paper and paper products |
| | Publish and print |
| | Furniture |
| | Food industry |
| Medium-tech industries | Coke and petroleum products |
| | Plastics and rubber |
| | Non-metallic mineral products |
| | Base metals |
| | Finished metal products |
| High-tech industries | Chemical products (pharmaceuticals, etc.) |
| | Cars and equipment |
| | Office equipment |
| | Electronics |
| | Communication equipment |
| | Precision tools |
| | Motor vehicles |
| | Other transport equipment |
| | IT industry |

Source: Authors' classification based on Business Environment and Enterprise Performance (BEEPS) and Hatzichronoglou (1997)

We apply CDM model that consists of three stages. At the first stage, firms decide how much to invest in R&D. We believe that the following factors can influence the propensity of firms to invest in R&D; they are included as independent variables in the model:

- *Factors of demand*, i.e. number of competitors and import of firms. Competition in the market is a strong driver of innovation for all companies regardless of industry, and import allows to get foreign experience and resources, and promotes demand.
- *External factors* associated with competition and business environment conditions, i.e. obstacles related to lack of financing, corruption, political instability, tax rates, etc. It is assumed that presence of business barriers reduces the involvement of firms in innovative activity.

- *Regional features* reflected by the Integral index of innovation development of Russian regions. A favorable innovative environment in the region will also encourage firms to engage in innovative project.
- *Individual characteristics of firms* such as age, size, being a part of a large association or enterprise. The size of the firm was taken into account in the model in order to find out whether large enterprises are becoming more inclined to innovate. It can be assumed that firms belonging to the group of enterprises should have access to the knowledge and resources available in the group, which allows them to increase their innovative potential.

Dependent variable at the first stage is expenditures on R&D. Another dimension of the input of innovations can be the joint costs of R&D (with another organization), which are also contained in BEEPS. This is a separate field for study, and is not the subject of this study. In some studies, two indicators of innovation resource are used within the framework of the Heckman two-step selection model (probability of investing in R&D and the amount of R&D). We immediately incorporate the amount of R&D costs in the model, and the first stage model is evaluated using Poisson estimator to take into account firms with zero expenditures.

At the second stage, the predicted amount of R&D is used in a model with an innovative result as a dependent variable. OLS method is used. At this stage, the study of the impact of human capital at the firm level is of particular interest. Human capital is measured here as a dummy variable of personnel training. If employees have special skills and competencies for innovation, this will increase innovation success.

Besides, dummy variables of firms' cooperation with various stakeholders (customers, suppliers, licensing, universities) are introduced, and they are all compared to the case of the companies that performed innovations based solely on their own idea. We think that collaboration will lead to greater innovative results.

As the choice of innovative indicators may affect the results and therefore correctness of policy recommendations, we used two indicators of innovative result at the second stage of CDM model: logarithm of innovative sales (from implementation of new products) and the number of implemented new products that can be considered as being equivalent to the number of patents. These indicators reflect an important sign of innovation - this is the commercialization of new products or services. Other variables of the result of innovation can be the likelihood of introducing different types of innovation (product, process, organizational, marketing). They require separate consideration and are not included in the subject of this study.

In the first case OLS method was applied, and in the second case Poisson method was used. The results proved to be similar; we present results with innovative sales.

At stage three, an impact on firms' productivity of the innovative result predicted at the second stage is estimated. For the third stage the modified Cobb-Douglas production function is used:

$$\log y_{ij} = \delta_0 + (1 - \alpha - \beta) \log h_{ij} + \alpha \log k_{ij} + \beta \log l_{ij} + \varepsilon_{ij}, \quad (1)$$

where y , h , k , l - revenue, innovative sales, capital and labor costs per employee.

Productivity can also be measured as total factor productivity. As indicators of the competitiveness of a firm, the absolute values of revenue or profit can be used as dependent variables. We decided to use revenue per employee to account for the size of the enterprise. In our research regional innovation index is used at the first stage to control for the regional innovative environment. Regional and industrial variables could also be introduced to help account for the attributes affecting innovation and productivity; we will consider this for our future research.

Third step is estimated on OLS method. Estimation results are presented below.

3 Results and discussion

Below are the results of the first stage of the CDM-model with R&D expenditures within the firm as a dependent variable (see Table 2).

Tab. 2: CDM modeling for the Russian firms: first stage

| Dependent variable - the sum of R&D expenditures within the firm (own expenditures) | Group 1 (low-tech firms) | Group 2 (medium-tech firms) | Group 3 (high-tech firms) |
|---|--------------------------|-----------------------------|---------------------------|
| Size | 1.915*** (0.622) | -2.865*** (1.035) | 2.126*** (0.407) |
| Age | -0.091** (0.044) | -0.197* (0.104) | -0.002 (0.009) |
| Competition | -0.006 (0.007) | -0.012 (0.009) | -0.010* (0.006) |
| Part of the larger enterprise | 0.495 (0.518) | 1.722** (0.759) | 0.987** (0.494) |
| Subsidies | 0.188 (0.625) | 1.978** (0.799) | 0.057 (0.705) |
| Taxes | -0.030 (0.767) | 0.371 (0.552) | -0.326 (0.527) |
| Inadequacy of the workers' specialization | 1.737** (0.884) | 0.727 (0.821) | 0.807* (0.419) |
| Import | 1.741 (1.058) | 1.816** (0.756) | 1.317*** (0.396) |
| Business licensing and permits | 0.955* (0.533) | -2.163*** (0.763) | 0.765* (0.398) |
| Integral index of innovation development of the Russian regions | -2.597 (6.180) | -5.197 (5.175) | 8.611** (3.559) |
| Wald test | 53.95*** | 46.37*** | 154.68*** |
| Pseudo R ² | 0.3313 | 0.3583 | 0.5063 |
| Number of observations | 532 | 390 | 642 |

*** significant at the 1% level, ** - at the 5% level, * - at the 10% level. The standard errors are in parentheses.

As it can be seen from the table, large firms are more inclined to invest in research and development, probably since they can provide substantial financing required by this. Besides, the younger the firm, the more it will invest in R&D. It confirms that startups have an important potential for economy; therefore they should be supported through venture financing and other measures. An increase in the number of competitors has a negative impact on investment into research and development in high-tech firms and does not affect industries with low and medium level of technology.

Medium- and high-tech firms owned by a large enterprise spend more on research and development. A firm being a part of a large enterprise, has access to knowledge and skills within this enterprise, representing broader experience and higher innovation potential, which certainly makes the R&D process more efficient.

Obtaining subsidies turned out to be significant for investing in research and development only for firms belonging to medium-tech group. This may, on one hand, suggest that subsidies received from any sources may be directed to the purposes other than innovations,

and firms might have unequal access to subsidies. On the other hand, enterprises might know little about state support programs, and these opportunities might be potentially available not to every enterprise.

Firms involved in import spend more on R&D in medium- and high-tech industries, probably as a result of access to foreign technologies and knowledge, for example, associated with production process and management. Coefficients of some variables reflecting obstacles for firms have positive signs probable because firms involved in innovative activities face greater difficulties than other firms due to specific features of institutional environment. Regional level of innovative development is found to have a positive impact on investment in R&D in high tech industries.

In Table 3 below, we present the results of the second stage of the CDM modeling.

Tab. 3: CDM modeling for the Russian firms: second stage

| Dependent variable – the logarithm of innovative sales | Group 1 (low-tech firms) | Group 2 (medium-tech firms) | Group 3 (high-tech firms) |
|--|-----------------------------|--------------------------------|------------------------------|
| Predicted sum of R&D expenditures within the firm | 5.34e-07 (8.75e-07) | 1.99e-06** (8.31e-07) | 5.68e-07*** (1.43e-07) |
| Licensing | -0.504 (2.639) | 6.644* (3.827) | 7.917*** (2.204) |
| Domestic suppliers | 10.043*** (2.015) | 8.842*** (2.156) | 5.873*** (1.601) |
| Foreign suppliers | 13.120*** (0.442) | 4.313 (3.216) | 6.125*** (2.219) |
| Domestic consumers | 14.243*** (0.447) | 13.717*** (0.940) | 9.055*** (1.325) |
| Foreign consumers | 16.402*** (0.346) | - | 7.173* (4.247) |
| Cooperation with universities | 8.321** (4.077) | 5.315 (4.200) | 4.984* (2.639) |
| Training of personnel | 1.192** (0.571) | 0.123 (0.661) | 1.846*** (0.570) |
| F-test | 371.35*** | 35.00*** | 17.15*** |
| Number of observations | 532 | 390 | 642 |

*** significant at the 1% level, ** - at the 5% level, * - at the 10% level. The standard errors are in parentheses.

Returns on investment into R&D are positive and significant for the firms belonging to medium- and high-tech industries. High-tech industries are the most innovative by definition; their share of expenditures on R&D in value added tends to be the highest. Practically all ways of implementing innovations (licensing, cooperation with various stakeholders, including universities) facilitate increase in innovative sales relatively more than firms' own ideas. Training of personnel positively affects innovative result in low- and high tech firms. For high tech firms training should be especially important so that firms could keep up with the on-going

innovations of their competitors. As for low-tech firms, larger firms are probably involved in training.

Below are the results for the last stage of the CDM modeling (see Table 4).

Tab. 4: CDM modeling for the Russian firms: third stage

| Dependent variable – the logarithm of labor productivity | Group 1 (low-tech firms) | Group 2 (medium-tech firms) | Group 3 (high-tech firms) |
|--|--------------------------|-----------------------------|---------------------------|
| Predicted Innovative sales per employee | 0.032* (0.017) | 0.059** (0.024) | 0.042** (0.020) |
| Cost of capital per employee | 0.060** (0.023) | 0.034 (0.035) | 0.048 (0.053) |
| Labor costs per employee | 0.477*** (0.086) | 0.633*** (0.096) | 0.449*** (0.100) |
| F-test | 17.17*** | 18.13*** | 11.46*** |
| Number of observations | 532 | 390 | 642 |

*** significant at the 1% level, ** - at the 5% level, * - at the 10% level. The standard errors are in parentheses.

Results show that the returns on innovations are significant in all groups of firms. In other words, the firms' investments in R&D lead to the successful commercialization. Despite the fact that, in particular, for low-tech industries, innovations are not in fact a priority area, sales from the introduction of innovative products have a positive effect on the productivity of enterprises. Labor costs per employee positively affect firms' productivity. Higher wages are probably associated with higher motivation of employees to contribute.

Results of the second and third steps with the number of new products instead of the innovative sales per employee are similar to those discussed above, confirming robustness of the model.

Conclusion

Our study confirms that innovations contribute significantly to firms' productivity in all groups of industries. It also shows that innovative projects are very risky for companies due to the overall business climate. Business environment and state policy are found to substantially affect firms' innovative activity. A range of problems important for the innovative activity of the Russian firms were revealed: underdevelopment of institutions, not high enough quality of human capital, low competition and inefficient spending. Such results lead to the conclusions discussed in this section and can be useful for improving economic policy measures.

Regional innovation development proved to be especially important for the high tech firms. It implies that firms will benefit from improvement of climate for business and innovations in the regions. Besides, results show that practically all ways of implementing innovations (licensing, cooperation etc.) facilitate increase in innovative sales relatively more than firms' own ideas. It implies that cooperation between firms might be useful; innovative cluster policy could be relevant, in the places and industries, where potential clusters exist.

Besides, it is important to develop competitive environment and minimize monopoly power, as well as to simplify bureaucratic procedures for business, so that startups and small firms could work on the market. Various mechanisms of subsidizing and stimulating innovative activities should be developed and implemented. Information about state financing and support should be made more accessible to small and medium firms, among other ways by improving quality of the relevant web sites.

Results confirm that startups are important for economy. The same time, small firms often require financial support, and the amount of time needed to implement an innovative project can be too long for small firms. Therefore cooperation of large and small firms should probably be more intensive. One of the ways to support startups is through venture financing.

As far as human capital and R&D are concerned, on the country and regional level it is important both to pay attention to fundamental science and education, and to aim education at the needs of innovative enterprises. A good tool for improving the educational system is the dual education program, in which students apply the theory obtained at the university in practice, that is, in the workplace. This would improve the skills of personnel. It is also important to provide opportunities for talented students and scientists. On the firm level, as part of creating attractive working environment, it is important to train and educate personnel using various approaches, from on job training to various courses. State support in this matter would be helpful, for example, exemption of the firm's expenditures on employees' education from taxes. Besides, successful experience of the other countries, regions and firms could be analyzed as a source of possible policy measures, keeping in mind specific features and circumstances of Russia.

Overall, results of our research are important both on the level of enterprise management and on the level of regional policy development, as they shed some light on factors that facilitate innovations on the firm and regional levels.

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CLUSTERING RUSSIAN REGIONS BY INNOVATIVE OUTPUTS USING A MULTI INDICATOR APPROACH

Oleg Mariev – Andrey Pushakrev

Abstract

Purpose: In this research, we aim to discover empirically the similarity of Russian regions in terms of innovation activity forming several groups of them.

Design/methodology/approach: We are using clustering technique, namely hierarchical clustering and map Russian regions based on the cluster memberships, which provides measure of similarity between all regions of Russia. We employ the region-level dataset of 83 Russian regions for the period from 2010 to 2015.

Findings: We find overall strong stratification of the Russian regions, with most of the Russian regions falling into clusters with low innovation outputs. We also find that over the time cluster memberships do not change for low-innovative regions, while for more innovative ones they do. It may imply that regions with higher innovative outputs increase them significantly faster than other regions.

Research/practical implications: Our research contributes to better understanding of Russian regional development and has implications for regional policy decisions. We argue that stimulating innovations in leading regions may be beneficial for development of the neighboring regions as well, due to spillover effects. We understand the limitations of the research and propose to investigate further the innovation inputs, as it may provide insight on why regions are performing the way they are.

Originality/value: This paper uses multi indicator approach to assess similarities in innovative output of the Russian regions. Our results provide an original insight of the current state of the innovations and their geographical distribution in Russia. This research may be of a practical use to the managerial decisions, connected to the location choice, as well as for adjusting current innovative policy in Russia.

Keywords: Innovation Activity, Russian Regions, Innovative Output, Cluster Analysis

JEL Codes: R11, C38

Introduction

It is a common knowledge that innovations are highly connected to a regional development and do affect productivity of the companies. Therefore, information on current innovative environment in the region (and how it compares to other regions) is highly important for managerial decisions, especially location choices. There is research suggesting that innovative indicators on the regional level has effect on the micro-level indicators, for example on productivity, wages, innovative activity and others. On top of that, current research suggests that innovative activity on the regional level may affect the level of competition in the region.

Case of Russia is especially interesting, since Russian regions are widely considered significantly different from one another in terms of economic and social indicators. There is also a significant variation in terms of innovative activity in Russian regions. For example, according to Russian Statistical Agency, in 2015 the highest share of innovative companies in the region was 20.5% in the Republic of Tatarstan, which is almost 20 times higher than in the region with the lowest share and on par with much wealthier regions like Moscow and Saint Petersburg. Therefore, managerial decisions in this field can be even more non-trivial.

In this research, we try to propose clustering of 83 Russian regions from 2010 to 2015 based on the variety of innovative indicators. Our data includes the following indicators: firms involved in the research activities, number of research personnel, number of scientists with PhD or doctoral degrees, number of patent applications, spending on the R&D activities as a share of GRP, volume of innovative goods, number of new technologies produced and used as well as some other indicators described further.

To empirically group Russian regions, we use hierarchical clustering. We first employ it for the whole dataset to provide the general overview of how Russian regions compare in terms of innovations. After that, data for the separate years is analyzed for more detailed analysis of innovation indicators and their dynamics. The results of cluster memberships are mapped to the geographical location of the regions, providing some insight on how different clusters are situated within Russia.

Topic of innovation clusters has been rather popular for some time in Russia. This can be attributed to the fact that since 2012 Russian government has been systematically supporting regional innovations clusters, as they are viewed as a way to make a transfer from dependence on natural resources export to innovative economic development. Nonetheless, innovative territorial clusters in Russia are in many ways different from clusters in the EU and the USA (see Kutsenko, 2015 for the overview of innovation clusters in Russia). Namely, innovative

clusters in Russia are initially set up and controlled by the government, compared to more private clusters of the West.

This paper uses multi indicator approach to assess similarities in innovative output of the Russian regions. To our knowledge similar research in terms of approach and conclusions has not been previously conducted for the case of Russia. We expect this research to provide an original insight of the current state of the innovations and their geographical distribution in Russia. This research may be of a practical use to the managerial decisions, connected to the location choice. We also suggest that our results may be used to modify Russian innovative policy, both on federal and regional levels.

The rest of the paper is organized as follows. Section 1 covers the current state of research in this field. Section 2 provides detailed description of data and methods used. The next section covers results of clustering algorithms. Practical implications and limitations of the research are outlined in the conclusion.

1 Literature review

In the following review, we try to cover several main aspects connected with geographical distribution of innovations and their effects, along with knowledge spillovers and proximity. Theoretic background for this research is mainly connected to the concept of innovative clusters and spillovers from innovation.

Literature on clusters and their characteristics has been developing for a several decades now, however it is mainly focused on the firms and networks between them. We argue that some characteristics of clusters on the micro level can be also considered on the regional level. One characteristic of a cluster that is frequently mentioned is a geographical proximity of the firms involved in it (see Kuah 2002). We argue that geographical proximity may be also beneficial for binding regions with knowledge and innovative networks, as shorter distances will allow easier transfer of the workforce and knowledge.

Simmie (2003) also suggests that firms can benefit not only from own region innovation networks and environment, but from the neighboring regions as well. This suggests that due to spillover effects regions with higher innovation activity may help neighbors to develop with that regard.

Wang & Wu (2016) conduct an empiric study of the knowledge spillovers among electronics firms in China. They find solid proof that geographical proximity and heterogeneous knowledge stimulate the formation of innovative geographical clusters around the most innovative regions. Läßle et al. (2016), studying agricultural firms of Ireland, also suggests that the most innovatively active regions promote innovations in the neighboring regions.

There is also evidence that geographical proximity allows better knowledge flow between organizations and workers. Bell & Zaheer (2007) highlight that organization-level connections are not that useful when transferring knowledge and effectiveness of the institutional level ties depends on the geographical proximity. Theoretical studies of the dynamics of the spread of innovations and their effects also indicate the possibility of the formation of innovative clusters consisting of nearby regions (see Hägerstrand (1967), Bivand (2015)).

Another important concept we are touching in this research is cognitive proximity between regions of Russia. As it is usually defined cognitive proximity is a similarity in the way actors perceive, interpret, understand and evaluate the world (Knoben & Oerlemans, 2006). It is also closely connected to the idea of absorptive capacity. So regions (firms located there) with the similar level of knowledge and technologies are more likely to be more innovative and successful, as suggested by the Lazzeretti and Capone (2016).

We want to highlight three main points that are found in the literature: geographical innovative clusters are beneficial for regional development and positive spillovers in terms of knowledge are present; geographical innovative clusters are frequently observed in different countries and industries; firms also benefit from the proximity-based characteristics, both geographical and knowledge-based.

2 Data & Methods

We employ the region-level dataset of 83 Russian regions for the period from 2010 to 2015 to cover the period of steady development after global financial crisis. The data is obtained from Russian statistical agency Rosstat.

In general, clustering approach is a widely used tool for assessing innovation systems (see Proksch et al. (2019)) and can be used the current state of the innovative development of the regions as well. For the clustering procedure we employ the following innovative output indicators: number of firms involved in R&D activities, number of patent applications and granted patents, number of new technologies produced and used in production, value of

innovative goods sold (in millions USD), export of technologies (in millions USD). Descriptive statistics are presented in the Table 1 below.

Tab. 1: Descriptive statistics (excl. Moscow and Saint Petersburg)

| | Obs. | Mean | Standard deviation | Median | Min. | Max. | Standard Error |
|-------------------------------------|------|----------|--------------------|---------|------|-----------|----------------|
| Research firms | 492 | 44.64 | 90.56 | 22.00 | 1.00 | 811.00 | 4.08 |
| Patent applications | 492 | 335.07 | 1083.28 | 116.50 | 0.00 | 12681.00 | 48.84 |
| Patents granted | 492 | 265.35 | 852.25 | 88.50 | 0.00 | 8699.00 | 38.42 |
| New technologies produced | 490 | 15.39 | 34.55 | 5.00 | 0.00 | 259.00 | 1.56 |
| New technologies used | 490 | 2450.83 | 3132.46 | 1491.50 | 0.00 | 20021.00 | 141.51 |
| Value of innovative goods, mil. USD | 492 | 34864.08 | 83160.82 | 8162.20 | 0.00 | 851583.36 | 3749.18 |
| Export of technologies, mil. USD | 492 | 466.09 | 2937.99 | 2.24 | 0.00 | 57412.84 | 132.46 |

Source: Own estimations based on Rosstat regional data

Preliminary estimations suggest several implications that characterize correct state of innovative activities in Russia. First, the most worrying finding is that there are several years for several regions, where innovative activities were almost non-existent. This mainly attributes to Republics and Autonomous Districts that are located in the North and East of Russia (i.e. Jewish Autonomous District in 2011, Chukotka Autonomous District, Nenetsk Autonomous district, Republic of Altai and others). We also observe pattern of mean values being at least two times higher than median values, and high values of standard deviation for all variables. This suggest that state of innovation in different Russian regions is drastically different, with some regions not involved in innovative activities at all. Such results may be a call for more uniform innovative policy that takes into account lagging regions as well.

These indicators are frequently used in various research and allow covering different aspects of innovation in the region. (for example see Eriksson, Quin, Wang (2014) or Zhang, (2015)). All values are normalized by subtracting mean value of the variable and dividing by it's standard deviation, which will allow avoiding possible bias towards larger or more economically active regions.

We also want to highlight that using several indicators of the innovations is necessary to uncover different aspects of innovation. Recent research Hauser et al. (2018) suggests that using single composite index or indicator may be inadequate for producing policy implications for innovations in general. On the other hand, single indicators are more useful for estimating specific aspects of innovations.

For the clustering, we use standard hierarchical clustering approach. The analysis is performed in R software following these steps. First, we calculate Euclidian distances between every region in the coordinates of the aforementioned indicators:

$$\rho(X, X') = \sqrt{\sum_i^n (x_i - x'_i)^2},$$

where $\rho(X, X')$ is a distance between two vectors of coordinates.

Second, using Ward's (1963) clustering method we assess cluster memberships for each observation, obtaining system of nested clusters. Based on the number of cluster members and overall membership distribution we select number of clusters and present it in the Results section below.²⁷

During preliminary testing, we found that both Moscow and Saint Petersburg are significantly different from other regions and from each other. Namely, innovative indicators in these regions are 10-20 times higher than the average values. Therefore, we exclude them from further estimations, as clustering results will be biased otherwise.

As a mean of confirming the results and checking if the dynamics of the innovation development are different for Russian regions, we repeat similar analysis for each year of the dataset. If the dynamics of the innovative development are not uniform, we should observe the change of the cluster memberships, with regions developing slower than others falling behind, and faster developing regions – moving to more innovative clusters.

3 Results

For the hierarchical clustering, we observe the following. First, we conduct estimation based on the averages for the whole period.

We observe rather strict stratification of the regions into four groups presented in the Table 2 below.

²⁷ Distance matrixes and systems of nested clusters are excluded from the paper due to size limitations, but available from authors upon request.

Tab. 2: Results of the hierarchical clustering for the Russian regions from 2010 to 2015

| | |
|-----------|---|
| Cluster 1 | Amur Region, Astrakhan Region, Bryansk Region, Chechen Republic, Chukotka Autonomous District, Jewish Autonomous District, Kaliningrad Region, Kamchatka Territory, Kirov Region, Kostroma Region, Kurgan Region, Magadan Region, Murmansk Region, Nenets Autonomous district, Pskov Region, Republic of Adygeya, Republic of Altai, Republic of Buryatia, Republic of Ingushetia, Republic of Kalmykia, Republic of Karelia, Republic of Khakassia, Republic of Mariy-El, Republic of North Ossetia-Alania, Republic of Sakha (Yakutia), Republic of Tuva, Smolensk Region, Tambov Region, The Kabardino-Balkarian Republic, The Karachaevo-Cherkessian Republic, Yamalo-Nenets Autonomous region, Zabaykalsky Territory |
| Cluster 2 | Altai Territory, Arkhangelsk Region, Belgorod Region, Chuvashi Republic, Irkutsk Region, Ivanovo Region, Kaluga Region, Kemerovo Region, Khabarovsk Territory, Komi Republic, Krasnodar Territory, Kursk Region, Novgorod Region, Novosibirsk Region, Orel Region, Orenburg Region, Penza Region, Primorsk Territory, Republic of Daghestan, Republic of Mordovia, Republic of Udmurtia, Ryazan Region, Saratov Region, Stavropol Territory, Tomsk Region, Tula Region, Tver Region, Tyumen Region, Ulyanovsk Region, Vladimir Region, Volgograd Region, Vologda Region, Voronezh Region, Yaroslavl Region |
| Cluster 3 | Khanty-Mansijsk Autonomous region, Krasnoyarsk Territory, Leningrad Region, Lipetsk Region, Omsk Region, Perm Territory, Republic of Bashkortostan, Rostov Region |
| Cluster 4 | Chelyabinsk Region, Moscow Region, Nizhni Novgorod Region, Republic of Tatarstan, Sakhalin Region, Samara Region, Sverdlovsk Region |

Source: Own estimations based on Rosstat regional data

Clusters²⁸ are ranked in terms of innovative output with cluster 1 being the least innovative and the cluster 4 being the most innovative. We want to highlight several patterns in the clustering of the regions. First, distribution is far from uniform, with most regions having low level of innovations. See Table 3 for core statistics of each cluster. It is also should be noted, that most of Republics and Autonomous districts are parts of clusters 1 and 2, except for the Republic of Tatarstan, Republic of Bashkortostan and Khanty-Mansijsk Autonomous region. This implies that structural problems in innovative development do exist in Russia and they are more pronounced for Autonomous districts and Republics, who are less dependent on the federal decisions.

²⁸ When talking about clusters in this section, we are not talking about clusters in economic sense (like Silicon Valley, or Skolkovo), but as about a group of regions, that are similar in terms of innovative indicators we are considering. Regions in these clusters may have completely different specialization and are not required to be close to each other. However we expect to see geographical proximity of similar regions as well.

We also observe that centers of Clusters 1 and 2 are rather close to each other, while at the same time Clusters 3 and 4 are different from each other and first two clusters. This suggests that huge gap is present in the innovative performance of the Russian regions. The modeled clusters explain 60.9% of the indicators' variance, which adequately high. At the same time it suggests that some other indicators might be determining distribution of Russian regions.

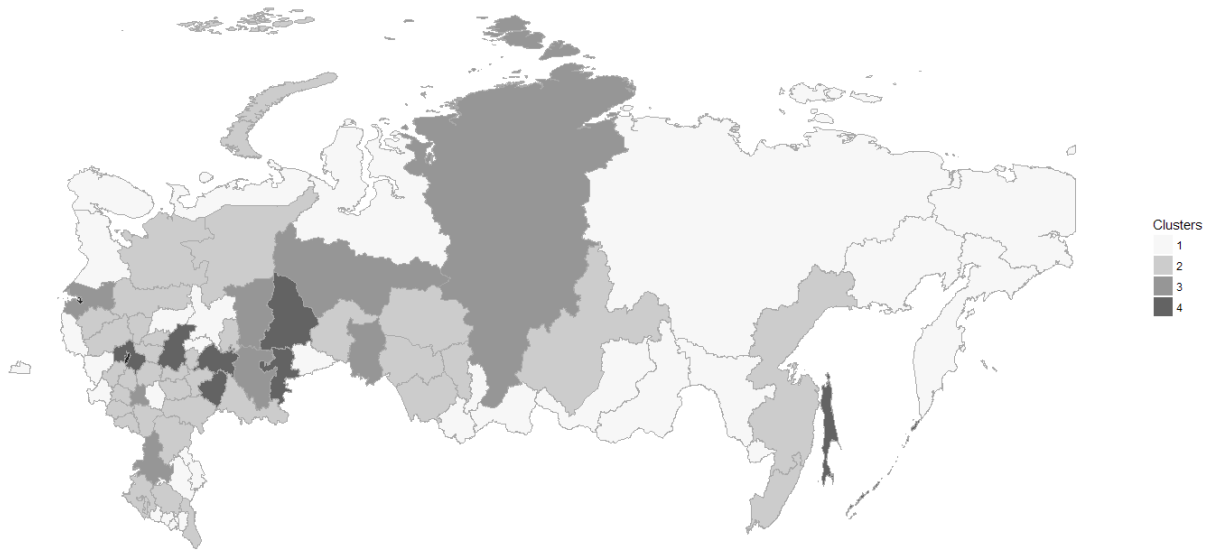
Tab. 3: Clustering statistics for the 2010-2015 average values

| | Cluster 1 (n=34, WSS=3.62) | | Cluster 2 (n=40, WSS=10.20) | | Cluster 3(n=8, WSS=5.32) | | Cluster 4 (n=6, WSS=31.00) | |
|-------------------------------------|----------------------------|---------|-----------------------------|----------|--------------------------|----------|----------------------------|-----------|
| | Mean | Median | Mean | Median | Mean | Median | Mean | Median |
| Research firms | 13.33 | 12.00 | 33.29 | 28.43 | 45.54 | 47.92 | 99.48 | 93.67 |
| Patent applications | 67.50 | 37.50 | 210.24 | 180.58 | 331.52 | 312.00 | 631.26 | 543.33 |
| Patents granted | 42.12 | 28.08 | 173.25 | 147.42 | 269.60 | 276.33 | 499.19 | 445.17 |
| New technologies produced | 2.22 | 0.80 | 10.37 | 7.50 | 10.81 | 9.58 | 48.88 | 59.17 |
| New technologies used | 746.54 | 506.33 | 2109.56 | 1820.00 | 3167.83 | 2856.25 | 8068.48 | 7239.50 |
| Value of innovative goods, mil. USD | 2575.28 | 1663.80 | 16154.39 | 13862.74 | 46985.10 | 42513.16 | 172509.08 | 195816.36 |
| Export of technologies, mil. USD | 78.57 | 0.00 | 129.96 | 15.01 | 460.39 | 265.53 | 876.28 | 844.59 |

Source: Explained variance (total sum of squares divided by the between sum of squares) = 60.9%, Own estimations based on Rosstat regional data

We also proceed to map the clusters over the map of Russia, to illustrate how innovative proximity correlates to the geographical one. The main interest here are the most innovative clusters. The results of the mapping are presented in Figure 1.

Fig. 1: Geographical distributions of clusters



Source: Own estimations based on Rosstat regional data

We observe that the most innovative regions from the first two clusters are located in the European part of Russia, but they are not necessarily in close proximity to Moscow or Saint Petersburg (the current innovative leaders of Russia). At the same time all regions from the Cluster 4, except for the Sakhalin Region, are either direct neighbors to other regions of the clusters are close to them. It is also evident that less innovative clusters are situated around more innovative ones. So more innovative regions act as centers of innovation, producing positive spillover effects. As we perceive it, the most adequate explanation for such pattern will be connected to the fact that the closer regions are to each other, easier it will be for qualified workers and firms to move from one region to another or just cooperate with firms from the neighboring regions. The same argument, along with the differences in concentration of workforce and knowledge, may be viable for explanation why European regions of Russia are more innovative. Regions in the European part of Russia are much smaller than the Asian ones.

As for the dynamics of innovative indicators, there is little to no change in clusters 1 and 2, which means that less innovative regions stay behind. Memberships are more frequently change in case of clusters 3 and 4. In the start of observation period cluster of the most innovative regions mostly consists from the same members as presented above (except for Chelyabinsk region), however over the years, the memberships change with some regions falling out from the Cluster 4, i.e. Perm region, and some joining as aforementioned Chelyabinsk region. It is also worth noting that in 2015 this cluster consists of only Moscow region, Chelyabinsk region, Republic of Tatarstan, Nizhni Novgorod Region, Samara Region

and Sverdlovsk region, while all other innovative regions are included in the Cluster 3. This result suggests that difference in terms of innovations between regions is growing, which, in turn, implies that previously implemented innovative policy failed to shrink the gap between most and least innovative regions, or even made it wider. Figures 2 and 3 below show the difference between mapping of clusters in 2010 and 2015 in Russia, respectively.

Statistics of the clustering procedure for years 2010 and 2015 are presented in the Tables 4 and 5 below. We observe mean and median growth in each cluster in 2015 compared to 2010 values, however two worrying patterns can be highlighted. Mean and median values are growing faster for Clusters 3 and 4, while some indicators (i.e. patent applications) become even lower for less innovative regions. Share of explained variance is adequate for both subsets.

Tab. 4: Clustering statistics for the 2010 values

| | Cluster 1 (n=41, WSS=6.80) | | Cluster 2 (n=24, WSS=15.63) | | Cluster 3(n=3, WSS=2.71) | | Cluster 4 (n=8, WSS=40.10) | |
|-------------------------------------|----------------------------|---------|-----------------------------|---------|--------------------------|----------|----------------------------|----------|
| | Mean | Median | Mean | Median | Mean | Median | Mean | Median |
| Research firms | 17.12 | 16.00 | 35.96 | 29.00 | 21.67 | 10.00 | 92.50 | 73.00 |
| Patent applications | 82.46 | 79.00 | 337.52 | 258.00 | 166.33 | 81.00 | 613.63 | 497.50 |
| Patents granted | 62.83 | 51.00 | 228.26 | 197.00 | 183.67 | 89.00 | 517.50 | 459.00 |
| New technologies produced | 2.20 | 1.00 | 8.22 | 6.00 | 12.33 | 0.00 | 26.38 | 18.00 |
| New technologies used | 1182.71 | 1006.00 | 2378.04 | 1818.00 | 2953.67 | 2212.00 | 7866.50 | 5931.00 |
| Value of innovative goods, mil. USD | 3087.82 | 2159.16 | 9715.11 | 8395.60 | 22917.69 | 19351.61 | 81689.14 | 70892.10 |
| Export of technologies, mil. USD | 30.42 | 0.00 | 123.44 | 37.80 | 357.11 | 315.56 | 548.64 | 225.47 |

Source: Explained variance (total sum of squares divided by the between sum of squares) = 59.6%, Own estimations based on Rosstat regional data

Tab. 5: Clustering statistics for the 2015 values

| | Cluster 1 (n=42, WSS=5.36) | | Cluster 2 (n=25, WSS=13.82) | | Cluster 3(n=6, WSS=4.47) | | Cluster 4 (n=6, WSS=17.87) | |
|-------------------------------------|----------------------------|---------|-----------------------------|----------|--------------------------|----------|----------------------------|-----------|
| | Mean | Median | Mean | Median | Mean | Median | Mean | Median |
| Research firms | 19.57 | 18.50 | 45.72 | 35.00 | 46.50 | 49.50 | 123.33 | 111.00 |
| Patent applications | 72.43 | 57.00 | 250.80 | 185.00 | 207.83 | 256.50 | 676.83 | 538.50 |
| Patents granted | 71.67 | 43.50 | 244.76 | 173.00 | 208.00 | 235.50 | 640.67 | 498.50 |
| New technologies produced | 3.02 | 1.00 | 14.12 | 12.00 | 9.50 | 7.00 | 66.17 | 66.00 |
| New technologies used | 1011.52 | 752.50 | 2833.32 | 2533.00 | 2590.83 | 2717.50 | 9905.33 | 9163.50 |
| Value of innovative goods, mil. USD | 5558.48 | 2737.41 | 38998.83 | 29603.08 | 50986.31 | 44744.44 | 208575.83 | 209358.40 |
| Export of technologies, mil. USD | 72.62 | 0.00 | 332.89 | 94.31 | 1877.04 | 182.59 | 1242.59 | 1037.25 |

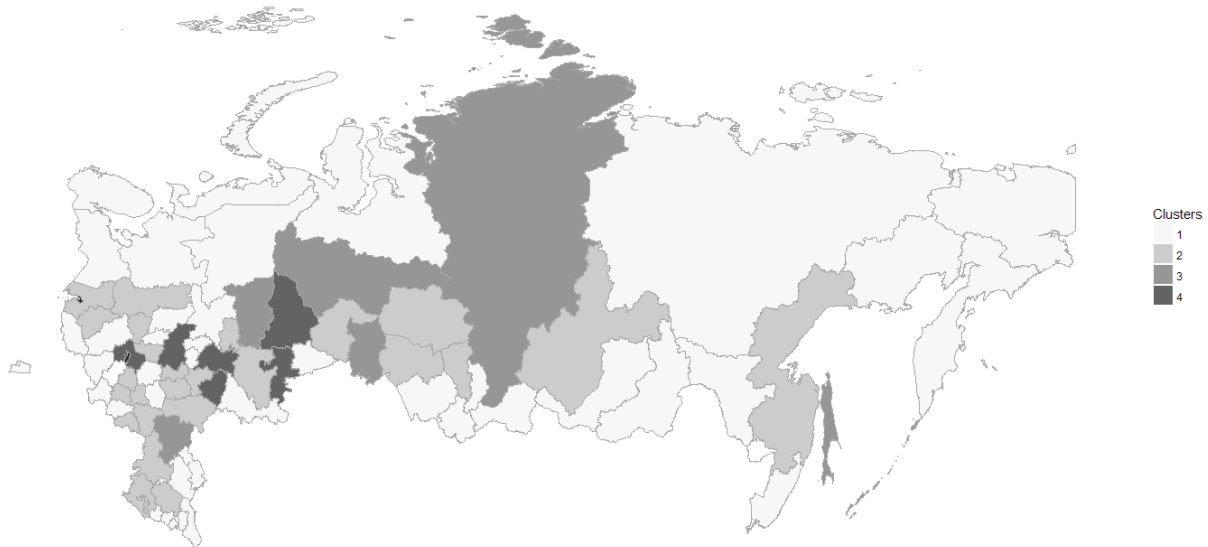
Source: Explained variance (total sum of squares divided by the between sum of squares) = 66.5%, Own estimations based on Rosstat regional data

Obtained results suggest growing stratification of the Russian regions in terms of innovative performance. Considering that Russian government has been supporting innovations in regions as a part of the federal strategy, we can conclude that it is much more effective for leaders in innovation, rather than the lagging regions.

Fig. 2: Geographical distributions of clusters in 2010


Source: Own estimations based on Rosstat regional data

Fig. 3: Geographical distributions of clusters in 2015



Source: Own estimations based on Rosstat regional data

From the figures above it can be clearly seen that number of the most innovative clusters has reduced over the years. All leading innovative regions in 2015, except for the aforementioned Chelyabinsk region, were already innovative leaders in the start of the observation period. Same can be said for the least innovative regions, most regions that were clustered as the least innovative, stay in this position in the end of the observation period as well, especially in the Eastern part of Russia. Another observed pattern is that regions do not move over one cluster from their initial position, meaning that regional policies only facilitate steady changes, but not drastic ones.

Conclusion

In this study, we apply hierarchical clustering approach to innovative outputs of Russian regions. We employ region-level data for the period from 2010 to 2015 since during this period there were no major shocks for the economy.

Our main results suggest overall suggest four well-defined clusters of Russian regions in terms of innovation outputs. Most of the Russian regions fall into clusters with low innovation outputs. The most innovative Russian regions are Chelyabinsk Region, Moscow Region, Nizhni Novgorod Region, Republic of Tatarstan, Sakhalin Region, Samara Region, and Sverdlovsk Region.

We note that most of the regions from two of the most innovative clusters are situated in the European part of Russia and usually close to each other. It may suggest that positive spillovers are present in terms of innovations and regions benefit from innovative leaders nearby. These results are in line previous findings, namely the similar results we obtained by Wang & Wu (2016) for Chinese regions and by Läßle et al. (2016) for Ireland. For the case of Russia work of Aldieri, Kotsemir, & Vinci (2018) also confirms presence of knowledge spillovers, which are especially high for Ural and neighboring regions. With that regard, we suggest that regional development policy can be focused on already leading regions, which have experience in producing innovations. Such approach will allow for knowledge transfer between the regions and should can facilitate innovative development in neighboring regions.

Performed dynamic exercise yields several interesting results. First, we do not observe neither uniform growth of all regions, nor catching up of the less developed ones. This implies that federal innovation policy is either ineffective in general, or effective just for the more innovative regions that already have some kind of experience innovation, or in other words, have already generated higher level of knowledge and human capital as innovative inputs. What is even more worrying is that previous research states that for the period before 2010 this gap between more innovative and less innovative regions was already growing (see Kazantsev (2013)). Thus, we argue that innovation policy of Russia, apart from directly stimulating all regions through subsidies and such, should specifically focus on accumulating knowledge and human capital in lagging regions, for example through importing tech technologies from other regions and countries. Second, we see that there is no drastic change in the cluster memberships. This suggests that regional innovative policies cannot facilitate fast and significant growth, but rather may be helpful to improve borderline cases. We argue, that this may suggest increasing role of federal innovative policy, especially in Republics and Autonomous Districts. This, combined with aforementioned measures on accumulating knowledge in lagging regions, may be viable strategy to improve overall innovativeness of Russian regions as well is making it uniform.

There are limitations to this research. Namely, consideration of innovative inputs is out of scope of this paper, thus, one cannot fully understand the economic reasons behind the current innovative situation in Russian regions. As a prospect for further research, we suggest to consider these indicators, which should provide more insight on the connection between geographical proximity, proximity in knowledge and proximity in innovative outputs. Such expansion will also help to understand why the gap between more innovative and less innovative regions is growing, allowing to distinguish between lack of innovative inputs and

other reasons. We also suggest that use of general economic indicators may be beneficial for better understanding of the reasons behind cauterization presented in this paper.

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STATE SUPPORT AND PROSPECTS FOR THE DEVELOPMENT OF AGRICULTURE IN RUSSIAN REGIONS

Maria Markhaichuk – Natalia Kovalenko – Andrey Chekunov

Abstract

Purpose: The aim of this study is to investigate whether agricultural production increases due to state support in the programs and activities on development of agriculture in Russian regions.

Design/methodology/approach: Authors have collected data on 85 Russian regions for the 2013-2017 years from Unified Interdepartmental Information and Statistical System (EMISS) of the Russian Federation. Panel regressions with fixed effects were employed to estimate the impact of state support funds amount on the increase in agricultural production using up to three years lag.

Findings: The regression analysis confirmed statistically significant positive impact of state support on the agriculture production in Russian regions. The study showed that state support for agriculture is highly effective in the short term, however, its impact increases over time.

Research/practical implications: The study results can be used to justify the increase in the budget funds expenditure to support agriculture, taking into account Russia's WTO commitments. Also, they can find practical implications in the formulation of state and regional programs for the development of agriculture and other industries for future periods.

Originality/value: This study stands out from other studies on the effectiveness of state support for agriculture in the Russian Federation by the fact that there were no significant researches, which would confirm a strong positive effect of the support being implemented. The study proved that state support for agriculture in the Russian Federation has positive effects in short and medium term.

Keywords: State Support Efficiency, Agriculture, Subsidies, Development Program, Incentives

JEL Codes: O13, O18, H71

Introduction

State support of agriculture in modern conditions is considered as an integral part of the regulation of the industry by the state. It comprises various economic, legal and political measures aimed at promotion of entrepreneurship (Bondarenko et al., 2017). The specificity of the agricultural producers' activities is associated with many factors that do not depend on their behavior, which directly affect their financial results. For example, in agriculture, the farmers can do very little about geographical differences in soil quality, and are normally not able to move their production to other geographical regions (Alem et al., 2019). The high importance of agriculture for the welfare of the nation predetermines the need for active state participation in supporting the industry. Since 2017, there have been profound financial and economic transformations of the mechanism of state support for agriculture in the Russian Federation. The allocation of budget transfers to producers is now linked to the effectiveness of the use of subsidies in agricultural production (Samygin and Kudryavtsev, 2018). The state independently determines the forms, methods and directions of agriculture support taking into account the development challenges the industry faces. With the help of approved indicators, it has the ability to monitor agricultural development and, if necessary, make appropriate adjustments to its support policy. Interventions should be designed to shape the decisions of aid recipients to generate optimal long-term outcomes (Shapiro, 2019).

At the same time, there are restrictions on the volume and type of state support for domestic agriculture. This is due to Russia's participation in the World Trade Organization (WTO) and Russia's WTO commitments. The rules and regulations of the WTO impose restrictions on the amount of direct state financial support for the industry. The WTO determines its maximum level for each of its members. Under these conditions, the effectiveness of state financial support for agriculture is of particular importance. The state needs to allocate budget funds between regions and enterprises as efficiently as possible in order to ensure the long-term development of the industry with no possibility of substantial increase in financial support in the future. The way state support influences the industry development over time determines the efficiency of budget spending and serves as an indicator for assessing the decision taken by the state. Establishing the relationship between the volume of state support and economic indicators of industry development in the dynamics is an important task of indicative planning, which determined the relevance of this study.

The aim of this study is to investigate whether agricultural production increases due to state support in the programs and activities on development of agriculture in Russian regions.

1 Literature Review

The problem of providing state support to national producers was and still is one of the most debatable in economics. Representatives of domestic and foreign economic thought within the framework of various approaches consider the possibility of providing state support and its conditions, and the forms, methods and directions of implementation of appropriate support. For example, Smith (1776) and Ricardo (1817) emphasized the exceptional nature of non-market incentives for the national production development, admitting short-term measures only during the war, as a response to the restriction of trade by the other party to equalize the conditions of competition. Helpman and Krugman (1989), Brander and Spencer (1992), Pursell and Snape (1973) linked state support to the export promotion of domestic enterprises. Stiglitz (2002) advocated equality of competitive conditions in international markets and providing support only to industries with potential for development.

A considerable effort has been devoted, in recent years, to the analysis of the impact of financial incentives and subsidies on the economic performance of recipient firms (Porro and Salis, 2018). There are papers providing evidence of the effectiveness of measures to support enterprises. Alvarez-Ayuso et al. (2018) confirmed long run effect of public grants and tax credits on R&D investment in Spanish manufacturing firms. The research findings of Zhang and Guan (2018) showed that direct government subsidies favor Chinese high-tech companies in the short-term, but hinder them in their long-term innovation performance. Subsidies are a good predictor of future regional economic development in terms of growth of GDP per capita and changes of the unemployment rate (Kolarikova et al., 2018). Acey et al. (2019) discovered that subsidies may stimulate access to safely managed sanitation services for low-income households. Bertoni et al. (2019) found evidence that Spanish state support for national enterprises (participative loans) provided their beneficiaries' employment and sales significant grow.

Some authors provided evidence of the state support ineffectiveness. Dvoulety and Blazkova (2017) showed, that public support of the companies from the Czech food processing industry did not lead to the better financial performance of the supported enterprises. Domadenik et al. (2018) found evidence that firms in Slovenia receiving a higher portion of subsidies were less productive when compared with counterparts from the same sector receiving less or no subsidies. Frey and Mojtahedi (2018) showed weak impact of solar subsidies on California's non-residential sector. Yang et al. (2019) indicated that the measures of state support of the national automotive industry may expand the market share of domestic

vehicles with less technology. Grainger et al. (2019) noticed GDP increase when cross subsidization reduces.

Some researchers consider the effect of subsidies depending on various factors. Huang et al. (2019) showed how subsidies affect the promotion of certified products by a low-cost firm and a high-cost firm: if subsidy is too low, the low-cost firm will produce an uncertified product while the high-cost firm will produce a certified product. Chen and Su (2019) concluded that using a coordination strategy in the photovoltaic supply chain allows to maximize social welfare with the least government subsidies and, at the same time, make much higher profits in the photovoltaic supply chain compared to profits earned without any subsidies. Hunermund and Czarnitzki (2019), investigating the effects of subsidy program for R&D, argued that treatment effects increase with project quality, but R&D grants have no average effect on job creation and sales growth. Safarzadeh and Rasti-Barzoki (2019) determined that tax deduction is better stimulation for energy-efficient manufacturer in competition with same manufacturers than subsidy scheme, but subsidy gives better conditions of controlling the household' energy consumption. Xiang (2019) proved the additional effect of state R&D support, which differ among the levels of industry competition. Bellucci et al. (2019) examined two programs of research and innovation support for SMEs: individual research projects and collaborative research projects. The first was successful, but the second had weaker effects: both effects had not always a uniform distribution among project participants.

Such contradictory results of research of the state support effects on supported enterprises and industries speak of the many-sided nature of the factors influencing the effectiveness of the support being implemented, the difference in approaches and methods of efficiency analysis.

As for Russia, recent studies also show rather weak impact of subsidy to Russian regions for agrarian sector support. The results of the analysis indicate that the effectiveness of subsidies is not related to the amount of support funds allocated (Samygin and Kudryavtsev, 2018). We suppose the results are not quite convincing due to the research methods used. The study was based on cross-sectional data, while the use of panel data is more accurate. That is why we decided to build our own research to check whether agricultural production increases due to state support in the programs and activities on agricultural development of Russian regions or not.

2 State support for agriculture in the Russian Federation

State support for agriculture in the Russian Federation is carried out in accordance with the State Programme for the Development of Agriculture and Regulation of Markets for Agricultural Products, Raw Materials and Food for 2013-2020, which was approved by Government resolution No. 717 dated July 14, 2012. The State Programme was prepared by the Ministry of Agriculture of the Russian Federation in accordance with article 8 of the Federal Law “On the Development of Agriculture“.

In accordance with the Protocol on the accession of the Russian Federation to the World Trade Organization dated December 16, 2011, the Russian Federation pledged to gradually reduce the level of state support for agriculture. In 2012, the volume of domestic support should not exceed \$ 9 billion, and by 2018 it should have decreased to \$ 4.4 billion as seen from Table 1.

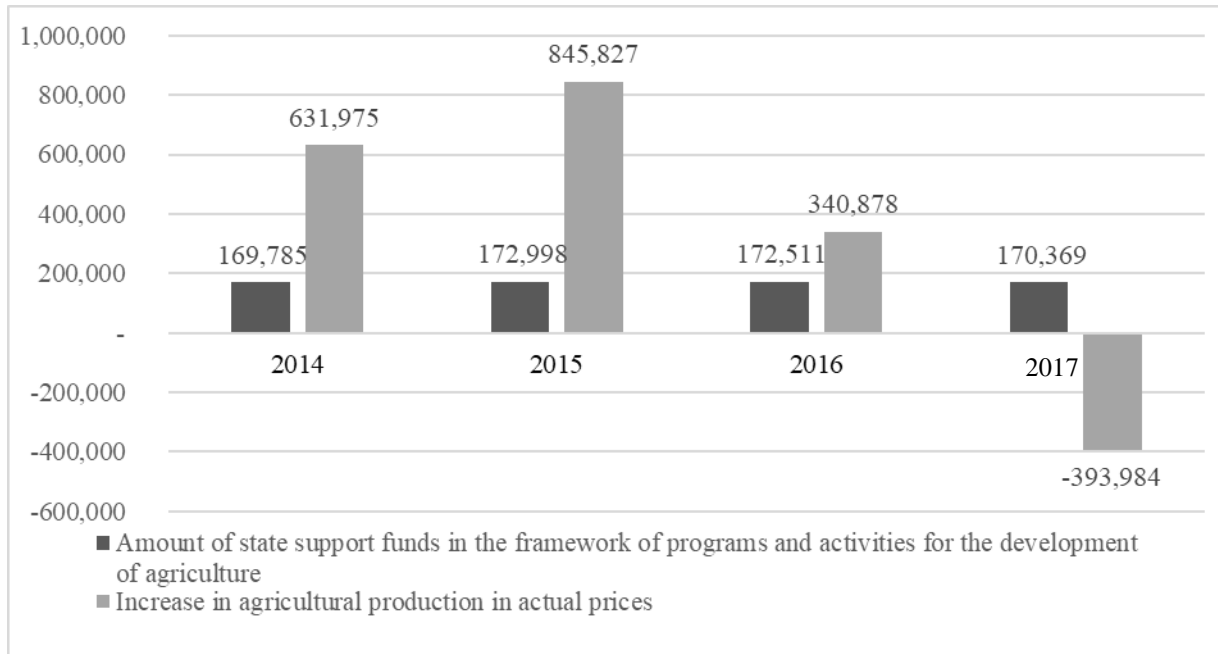
Tab. 1: Agricultural Products: Commitments Limiting Subsidization. Domestic Support: Total Aggregate Measurement of Support (AMS) Commitments

| BASE TOTAL AMS | Annual and final bound commitment levels (Billion USD) | | | | | | | Relevant Supporting Tables and document reference |
|----------------------|--|------|------|------|------|------|------|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | |
| 1 | 2 | | | | | | | 3 |
| | 9.0 | 9.0 | 8.1 | 7.2 | 6.3 | 5.4 | 4.4 | JOB/ACC/5/Rev.3 |

Source: Protocol on the accession of the Russian Federation to the World Trade Organization, WT/L/839, 16 December 2011

The need to reduce the volume of state support for agriculture in accordance with the requirements of the WTO could serve as one of the reasons for the decline in the output of the industry (Fig. 1).

Fig. 1: Dynamics of state support funds amount in the framework of programs and activities for the development of agriculture and increase in agricultural production in actual prices, million rubles



Source: EMISS (2018); authors' elaboration

However, we should note that the Russian Federation did not reach the maximum level of state support prescribed by the WTO in any year over the period 2012-2017. Thus, in 2013, in terms of US dollars, state support amounted to about \$ 5.7 billion, in 2014 – \$ 3.0 billion, in 2015 – \$ 2.4 billion, in 2016 – \$ 2.9 billion, in 2017 – \$ 3.0 billion.

The current amount of state support funds does not reach the maximum allowable volume; therefore, the decrease in state support of agriculture can be considered premature, but only if the support of agriculture has significant positive effect.

3 Data and Empirical Results

In order to check whether decrease in amount of state support funds leads to decrease in agricultural output, and vice versa, increase in amount of state support funds leads to increase in agricultural output, regression analysis was applied.

The following hypothesis was to be tested:

H0: The greater amount of state support funds allocated across Russian regions in the framework of programs and activities for the development of agriculture is associated with the greater increase in agricultural production.

The study was based on the data from Unified Interdepartmental Information and Statistical System (EMISS) of Russian Federation for the 2013-2017 years. It was all available data to the beginning of the study since the start of State Programme for the Development of Agriculture and Regulation of Markets for Agricultural Products, Raw Materials and Food for 2013-2020.

Data on 85 Russian regions were taken as a basis for the research. The sample includes data on amount of state support funds allocated across the Russian regions in the framework of programs and activities for the development of agriculture and the data on agricultural production in actual prices for the 2013-2017 years.

We used the amount of state support funds (State Support, million rubles) as an independent variable for testing the hypothesis. The dependent variable was the increase in agricultural production (Production Increase, million rubles), which was calculated as the difference between the agricultural production of the current period and the agricultural production of the previous period.

Descriptive statistics for the above indicators are presented in Table 2 below.

Tab. 2: Descriptive statistics

| Variable | Mean | Median | Maximum | Minimum | Std. Dev. | Observations |
|----------------------------------|----------|----------|----------|----------|-----------|--------------|
| State Support, mln. rubles | 2040.210 | 1435.133 | 13641.99 | 1.002200 | 2134.735 | 337 |
| Production, mln. rubles | 59780.15 | 38681.90 | 402845.9 | 0.000000 | 63411.13 | 337 |
| Production Increase, mln. rubles | 4234.789 | 1724.600 | 79234.60 | -39412.9 | 11176.77 | 337 |

Source: Own elaboration

All variables were tested with Levin, Lin & Chu unit root test for panel data. All variables are stationary at 5% level of statistical significance. The fixed effects estimation approach was chosen as an estimation technique, because the panel data consist of regions that do not change over time. Fixed effects models were tested for redundancy of fixed effects. Also fixed effects approach is appropriate according to Hausman test.

We quantified the impact of state support funds amount on increase in agricultural production using up to three years lag. Estimated econometric models are presented in Table 3.

Tab. 3: Model table

| Variable / Model | Model 1 | Model 2 | Model 3 | Model 4 |
|---|--------------------------|------------------------|-------------------------|----------------------------|
| Dependent variable | Production Increase | | | |
| State Support | 3.092611** (1.345577) | | | |
| State Support(-1) | | 1.178870 (1.389814) | | |
| State Support(-2) | | | 3.044515 (2.044697) | |
| State Support(-3) | | | | 10.42478*** (2.585827) |
| Constant | -2074.788 (2811.810) | 1649.366 (2982.716) | -3340.124 (4419.242) | -22777.19*** (5632.022) |
| R-squared | 0.254714 | 0.247128 | 0.199011 | 0.303317 |
| Adjusted R-squared | 0.002326 | -0.010913 | -0.211251 | -0.428200 |
| F-statistic | 1.009217 | 0.957710 | 0.485083 | 0.414641 |
| Observations | 337 | 334 | 249 | 165 |
| Note: Standard Errors are in parentheses. *** stat. significance on 1%, ** stat. significance on 5%, * stat. significance on 10%. | | | | |

Source: Own elaboration

Model 1 is significant at 5% significance level. Models 2 and 3 are insignificant. Model 4 is significant at 1% significance level.

According to the obtained models, we can draw the following conclusions.

Model 1 confirms statistically significant positive relationship between the amount of state support funds and the increase in agricultural production. 1 ruble of state support funds allocated leads to an increase in agriculture production by 3 rubles.

Models 2 and 3 show, that there is no relationship between the amount of state support funds allocated across Russian regions one or two years ago and the increase in agriculture production in the current period.

Model 4 confirms statistically significant positive relationship between the amount of state support funds allocated across Russian regions three years ago and the increase in agricultural production in the current period. 1 ruble of state support funds allocated three years ago leads to an increase in agriculture production by 10 rubles in the current period.

Thus, the formulated hypothesis H0 was confirmed.

The study showed that state support for agriculture is highly effective in the short term (the effect comes in the year of support). However, state support has the strongest effect in the medium term (in three years after the implementation of the support).

Conclusion

The aim of this study was to investigate whether agricultural production increases due to state support in the programs and activities on development of agriculture in Russian regions. The regression analysis confirmed statistically significant positive impact of state support on the agriculture production. The study showed that 1 ruble of state support funds allocated leads to an increase in agriculture production by 3 rubles; 1 ruble of state support funds allocated three years ago leads to an increase in agriculture production by 10 rubles in the current period.

State support for agriculture in Russian regions has positive effects in the short and medium term. Moreover, the medium-term effects are more than three times greater than the short-term effects. We also note that the results of this study have established a general positive effect for the state as a whole, which does not mean its automatic and uniform distribution to each region or enterprise. In addition, when building models, inflation was not taken into account.

Considering the strong influence of state support for agriculture on the agricultural production increase, the question of the economically sound allocation of subsidies is particularly acute. This question may be the subject of further research. In addition, further research may be aimed at identifying the factors that determine the success of the state support for agriculture and other industries.

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INTELLECTUAL CAPITAL AS A BASIS FOR INNOVATIVE DEVELOPMENT

Maria Markhaichuk – Natalia Kovalenko – Andrey Chekunov

Abstract

Purpose: The purpose of this paper is to investigate the link between intellectual capital and innovative development on the example of Russian regions.

Design/methodology/approach: Authors have collected data on 85 Russian regions for the 2013-2016 years from Unified Interdepartmental Information and Statistical System (EMISS) and Federal State Statistics Service of the Russian Federation. Panel regressions with random effects were employed to estimate impact of intellectual capital, VAIC and their components on the indicators of regional innovative development.

Findings: The regression analysis confirmed significant and positive impact of intellectual capital, VAIC, and their components on the indicators of innovative development of Russian regions. Human capital and its effectiveness have stronger impact on the innovative development of Russian regions than other components of intellectual capital and VAIC.

Research/practical implications: The study results can be used by state bodies in the formation of innovative development strategies for future periods and in the development of measures to achieve the targets of the current strategy.

Originality/value: This study empirically proved positive impact of intellectual capital, VAIC and their components on innovative development of Russian regions.

Keywords: Regional Intellectual Capital, Innovations, VAIC, the Russian Federation

JEL Codes: O31, O34, R11

Introduction

In the light of the recent external political challenges, an increase in the efficiency of Russia's innovative activity is one of the necessary conditions to transit to a new economic policy focused on accelerating socio-economic development, on technological renovation and knowledge economy (Fedotova et al., 2016).

There is a demand to develop and implement new methods for the formation of innovative strategies and the management of the innovative process (Kudryavtseva and Shinkevich, 2015).

The maintenance of the efficient transition to the knowledge-based economy is stated in the Concept of the long-term socio-economic development of the Russian Federation until 2020, while the transfer of the Russian economy to the innovative path of development is the goal of the Strategy of innovative development of the Russian Federation until 2020. However, the researchers note the impossibility of achieving the goals of the Strategy in the appropriate time (Rudakov and Akhmetova, 2017).

Since innovations essentially draw upon deployed knowledge, finding association between innovation on the one hand and various aspects of intellectual capital (IC) and knowledge flows on the other hand is interesting (Nguyen, 2018).

Recent studies are devoted to the measurement of regional IC (Nitkiewicz et al., 2014, Trequattrini et al., 2018), including regional IC in the Russian Federation (Kireeva and Galiakhmetov, 2015, Kotenkova and Korablev, 2014, Tsertseil and Ordov, 2017), as well as to the investigation of the relationship between IC, its components and innovative activity, potential and development (Fedotova et al., 2016, Echebarria and Barrutia, 2013, Leitner, 2015, Panshin and Tobien, 2016, Santos-Rodrigues et al., 2015).

However, in general, in all regions of the Russian Federation, the relationship between IC and innovative development has not yet been studied. Therefore, the purpose of this study is to investigate the relationship between IC, its components and indicators of regional innovation development.

1 Literature Review

In the modern world, IC has become one of the most valuable assets of the organization, region or state. IC was defined as “organized knowledge that can be used to produce wealth” (Demigha, 2015). From a wholly accounting approach, it has been scanned and reported as intangible assets, source in itself of sometimes abnormal expected future returns (Lopes, 2014).

Many studies are devoted to the assessment of IC level, its impact on the economic efficiency of the organization, region, and nation (Buenechea-Elberdin, 2017, Demigha, 2015, Trequattrini et al., 2018).

The existing literature presents different approaches to the measurement of IC. Approaches vary depending on viewpoints of different groups of interest or disciplines. The most popular is the three-component model of IC (human capital, structural capital and relational capital) and its variations, which include such components as technology, social, innovative and IT capital (Buenechea-Elberdin, 2017, Matricano, 2016, Pedro et al., 2018, Stam and Andriessen, 2009, Wee and Chua, 2016).

Intellectual capital management is not and can not be a means to an end in itself but must be in the function of value creation that is the prime objective of any business (Pulic, 2004). Using the Pulic's Value Added Intellectual Coefficient (VAIC™) allows analyzing the role of human, structural and physical capital in organizational performance. (Molodchik & Bykova, 2011) investigated empirically the dynamics and structure of VAIC, and studied the relation between the intellectual capital and indicators of organizational performance, such as labor productivity, sales growth and profitability in Russian industrial enterprises. VAIC model more often is applied in studies on the organizational level (Dzenopoljac et al., 2017, Al-Musali and Ismail, 2016, Carrington, 2013), however, value added and efficiency of value creation reconnect the micro and macro levels of economy after a long time. This is due to the fact that these measures are equally relevant at all levels of business, from processes and units inside the company to company level, at the level of virtual communities, to city, regional and national economy level (Pulic, 2008). As for the Russian Federation, the studies using VAIC model on regional level are missing.

Recent researches of RIC in Russia are dedicated to entrepreneurial capacity of universities and its impact on regional economic growth (Kochetkov et al., 2017), developing the system of principles to manage the intellectual capital of a region (Makarov, 2016), evaluation of IC in regions of Volga federal district (Kotenkova and Korablev, 2014), the assessment of the IC as a factor of investment attractiveness of the region (Kireeva and Galiakhmetov, 2015) etc.

Interrelation between IC and innovative development also have been studied. Kudryavtseva and Shinkevich (2015) noted that IC is the basis of the innovation economy. Nguyen (2018) proved that human capital and downward knowledge flows significantly and positively affect both incremental and radical innovations, while social capital and upstream knowledge flows do not significantly affect them, and organizational capital has positive impact

on incremental innovations. Grigoriev et al. (2014) considered the innovative development of the company through the prism of increasing its technological capital, consisting of the components of IC. Waseem et al. (2018) found a significant positive direct and indirect impact of three dimensions of IC (human, relational and technological) on the ability to innovate and the effectiveness of the organization. Allameh (2018) showed that the components of social capital and knowledge sharing, as well as the dimensions of IC play an important role in the organization's innovations. Jardon (2018) concludes that innovation is closely related to IC, but the limited means of small business weaken this connection. Leitner (2015) found that IC enhances the ability of firms to successfully implement innovations, which positively affects their efficiency.

The impact of IC on the innovative development of regions is the subject of research papers too. Fedotova et al. (2016) came to the conclusion that the quality of the IC of the region and the level of development of the innovation culture significantly affect the frequency of new innovations and the duration of the innovation cycle. Santos-Rodrigues et al. (2015) considering the aspects of IC at the regional level, determined its direct positive impact on innovation. Echebarria and Barrutia (2013) showed that the higher is the IC of the neighboring regions of a particular region the more successful are the innovative results of this region. Leitner (2015) argued that intellectual capital enhances a firms' ability to successfully realize innovations. Panshin and Tobien (2016) assessed the influence of human capital quality on the innovative development of the territory on the example of average Russian region.

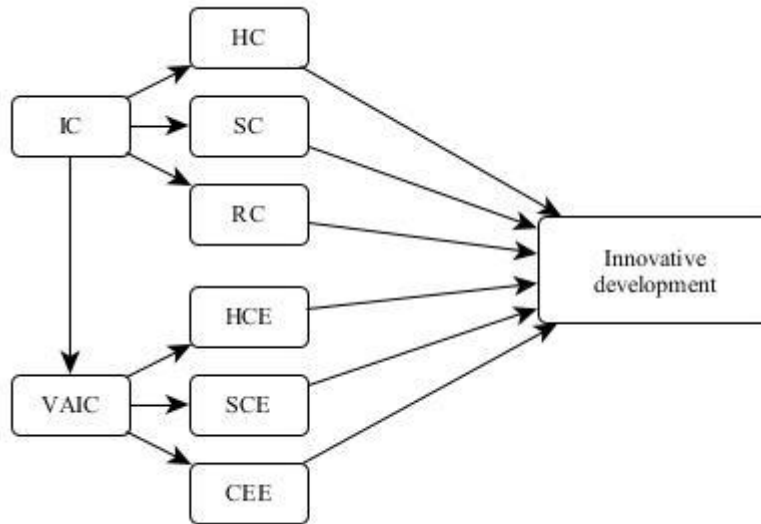
Analysis of recent literature showed that the relationship between RIC and the innovative development of the regions of the Russian Federation is studied insufficiently. In addition, the studies applying the VAIC model on regional level of the Russian Federation are missing. Thereby, our research is aimed at assessing RIC in the Russian Federation, evaluating VAIC and analyzing the relationship between the components of IC, VAIC and the indicators of innovative development of regions.

2 Regional IC and innovative development of the Russian Federation

The framework of this study was developed based on the three-component IC model (human, structural and relational capital) and the VAIC model (Fig. 1). We included the VAIC model in our study to complete the whole picture of RIC on the other level – organizations. The VAIC model is used mainly for direct evaluation of IC of specific companies, but it can be applied to

study the value added of organizations at the regional level and assess its impact on the innovative development of regions.

Fig. 1: Theoretical framework



Source: Authors' elaboration

For example, the statistics service of the Russian Federation presents some important indicators only for the state as a whole, but not in the context of regions, therefore such indicators were not included in the assessment of IC in the regional context. In general, the statistical information on the development of IC collected in the Russian Federation limits the possibilities for conducting research in this area. The resulting set of indicators for assessing IC is presented in Table 1.

The next step in the IC assessment process was to identify minimum and maximum values for each indicator and region. We used the value of the lowest region as minimum value. Instead of the maximum values, target values can be used, if the government established them. We used the highest value among the regions as the target. We used these minimum and maximum values to normalize all indicators by subtracting the minimal value and dividing it by the total length of the scale. Then we constructed separate indicators for human capital, structural capital and relational capital and an overall indicator for IC. The resulting indicators are in the range from 0 to 1. The results of IC assessment are presented in the Figure 2.

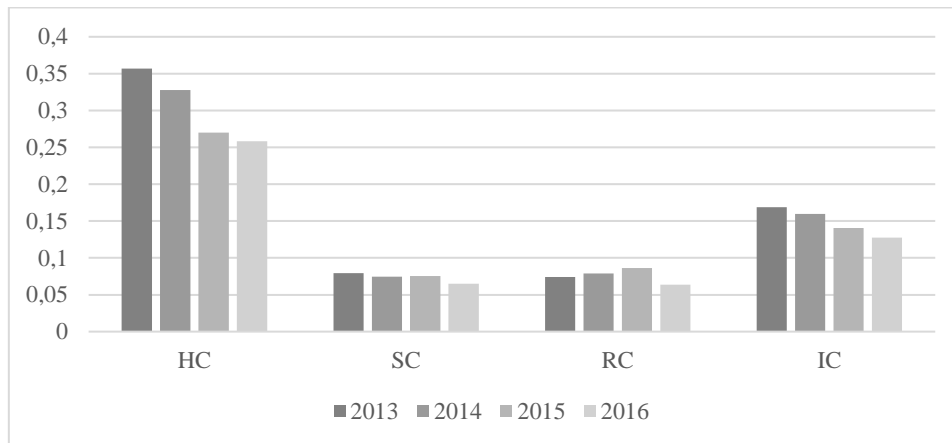
As can be seen from the Fig. 2, there was no positive dynamics of IC level in the Russian regions in 2013-2016 years. On average, human capital is the most developed in the regions of the Russian Federation. Structural and relational capitals are less developed.

Tab. 1: Intellectual capital indicators within three-component IC model

| IC components | Variable | Variable description |
|-------------------------|----------|---|
| Human capital (HC) | HC1 | Funding of higher education institutions |
| | HC2 | The share of the employed population aged from 25 to 64 years, who has higher education in the total number of employed population of this age group |
| | HC3 | Share of highly skilled workers in the total number of skilled workers |
| | HC4 | Graduation from postgraduate school with thesis defense |
| | HC5 | Employment rate |
| | HC6 | GRP per capita |
| | HC7 | Labor productivity index |
| | HC8 | The growth of high-performance workplaces |
| Structural capital (SC) | SC1 | Domestic costs of R&D |
| | SC2 | Share of domestic expenditures on R&D, as a percentage of gross regional product |
| | SC3 | Investments of organizations in technological innovations |
| | SC4 | Special costs associated with environmental innovation |
| | SC5 | The cost of technological innovation of small enterprises |
| | SC6 | Submission of applications by Russian applicants for state registration of intellectual activity results and means of individualization |
| | SC7 | Issue of patents and certificates for results of intellectual activity, means of individualization |
| | SC8 | Use of intellectual property |
| Relational capital (RC) | RC1 | Investments from abroad in fixed assets, including intellectual property and ICT |
| | RC2 | Number of export agreements |
| | RC3 | Number of import agreements |
| | RC4 | Technology export receipts under agreements with foreign countries (receipts from engineering services, R&D, know-how, patents for invention, utility models, industrial design, trademarks etc.) |

Source: Authors' elaboration

Fig. 2: Average dynamics of IC and its components in the regions of the Russian Federation in 2013-2016



Source: Authors' elaboration

The Value Added Intellectual Coefficient estimation procedure is given below (Pulic, 2004):

$$VAIC = ICE + CEE \quad (1)$$

ICE – intellectual capital efficiency is obtained by adding up the partial efficiencies of human and structural capital: $ICE = HCE + SCE$;

HCE – human capital efficiency: $HCE = VA/HC$;

SCE – structural capital efficiency: $SCE = SC/VA$;

CEE – capital employed efficiency: $CEE = VA/CE$;

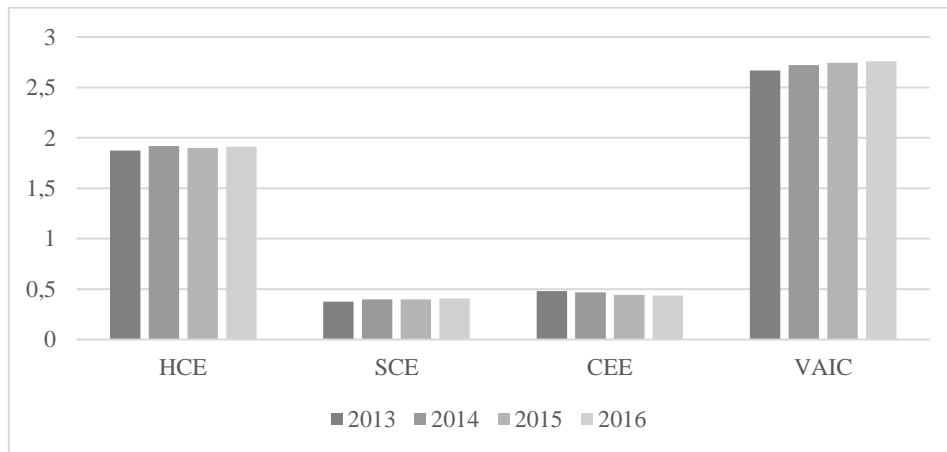
VA – value added is calculated as the difference between total sales (OUT) and material costs (INPUT);

SC – structural capital: $SC = VA - HC$;

CE – capital employed: book value of the net assets.

Fig. 3 shows results of VAIC estimation for Russian regions.

Fig. 3: Average dynamics of VAIC and its components in the regions of the Russian Federation in 2013-2016



Source: Authors' elaboration

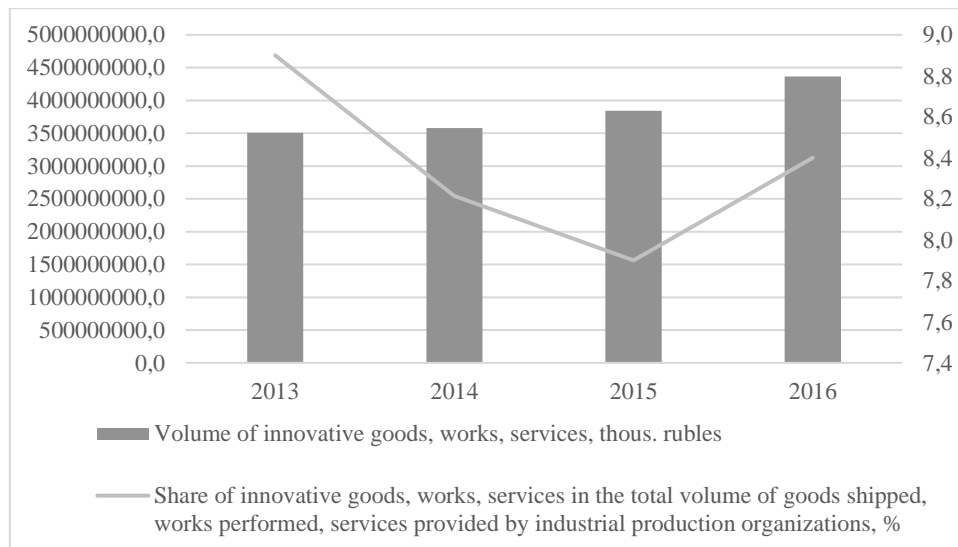
As can be seen from the Fig. 3, VAIC shows some positive dynamics. The most efficient form of intellectual capital on the organizational level is human capital.

According to Strategy of innovative development of the Russian Federation until 2020 monitored target indicators of innovation development that can be assessed at the regional level are:

1. Volume of innovative goods, works, services (Fig. 4).
2. Share of innovative goods, works, services in the total volume of goods shipped, works performed, services provided by industrial production organizations (Fig. 4).
3. Share of organizations implementing technological innovations in the total number of organizations surveyed (Fig. 5).
4. Share of organizations implementing technological innovations in the total number of industrial production organizations (Fig. 5).

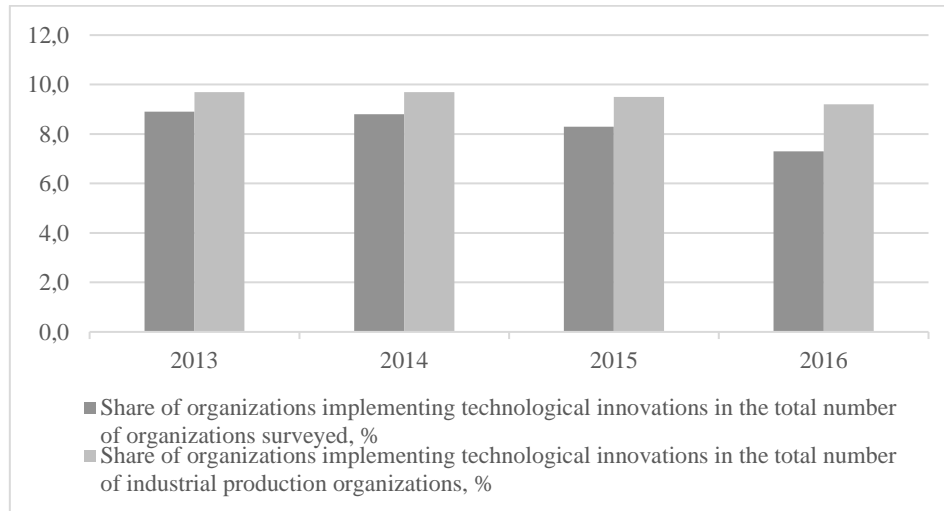
We used them as dependent variables Y1, Y2, Y3 and Y4 respectively.

Fig. 4: Dynamics of volume of innovative goods, works, services and share of innovative goods, works, services in the total volume of goods shipped, works performed, services provided by industrial production organizations in the Russian Federation in 2013-2016



Source: EMISS (2018); authors' elaboration

Fig. 5: Dynamics of share of organizations implementing technological innovations in the total number of organizations surveyed and in the total number of industrial production organizations in the Russian Federation in 2013-2016



Source: EMISS (2018); authors' elaboration

As can be seen from Fig. 4-5, only volume of innovative goods, works, services has positive dynamics. The Strategy stipulates that by 2020 the share of organizations implementing technological innovations in the total number of industrial production organizations will be 40%. Share of innovative goods, works, services in the total volume of goods shipped, works performed, services of industrial production organizations should be 25% by 2020. Obviously, that achieving the target values of the Strategy indicators with the current dynamics is impossible. It is necessary to look for opportunities to accelerate innovative development, the basis of which can be the development of IC.

3 Data and Empirical Results

In order to explore the relationship between IC and innovative development of the Russian regions, regression analysis was applied.

The following hypotheses were to be tested:

H1: IC and its components have positive impact on innovative development of Russian regions.

H2: VAIC and its components have positive impact on innovative development of Russian regions.

H3: IC and its components have positive impact on VAIC and its components.

We took the data on 85 regions of the Russian Federation for the period 2013-2016 to check the interrelation between IC and innovative development. Later years could not be included, since the data have not yet been updated in the EMISS and in the Federal state statistics service. Information was not collected on some indicators in previous years.

Descriptive statistics are presented in Table 2.

Random effects estimation approach was chosen as estimation technique, because it is appropriate according to Hausman test. Estimated econometric models are presented in Tables 3-4. We presented only models with significant variables.

Models 2, 5, 9 and 12 show that IC level has positive impact on all indicators of innovative development considered in the study.

Models 1, 8 and 11 show that human capital and structural capital have positive impact on more indicators of innovative development of Russian regions than relational capital.

Models 4, 7 and 13 show positive impact of VAIC on three indicators of innovative development.

Tab. 2: Descriptive statistics

| Variable | Mean | Median | Maximum | Minimum | Std. Dev. | Observations |
|---------------------|-----------|-----------|----------|-----------|-----------|--------------|
| HC1, thous. rubles | 8967279. | 3390904. | 2.24E+08 | 56825.70 | 24646577 | 334 |
| HC2, % | 30.96229 | 30.07828 | 50.27598 | 18.20094 | 5.015030 | 336 |
| HC3, % | 29.11399 | 28.40000 | 50.60000 | 16.10000 | 4.696796 | 336 |
| HC4, people | 82.60938 | 29.00000 | 2459.000 | 0.000000 | 222.4557 | 320 |
| HC5, % | 64.13869 | 64.45000 | 81.20000 | 38.60000 | 5.003592 | 336 |
| HC6, thous. rubles | 459.9540 | 297.0866 | 5821.560 | 78.00930 | 650.0858 | 338 |
| HC7, % | 101.7580 | 101.7500 | 118.6000 | 84.30000 | 3.213023 | 336 |
| HC8, % | -1.454734 | -1.600000 | 24.40000 | -23.90000 | 8.302153 | 338 |
| SC1, thous. rubles | 10412017 | 1452700. | 3.30E+08 | 38900.00 | 36899491 | 333 |
| SC2, % | 0.763225 | 0.460000 | 6.580000 | 0.010000 | 0.938465 | 338 |
| SC3, thous. rubles | 15101629 | 3599628. | 2.84E+08 | 96.00000 | 30357892 | 334 |
| SC4, thous. rubles | 251567.3 | 10011.50 | 6193893. | 0.000000 | 765086.6 | 338 |
| SC5, thous. rubles | 162615.6 | 56637.70 | 2147911. | 0.000000 | 267871.8 | 336 |
| SC6, units | 166.9939 | 67.00000 | 4723.000 | 0.000000 | 476.4455 | 329 |
| SC7, units | 176.2308 | 75.00000 | 4972.000 | 0.000000 | 506.0697 | 338 |
| SC8, units | 336.9585 | 94.00000 | 8307.000 | 0.000000 | 775.9431 | 337 |
| RC1, thous. rubles | 1112979. | 89200.00 | 22444300 | 0.000000 | 2579352. | 340 |
| RC2, units | 24.68529 | 3.000000 | 500.0000 | 0.000000 | 67.58238 | 340 |
| RC3, units | 35.52353 | 12.00000 | 403.0000 | 0.000000 | 59.70154 | 340 |
| RC4, thous. usd | 14651.63 | 95.80000 | 936670.4 | 0.000000 | 71449.70 | 340 |
| HC | 0.302761 | 0.295292 | 0.766518 | 0.110435 | 0.079351 | 330 |
| SC | 0.073554 | 0.034139 | 0.805334 | 0.000451 | 0.108665 | 329 |
| RC | 0.065555 | 0.020378 | 0.794089 | 0.000000 | 0.122011 | 339 |
| IC | 0.148817 | 0.127571 | 0.728801 | 0.037871 | 0.092977 | 322 |
| HCE, thous. rubles | 1.902079 | 1.799604 | 8.974690 | 0.378830 | 0.862836 | 336 |
| SCE, thous. rubles | 0.396160 | 0.444322 | 0.888576 | -1.639707 | 0.252475 | 336 |
| CEE, thous. rubles | 0.457272 | 0.438828 | 1.357925 | 0.048188 | 0.165779 | 336 |
| VAIC, thous. rubles | 2.755511 | 2.677861 | 10.25184 | -1.212689 | 1.055005 | 336 |
| Y1, thous. rubles | 45922542 | 11031524 | 9.11E+08 | 7.000000 | 1.07E+08 | 334 |
| Y2, % | 6.755201 | 4.300000 | 62.38375 | 0.000817 | 7.690106 | 297 |
| Y3, % | 7.932036 | 7.100000 | 29.20000 | 0.300000 | 4.420946 | 334 |
| Y4, % | 9.413707 | 8.700000 | 33.30000 | 0.800000 | 5.286853 | 321 |

Source: Own elaboration

Models 3, 6 and 10, which aimed to analyze impact of VAIC components on innovative development, show that only human capital efficiency has significant positive impact on regional innovative development.

Models 15, 17, 19 and 21 show positive impact of IC on VAIC, human capital, structural capital and capital employed efficiency.

Models 14, 16, 18 and 20 show positive impact of IC components on VAIC and its components.

Tab. 3: Model table 1

| Variable / Model | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 | Model 9 | Model 10 |
|-------------------------|-------------|--------------|--------------|--------------|-------------|------------|-------------|-------------|-------------|-------------|
| Dependent variable | Y1 | Y1 | Y1 | Y1 | Y2 | Y2 | Y2 | Y3 | Y3 | Y3 |
| HC | -63938707 | | | | | | | 9.805956*** | | |
| | (37619306) | | | | | | | (1.847616) | | |
| SC | 5.57E+08*** | | | | | | | 6.645210* | | |
| | (55434397) | | | | | | | (3.078909) | | |
| RC | 1.14E+08** | | | | | | | 1.500113 | | |
| | (45119671) | | | | | | | (2.385159) | | |
| IC | | 5.34E+08*** | | | | 14.36504** | | | 18.69149*** | |
| | | (50154758) | | | | (6.402751) | | | (3.002013) | |
| HCE | | | 1.06E+08*** | | | 1.829011** | | | | 0.935606** |
| | | | (7311088.) | | | (0.840745) | | | | (0.460604) |
| SCE | | | -1.07E+08 | | | 2.038617 | | | | -1.902262 |
| | | | (22008454) | | | (2.240928) | | | | (1.071678) |
| CEE | | | -73004358 | | | -4.830568 | | | | 0.446641 |
| | | | (23778598) | | | (3.003827) | | | | (1.576910) |
| VAIC | | | | 43587030*** | | | 1.464663*** | | | |
| | | | | (4532439.) | | | (0.498301) | | | |
| CONSTANT | 17040756 | -33026794*** | -80451086*** | -74942899*** | 3.938220*** | 3.895303** | 1.936058 | 4.180467*** | 4.979071*** | 6.645905*** |
| | (11851181) | (9231059.) | (14853309) | (14358798) | (1.163765) | (1.877960) | (1.523363) | (0.669067) | (0.590310) | (0.992684) |
| R-squared | 0.343696 | 0.191412 | 0.427037 | 0.198889 | 0.015365 | 0.040194 | 0.025208 | 0.128207 | 0.109460 | 0.013503 |
| Adjusted R-squared | 0.337465 | 0.188870 | 0.421796 | 0.196461 | 0.012288 | 0.031521 | 0.022289 | 0.119904 | 0.106651 | 0.004480 |
| F-statistic | 55.16129 | 75.27835 | 81.48759 | 81.92797 | 4.993507 | 4.634457 | 8.637114 | 15.44138 | 38.96384 | 1.496515 |
| Cross-sections included | 85 | 85 | 85 | 85 | 77 | 78 | 78 | 85 | 85 | 85 |
| Observations | 320 | 320 | 332 | 332 | 288 | 296 | 296 | 319 | 319 | 332 |

Note: Standard Errors are in parentheses. *** stat. significance on 1%, ** stat. significance on 5%, *stat significance on 10%.

Source: Own elaboration

Tab. 4: Model table 2

| Variable / Model | Model 11 | Model 12 | Model 13 | Model 14 | Model 15 | Model 16 | Model 17 | Model 18 | Model 19 | Model 20 | Model 21 |
|-------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Dependent variable | Y4 | Y4 | Y4 | VAIC | VAIC | HCE | HCE | SCE | SCE | CEE | CEE |
| HC | 4.368316* (2.644100) | | | 0.630849* (0.333027) | | 0.258859 (0.245176) | | 0.032855 (0.061899) | | 0.390618*** (0.067587) | |
| SC | 6.848656 (4.375550) | | | 4.069752*** (0.538578) | | 3.697056*** (0.401109) | | 0.372660*** (0.110144) | | -0.163221 (0.116203) | |
| RC | -0.309106 (3.420232) | | | 1.000330** (0.425059) | | 0.758735** (0.315050) | | 0.216672*** (0.083427) | | -0.058322 (0.089350) | |
| IC | | 10.34165** (4.159105) | | | 2.035698*** (0.097764) | | 4.037860*** (0.383213) | | 0.498638*** (0.108753) | | 0.331460*** (0.115561) |
| VAIC | | | 0.897687*** (0.341903) | | | | | | | | |
| CONSTANT | 7.106422*** (0.938363) | 7.381312*** (0.807649) | 6.465596*** (1.073604) | 2.228441*** (0.114748) | 5.047585*** (0.510961) | 1.513443*** (0.085708) | 1.313676*** (0.073835) | 0.355214*** (0.024693) | 0.332848*** (0.022945) | 0.359961*** (0.025379) | 0.414137*** (0.023321) |
| R-squared | 0.023048 | 0.018834 | 0.020135 | 0.254723 | 0.202013 | 0.286335 | 0.204549 | 0.076551 | 0.054750 | 0.087679 | 0.022402 |
| Adjusted R-squared | 0.013831 | 0.015768 | 0.017202 | 0.247692 | 0.199519 | 0.279602 | 0.202064 | 0.067839 | 0.051796 | 0.079072 | 0.019347 |
| F-statistic | 2.500680 | 6.142590 | 6.863384 | 36.22895 | 81.00907 | 42.52902 | 82.28771 | 8.787047 | 18.53467 | 10.18716 | 7.332762 |
| Cross-sections included | 83 | 83 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 85 |
| Observations | 309 | 309 | 336 | 322 | 322 | 322 | 322 | 322 | 322 | 322 | 322 |

Note: Standard Errors are in parentheses. *** stat. significance on 1%, ** stat. significance on 5%, *stat significance on 10%.

Source: Own elaboration

Hypotheses 1-3 were confirmed. In this connection, it can be argued that the focus on the development of IC will accelerate the innovative development of the regions of the Russian Federation.

Conclusion and discussion

The study was aimed at assessing RIC in the Russian Federation, evaluating VAIC and analysing the relationship between the components of IC, VAIC and the indicators of innovative development of regions.

The regression analysis confirmed significant and positive interrelation between regional IC, VAIC, and their components and the indicators of innovative development of Russian regions.

It should be noted that the results of the regression analysis showed stronger impact of human capital and its effectiveness on the innovative development of Russian regions than other components of IC and VAIC. Therefore, we can argue that in order to achieve more significant growth in the innovation activity of the regions of the Russian Federation, it is necessary to focus on human capital development.

The results of our study are consistent with Nguyen (2018), who proved that human capital significantly and positively affects innovations at organizational level, but we proved this relationship at the regional level. Also, our research results are consistent with other studies that proved the relationship between different IC components and innovation (Allameh, 2018, Leitner, 2015, Santos-Rodrigues et al., 2015, Panshin and Tobien, 2016).

Stahle (2011) showed, that VAIC parameters have nothing to do with intellectual capital. Our research in contrary showed strong impact of IC on VAIC. Measurement of IC is a matter of approach. We consider the value-based approach has the right to exist.

Parshin and Tobien (2016) showed the strong influence of human capital on the volume of innovative products on the example of the average Russian region. Our research does not confirm this research result. Our analysis showed positive impact of human capital on share of organizations implementing technological innovations in the total number of organizations surveyed and in the total number of industrial production organizations, but not on the volume of innovative production. It could be because of research design. Our research covers all the regions of the Russian Federation while Panshin and Tobien (2016) studied only one region.

Pedro et al. (2018) argued that human capital is observed not to be the most relevant in RIC and NIC, unlike the case in OIC. Our research in the contrary proved the relevance of

human capital in RIC. It should be studied and developed to become the basis of innovative development of the regions.

The study results can be used by state bodies in the formation of innovative development strategies for future periods and in the development of measures to achieve the targets of the current strategy.

It should be noted, that our findings cannot be applied to each Russian region. They describe the average situation in the country. The authors do not claim that they studied all possible indicators of IC at the regional level. There are also other indicators of innovation development that have not been included in this study.

Future research can be aimed at studying the barriers to increase IC and the mechanisms of its improvement.

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MEASURING THE LEVEL OF SUSTAINABILITY IN A SMALL AND MEDIUM COMPANIES: EAN SUSTAINABILITY INDEX CASE

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Abstract

Purpose: The analysis of the impact of the concept of sustainability in the companies generally use a big number of indicators; however, is very common to measure the appropriation of sustainability into the companies as specific aspects that make up sustainability (environmental, social or economic) and not with an integral vision (triple bottom line).

Design/methodology/approach: This situation leads to the fact of being impossible to generate a consistent follow-up, from a statistical perspective, on the evolution of the degree of appropriation and impact of sustainability as a tool for improving business effectiveness, since the qualitative parameters are subject to a highly subjective approach by those who collect the information, also highlighting the development of different indices that may provide partial or non-integral interpretations on the subject.

Findings: The present research proposed and analyzed previous research criteria and variables to determine how these qualitative and quantitative variables can be used as inputs in an index that allows measuring objectively and under a series of standard criteria, the degree of appropriation and implementation of sustainable production in small and medium companies.

Research/practical implications: The present case study was developed as exploratory research, for to generate an analysis and relationship basis of the measure factors, and to collect data about the economic, environmental and social indicators for SMEs in Colombia.

Originality/value: The EAN Sustainability index is the first sustainability indicator that, from the measurement idea for one incubator, can be used for SMEs in Colombia, and the work with the economic development secretary of Bogotá is a preliminary proof of it.

Keywords: Index, Sustainable Entrepreneurship, Sustainability

JEL Codes: M10, O44

Introduction

A sustainable company, by definition, is that able to create economic, environmental and social value in the short and the long term, contributing in such way to greater welfare as well as authentic progress within the general environment of present and future generations (Caroll Irene Rodriguez Rojas, 2012). The way out of the present situation has to do with settling the growth foundations through policies, which aim to allow a “sustainable and balanced” economic development, and all remarked the former is one of the priority ways to “reach a way out of the crisis and avoid them in the future”. In fact, in this sense, the panelists stated that sustainability has probably become “the key economic sector from the 21st century” (Ernest and Young, 2013). In recent years, one of the most concerning matters has been determining if real sustainability guidelines are being implemented, that is to say, if indicators warning about the positive or negative evolution of this process are being used. Although the ambiguity of the concept on its own makes this task difficult, indicators analyzing aspects regarding the three dimensions of sustainability: economic, social, environmental, have been elaborated. Nevertheless, it is not usual to find a single system able to integrate the three dimensions beyond academic or consulting experiences in order to intervene in companies and enable their improvement. Given the present importance and impact generated in society by all that has to do with corporate sustainability, it seems necessary to determine whether a company is sustainable or not and to what extent, so that it can establish an improvement plan which allows reaching the required levels regarding corporate interests and policies. In this way, the research aimed to answer the following question: ¿How to perform the measurement of sustainability in small and medium companies?

1 State of the art

The topic of corporate sustainability has been gaining importance amongst productive sectors and companies, due to the natural existing relationship between corporations and the needs being demanded by society; which explains why globally the concept of sustainability has become more important, based on the sustainable development model proposed since the last century in the 70s (Martínez & Valero, s.f.). For several years the quest for mechanisms that allow the beginning of the identification process of environmental factors conducive to benchmarking among companies in different geographic regions has been going on, aiming to accomplish the identification and assessment of environmental factors and therefore enable the strengthening of processes of continuous improvement, productivity and competitively within

corporations (Gómez & Martínez, 2013). Inside the Universidad EAN, methodological approaches based on the institutional experience (waste production basic information management, water, and energy consumption, among others) have been proposed, seeking to reach an environmental indicators system, which allows the future consolidation of an Institutional Sustainability Report (Gómez & Martínez, 2013). However, it seemed necessary to generate an instrument able to assess through a solid methodological way, without leaving pragmatic aside, the implementation level of sustainability inside the institution's business model, in accordance with the highest purpose of the institution to promote sustainable entrepreneurship. Lastly, in 2016 several nations around the world have endorsed the Sustainable Development Goals - SDGs, as a cosmopolitan agenda of a "global agreement for development", readjusting global goals within a multilateral, more inclusive, representative and legitimate frame, emphasizing the emergence of new relevant actors both public and private as well as the rise of specific emerging powers (Perales, J. & Vázquez, S., 2016). The way to measure the corporate implementation of sustainability has to work in sync with the goals that will have to be consolidated by states in terms of both public and private, which is why it is necessary to develop tools capable of reflecting the corporate performance in accordance with the SDGs.

In Colombia, according to the Law for the Promotion of Micro, Small and Medium Enterprises - SMEs, Law 590, are classified as follows: Microenterprise: Personnel not exceeding 10 workers and total assets below 501 legal monthly minimum wages. A small business that has between 11 and 50 workers and total assets are greater than 501 and less than 5,001 legal monthly minimum wages and the medium company that has between 51 and 200 workers and total assets between 5,001 and 15,000 legal monthly minimum wages. SMEs in Colombia are 96.4% of establishments, 63% of employment; 45% of manufacturing production, 40% of wages and 37% of value added. With this panorama, it's clear that sustainability behavior of companies analysis is very important, and have been of interest to academia and practice for decades (Petts, Herd & O'hechocha, 1998; Friedman & Miles, 2002; Simpson, Taylor & Barker, 2004), but the focus should be the SMEs, segment that has not received as much attention, which is paradoxical, due to the great importance that the SMEs have in the global economy and particularly, in developing countries like Colombia.

1.1 Existing methodologies

There are several methodologies used to report performance in terms of sustainability. According to Lozano (2011), the most widely used guidelines include the ISO 14000 series (especially ISO 14031), EMAS (ECO-Management and Audit Scheme by the EU), social accounting (Social Accountability 8000 Standard) and the GRI sustainability guidelines. Among the different used guidelines, GRI (Global Reporting Initiative) is the best choice (Hussey et al., 2001; Morhardt et al., 2002). It should be noted that certain diagnosis tools for sustainability reporting in special sectors have been developed, such as the “State of the Environment” by the National Wildlife Federation, “Sustainability Assessment Questionnaire”, Auditing instrument for sustainability, Environmental Workbook and Report, Environmental performance survey, indicators Snapshot/Guide, Grey Pinstripe with Green Ties and the EMS Self Assessment. Fonseca et al. (2010) state that previous studies regarding these methodologies show there is no such thing as an ideal method for sustainability reporting in different productive sectors. However, several authors (Adkins et al, 2003; Newport et al., 2003) agree that partially following the GRI methodology and adapting it to simpler indexes will foster the potential to harmonize all the different approaches regarding sustainability reporting and diagnosis that are being carried out in different productive sectors. The GRI methodology uses main performance indicators and additional indicators regarding the indicators category that encompasses the three dimensions of sustainability (Economic, Environmental and Social). The economic dimension has an indicator category (EC - Economic). The environmental dimension also has an indicator category (EN - Environmental) and the social dimension is represented by four categories made up of main and additional performance indicators. Additionally, the authors showed that SMEs carry out more sustainable practices that would be expected due to their size, but this issue is not a strategic tool that should be studied only from the perspective of large companies in economies driven by innovation: It should also be considered from the scope of SMEs in economies driven by efficiency with adequate standards (different to the GRI for large companies).

1.2 Analysis of observed factors in the sustainability dimensions

1.2.1 Economic

The financial analysis or diagnosis represents the most effective tool to assess the economic and financial performance of a company throughout a specific exercise in order to compare its results with other companies belonging to the same sector and with similar characteristics in

terms of management and other aspects; since its basis and objectives focus on determining quantitative relationships from the decision making process, through the application of techniques on accountability data, which at the same time is transformed to be analyzed and interpreted. Nava Rosillón, M. (2009). From a classical and general perspective appropriate for SMEs and non-listed companies in the stock market, the perspective of economic and financial corporate sustainability is measured and handled through the analysis of financial indicators which at the same time are used when defining objectives to analyze their evolution, some of the most widely used indicators or measures are: total profit, return on assets, return on equity, net profit, operational profit, net profit. As it is stated by Nava Rosillón (2009), a company facing an adverse and troubled situation with the respective inconvenient of a changing environment has to take actions aiming to be more competitive and efficient from the economic and financial perspective, in such a way that it is able to make a better use of its resources and obtain more productivity and better results with lower costs. To meet this objective, besides the previously described indicators, companies frequently use performance measures linked to corporate effectiveness, which are monitored through mechanisms such as the balanced scorecard. Economic sustainability is included within the income concept proposed by Hicks, who defines it as the maximum amount an individual can consume within a given time period without reducing his consumption in a future period (Hicks, 1945, p. 205). According to this definition of income, its calculation in terms of a gross domestic product has to be made including a country's wealth and environmental resources. Otherwise, the calculation would not reflect the degree of sustainability. In view of this, it is clear that it is not possible to talk about economic sustainability without taking into account the efficient use of resources, that is, even though there are countries or companies which present outstanding results when analyzed in the light of profitability indicators or income level, it is evident that these results are accomplished at the expense of environmental quality and decent work as well as the intensive use of non-renewable resources, risking the future consumption capability. Bearing in mind that resources are limited, a new corporate approach emerges based on sustainability and defining itself as “companies with a socially responsible behavior who design and establish strategies and internal procedures taking into account not only the economic dimension of their actions, but also the social and the environmental ones” (Saavedra García, 2011).

1.2.2 Environmental

There is a broad range of activities being implemented in order to improve the corporate environmental performance by incorporating companies into environmental management systems (EMS) in different industrial sectors, which is why several benefits have been acknowledged in small and medium companies regarding customers, communities, and environment (Tinsley, 2002). Among the observed benefits is the cultural change in terms of going from reactive to proactive management, as well as the trust in management and the improvement of relationships with the community. Additionally, the improvement in the environmental performance because of the EMS reflects likewise on both on the economic performance and the corporate environmental results. The motivators companies have to improve on environmental aspects are either certain environmental factors seen as personal threats in terms of health impact and personal/family security or on the other hand economic factors such as greater market access and product differentiation. Other drivers are: decreasing negative environmental impact, being consistent with personal/administrative principles, complying with laws and standards, enabling employees participation, reducing costs, having regulatory benefits and lastly obtaining a competitive advantage. In addition, Corbett et al. (2003) mention improving the corporate image. On the contrary, certain barriers for the improvement of environmental aspects have been identified: lack of knowledge, non-identification of potential benefits, lack of skilled personnel to develop and establish the system, lack of resources, difficulty to determine environmental aspects and impacts, lack of time for development, lack of resources to finance associated expenses, lack of interest from the administrative expenses, lack of processes continuity (Grolleau et al., 2007). The factors used to monitor a company's environmental performance are numerous and most of the times linked to the specificity of the sector where the company operates; there are generic mechanisms seeking to globally assess how the company is behaving in environmental terms, just, which names among other factors: presence of an environmental management system in the company, green practices implementation, good practices implementation, environmental performance indicators assessment, existence of an environmental manager position, knowledge of environmental legislation and knowledge of environmental impact on product design. Finally, other studies synthetically link the environmental dimension with aspects related to impact minimization, energy saving, and environmental protection. In the same way, Maestre, Ramírez & Romero (2017) mention corporate practices related to the environmental dimension, such as complying with environmental laws, having a department or individual in charge of

environmental issues, decreasing solid wastes derived from the production process, optimizing water and energy consumption and lastly implementing environmental awareness programs.

1.2.3 Social

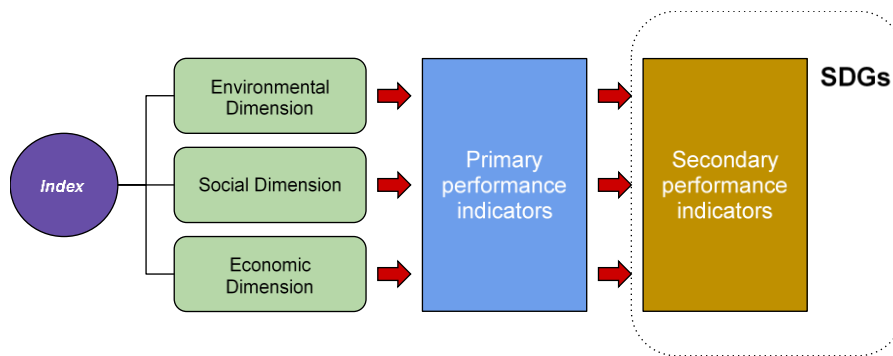
The functioning of society based on selfish behavior and which favors individual benefit has not brought positive consequences for the community's well being over time. Thus, companies should include within their course of action the requirements presented by society (Sabogal, 2008). Studies evaluating corporate practices that allow companies to identify a social responsibility within the organization (Bigné et al, 2005) mention factors such as: rejection to operate in countries violating human rights (child labor, anti-democratic political regime, etc.), contribution to life quality improvement in the regions where the company operates; fair treatment to all employees regardless of their gender, race, background or religion; help provided to developing countries. The social dimension can also be assessed through aspects related to workers such as equality, a balance between work and family, communication and participation within the company and workplace health, as well as aspects related to society, like employment generation, disability attention or relationships with non-governmental organizations. Nieto & Del Carmen (2016) propose an assessment which mentions among other indicators regarding the social dimension: (i) with the internal audience: ethical commitment from the company, remunerations, benefits and career policy, health and safety at work, commitment with professional development and excellence in service and attention ; (ii) with the external audience: relationships with local organizations, actions financing, actions involvement. At last, it is worth highlighting other factors centered on stakeholders that may be used to assess the social component within the company: working practices, special treatment of human rights, corruption handling, value chain responsibility, ways to establish efficient communication with shareholders, and finally, responsibility degree with customers (Medina, Martín & Beltrán, 2016).

2 Integrated proposal design

The review made of the different methodologies allowed to identify that most of the indicators used are harmonizable for different functions, such as sustainability reports, stakeholder reports, internal reports, Sustainable Development Goals contribution reports among others. However, there is not a straightforward scheme that allows undertaking a simple measurement based on primary information, and that can be used as an input for company benchmarking.

Therefore, for the sustainable production measurement indicator *EAN Sustainability Index*, the work regarding the three dimensions of sustainability was formulated through primary performance indicators, complemented with secondary indicators seeking to obtain a comprehensive development vision directly related with the SDGs seen from a corporate approach, as it is observed in figure 1. The selected primary performance indicators were chosen under the following criteria: (i) That they represent the respective dimension in the best way, (ii) That the required data is not complex to obtain or analyze and (iii) That they address subjects linked to management systems previously implemented within companies (quality systems, environmental management systems, OSHAS or similar).

Fig. 1: The general structure proposed for the Index

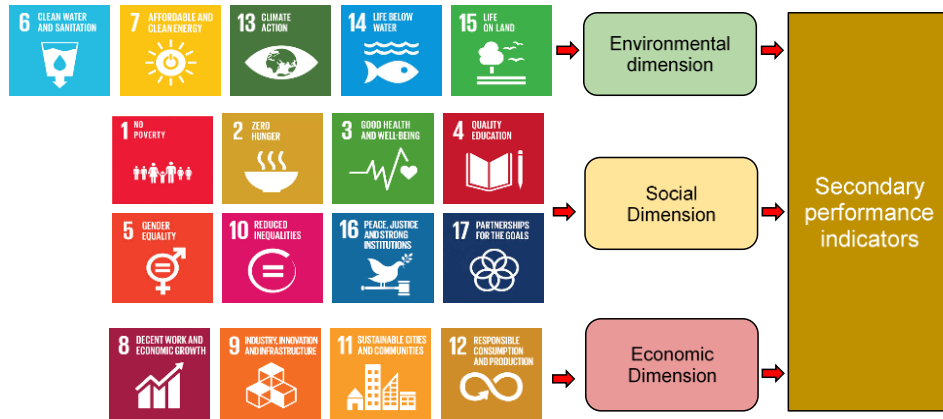


Source: Prepared by the authors

Out of all the goals contained in the seventeen (17) SDGs, it was necessary to identify those related to a greater degree to the entrepreneurial activity rather than the public activity, choosing a set of indicators that could be easily measured within companies and that would appropriately complement the proposed primary performance indicators in the index. In this way, it is clear that there was a prioritization process, as it is represented in figure 2.

In this way, the practical possibilities from the corporate sector were harmonized from a strategic management context with the elements that have been defined and accepted according to the SDGs and thus have to be implemented and measured since 2016.

Fig. 2: Indicators selection scheme for the ESuI based on the SDGs



Source: Prepared by the authors

The development of the index implied the pilot application of the *EAN Sustainability Index* to a random sample of companies belonging to the “*EAN Impacta*” incubator program from the Universidad EAN, as well as the “Innovation Consulting for Sustainability” internship program. The factors, selected in according with representative criteria (see tables 1 to 3), were standardized so that they can be added by one aggregation mechanism for adding variables.

Tab. 1: Economic factors measurement components

| Sub-dimension name | Definition |
|-----------------------------|---|
| Financial stability | The ability of a company to maintain itself in favorable financial conditions over a given time period. It is measured based on the evolution of three variables over the past three years: Sales, operating profit, operating investment. |
| Productivity and efficiency | The relationship between produced goods and services and resources invested in production so that the greatest amount of goods and services can be obtained. It is calculated through the formula: Total sales / Total costs |
| Liquidity | The relationship between current assets and current liabilities. Liquidity ratio= Current assets / current liabilities It proves the ability to meet short term debts. |
| Solvency | Existing difference between total assets and current liabilities, it is defined as final since it would be the one to be used in case of liquidation. Solvency determines if the value of assets backs up the total incurred debts. Solvency ratio= (Non-current assets + current assets)/(Non-current liabilities + current liabilities) |
| Profitability | Profitability: the Existing relationship between the profits or benefits and the investment or resources used to obtain them. ROIC = NOPAT / INVESTED CAPITAL WACC = (TOTAL LIABILITIES/ TOTAL ASSETS)*(COST OF DEBT) + (EQUITY/ TOTAL ASSETS)*(COST OF EQUITY) EVA = (ROIC-WACC) *INVESTED CAPITAL |
| Innovation | An innovation comprehends either the introduction of a new or significantly improved product (good or service), or the introduction of a commercialization or organization method applied to business practices, work organization or external relations. In order to evidence innovation it is at least necessary that the product, process or method are new (or significantly improved) to the company. |

Source: Prepared by the authors

Tab. 2: Environmental factors measurement components

| Sub-dimension name | Definition |
|--|---|
| Energy efficiency and clean energy consumption | It identifies the pressure over energy resources (by the sales unit) in the company. Measured taking the average energy consumption in kWh during the reported billed period. |
| | Energy efficiency is the practice that seeks to optimize production processes and energy usage by using the same or less to produce more goods and services. It is measured through the existence of an energy conservation and efficiency plan. |
| | Clean energy consumption is a practice-oriented to the replacement of non-renewable energy sources for renewable ones. |
| Water consumption and efficiency | Water conservation and efficiency plan / Recycled water / Residual water Measured taking into account: consumption/ time period, generation of a water conservation and efficiency plan and identification of the way wastewaters are handled. |
| Waste | Measured as the total amount of waste being generated and the fraction that is being recycled. |
| Air emissions | Measured through the identification of carbon footprint assessment, emissions permit, and combustion systems. |
| Environmental investments | Resource level destined to environmental education, conservation and restoration activities. |
| Environmental Management System and reports | The search for the implementation of an environmental management system, as a tool that systematizes and documents the procedures from different environmental aspects, which affect the company. |

Source: Prepared by the authors

Tab. 3: Social factors measurement components

| Sub-dimension name | Definition |
|---|--|
| Customer management | This sub-dimension analyzes complaints and claims programs, in terms of the existence or not of a customer service system as well as the satisfaction level percentage. |
| Health and safety at work | Securing decent working conditions in terms of physical risk. Measured through health and safety at work indicator compliance. |
| Relationships with the community | Identifies activities carried out jointly with the community at the area of influence, as well as with other communities from different areas. Measured in terms of developed activities and invested resources. |
| Equal opportunities (men, women, young, disabled) | Identifies the type of contract, the gender and even the conditions of ethnic or social minorities regarding the company. Likewise, it identifies the number of young people in the company and the type of contract they have, besides verifying if there are gender gaps in terms of activities or wages. |

Source: Prepared by the authors

With these factors, the value of the proposed EAN sustainability index for an SME in Colombia will generate a tool for the companies for the sustainability self-management: a tool for support to increase the competitiveness of the entrepreneurship ecosystem in the region. This explorative research and the application pilots will be let validate the tool statistically in the next step, and to apply in extensive form the Index in Bogota and Colombian companies in the future.

Conclusions

The development of this research allowed the formulation of a methodology that integrates different information needs currently existing for the private company, without generating additional demands for data capture or information processing, developing an index that allows the measurement of sustainable production for both manufacturing activities and services.

The validation of the instrument, the harmonization with external requirements (such as the ODS) and internal requirements (such as the KPIs - Key performance indicators) of a company, as well as the synergy of the proposed index with other proven and functioning methodologies and the program EAN Impacta, allow to guarantee the operation of the index beyond the pilots developed.

The analysis of the dimensions of sustainability seen under the lens of the Sustainable Development Goals - SDGs allow the complementarity of the proposed analyses and generate added value for the reports that from the private sector must be made to consolidate information on the goals of the SDGs in the framework of a country report.

It is necessary the statistical validation of the tool, before the massive application, because this step will ensure that the conclusions about the reports and data can generate value for the company that applies the index, as well as for public policy generators.

The results obtained during the design of the tool, allowed the application of the EAN Sustainability Index voluntarily in 2018/2019, in companies that are part of voluntary initiatives of work in sustainable entrepreneurship in Colombia, in order to generate a platform of recognition and benchmark among companies that have been implementing measures of sustainability historically in their actions and, additionally, develop sustainability reports or reports under any of the existing standards and recognized worldwide.

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CULTURAL DIVERSITY AND INNOVATION: THE CASE OF THE CZECH REPUBLIC IN COMPARISON TO THE EU

Manuel Mayerhoffer

Abstract

Purpose: Given the controversial impact of cultural diversity on a firm's innovative capacity, the objective of this study is to explore the relationship of cultural diversity to innovation on a country level in the 2018 European Innovation Scoreboard among EU countries in accordance with the research of Zhan et al (2015). By linking the findings to diversity management, the case of the Czech Republic is considered specifically.

Design/methodology/approach: The study is based on the 2018 European Innovation Scoreboard data on the innovative potential of nations which has been correlated with the percentage of foreigners to a nation's population. To test for significance, linear regression has been employed. The scope was to investigate a potential linkage of cultural diversity and innovation on a country level, which could prove beneficial for the theoretical field, as well as provide implications for practitioners towards diversity management.

Findings: The analysis indicates significant and mostly positive correlations of a nation's percentage of foreigners to various factors from the European Innovation Scoreboard including academic research activities, venture capital investments, marketing and organisational innovations, as well as knowledge-intensive activities and their export.

Research/practical implications: The research emphasizes the need for stronger consideration of cultural diversity in relation to innovation and emphasizes the opportunities for Czech businesses. Suggestions for further research focus especially on the inclusion of cultural diversity as a variable when comparing innovation performance on a country level.

Originality/value: The presented study contributes to the field by further investigating the relationship of cultural diversity and innovation and proposes the inclusion of the demographic composition as an additional factor in country-level analyses of innovative potential. The inclusion of cultural diversity is so far missing in the European Innovation Scoreboard.

Keywords: Diversity, Innovation, Czech Republic, EU

JEL Codes: M14, J82, O57

Introduction

Today's business environment is increasingly characterized by a high degree of dynamism and complexity, where remaining competitive is more and more dependent upon the innovative potential of a firm. For this reason, numerous studies have been conducted in order to explore what measures can be taken to enhance innovative potential. One of such measures is the concept of diversity, also including cultural diversity. Its adaptation to the field of management (Bassett-Jones, 2005) is especially due to the linkage to creativity and innovation and thus ultimately the tendency to maintain a competitive edge.

Innovation is often measured in international comparison. One of such measures is the 2018 European Innovation Scoreboard (EIS) published by the European Commission (2018) which compares European countries in the categories of framework conditions, investments, innovation activities and impacts, each linked to innovation. The scope of the EIS is to provide guidance to countries in identifying potential areas for improvement.

Yet, despite the mentioned linkage of diversity and innovation, the EIS does not take into account the potential impact of cultural diversity as a result of the demographic composition of a country. In fact, the number of foreign residents could provide indications on the innovative potential stemming from the cultural diversity of a nation and would hence need to be included in future analyses. Therefore, this paper aims at exploring this potential linkage by testing the innovation score for a correlation to the respective countries' demographic composition of foreigners. Furthermore, recommendations on potential areas of development for strong diversity management will be derived for the Czech Republic, based on the results of the analysis.

In order to achieve the aim, as a first step, both cultural diversity and innovation will be briefly reviewed, so as to provide context for a discussion on the controversial effects of cultural diversity on innovation. Secondly, the 2018 European Innovation Scoreboard (EIS) will be introduced and the method of analysis briefly described. This allows for a discussion of the results of the data analysis and opportunities for Czech firms in their diversity management approaches. Finally, conclusions will be drawn and directions for future research suggested.

1 Cultural Diversity and Innovation: Review

The following section firstly theoretically introduces the concepts of cultural diversity and innovation. After a brief discussion on the impact of the former on the latter key findings of the

2018 EIS will be summarized with a specific focus on the innovation scores for the Czech Republic.

1.1 Cultural Diversity

Culture as “the collective programming of the mind that distinguishes the members of one group or category of people from another” (Hofstede, 2001, p. 9) has a major impact on the way individuals make sense of the world and hence influences the way employees execute their work. In this line, cultural diversity can be understood as the “diversity arising from the cultural distance between ethnic groups” (Zhan et al., 2015, p. 1028), whereby a higher degree of cultural distance translates to stronger cultural diversity. Thus, depending on the cultural make-up of a work team, tasks can be done differently based on the varying skill sets, ideas, and approaches of the respective team members.

This effect, as Stahl et al. (2010) point out, is based on the information-processing theory where cultural diversity can be seen as a positive influencing factor fostering creative and innovative potential amongst others. Nevertheless, heterogeneous groups can also suffer as a result of different cultural basic assumptions which can spark negative conflict, ultimately leading to a decrease in the group’s performance (Ramasamy & Yeung, 2016).

1.2 Innovation

As Adams et al. (2006) point out, despite the increasing attention being devoted to innovation, there appears to be a lack of a clear definition, incorporating the various approach to it. Just as Adams et al. (2006), this study adopts the definition of innovation as the successful exploitation of new ideas (DTI, 1998). This takes into account not only the approach to innovation by its outputs, such as products and services but also by other types including processes, administration, and technology (Adams et al., 2006).

1.3 Cultural Diversity and Innovation

Based on the assumption that employees from different cultural backgrounds are shaped differently by their respective culture and hence possess different skills than members of other cultures (such as other employees), cultural diversity has been identified as a factor impacting the innovative potential of firms, as the unification of various skill sets is seen as advantageous (e.g. Stahl et al., 2010). Yet, as Zhan et al. (2015) point out, diversity can be seen as a double-edged sword, either contributing to innovation through the various new perspectives and

cognitive abilities of the multi-cultural team or hindering it due to arising conflicts. They conclude that ethnic diversity impairs innovation, while cultural distance fosters innovation. Hence, in an optimal setting, the members of a team would be of homogeneous ethnicity (Ramasamy & Yeung, 2016, Zhan et al., 2015) but strong cultural distance. The diversity of a team is hence to a certain extent influenceable by effective diversity management to foster innovation.

1.4 European Innovation Scoreboard: The Czech Republic

The European Innovation Scoreboard (European Commission, 2018) is a measure of innovative performance of countries of the European Union and is published on an annual basis. The report allows for comparative analysis of the EU countries which then can be used as a basis for evaluation for each country, so as to identify areas for improvement. The 2018 EIS concludes that the EU's innovative performance has improved significantly and predicts future growth, also in comparison to countries such as the United States, Japan, and Canada. Sweden is the innovation leader for 2018.

The EIS (European Commission, 2018, Main Report, p. 52) describes the Czech Republic as a moderate innovator, scoring under the EU average and with declining performance in comparison to 2010. The report points out the employment impacts and firm investments as the strongest innovation dimensions for the Czech Republic.

2 Method

The analysis is based on the data of the 2018 EIS (European Commission, 2018) and demographic data obtained from Eurostat (2018) on the number of foreigners in EU countries in 2016. It should be noted that the analysis is to be seen as exploratory and preliminary, as the extent of cultural distance (Zhan et al., 2015) cannot be sufficiently measured in the data set used. Each country score for EU countries was correlated to the percentage of foreigners in the respective country (number of foreigners 2016 divided by population 2016). To test for significance, linear regression analysis was employed to obtain R^2 , standard error, t-statistic, and p-value for each innovation descriptor. Due to the lack of data in the 2018 EIS of some of the measures for Greece (1.2.3, 4.1.2) and Malta (1.3.2), the analyses for these descriptors are based only on the remaining EU countries.

3 Results

The following section provides a discussion for each of the four parts of the EIS based on the statistical results of the analysis.

3.1 Framework Conditions

Table 1 provides an overview of the results for the section of framework conditions. There appear to be various significant correlations. Logically, the correlation to the number of foreign doctorate students (1.2.3) is highly positive and significant at a $p < 0.01$ level. Further correlations are connected to the research conducted in the respective countries, with significant positive correlations to international scientific co-publications (1.2.1) and scientific publications among top 10 % cited (1.2.2).

Especially the apparent linkage to academia seems surprising and could be an indicator for the positive effects of cultural diversity in teams performing non-routine tasks. There appears to be a gap in the research on the impact of cultural diversity on the performance of academic research teams, which are somewhat distinct from regular working teams due to the difference in their scope.

Tab. 1: Analysis: Framework Conditions

| Descriptor | r | R ² | t-statistic | Stan. Err. |
|---|--------|----------------|-------------|------------|
| 1.1.1 New doctorate graduates | -.07 | .01 | -.37 | .89 |
| 1.1.2 Population completed tertiary education | .39** | .16 | 2.19 | 7.85 |
| 1.1.3 Lifelong learning | .27 | .07 | 1.42 | 7.64 |
| 1.2.1 International scientific co-publications | .42*** | .18 | 2.39 | 527.23 |
| 1.2.2 Scientific publications among top 10% cited | .46*** | .21 | 2.64 | 2.92 |
| 1.2.3 Foreign doctorate students | .71*** | .50 | 5.04 | 13.89 |
| 1.3.1 Broadband penetration | .08 | .01 | .42 | 9.90 |
| 1.3.2 Opportunity-driven entrepreneurship | .17 | .03 | .84 | 2.34 |

*** $p < 0.01$ ** $p < 0.05$

Source: Data were taken from the European Commission (2018) and Eurostat (2018); own analysis

3.2 Investments

The analysis of the investment section of the EIS reveals a strongly positive, significant correlation ($r = .68$, $R^2 = .47$, $p < 0.01$) of the percentage of foreigners of an EU country's population to the venture capital investments measured as a percentage of the respective gross domestic product (GDP). As mentioned in the methodology report of the EIS (European

Commission, 2018), high percentages indicate a dynamic environment for the creation of new businesses and the development of disruptive technologies. It would be beneficial to further investigate if there is a direct relationship, or to what extent moderating variables are involved.

Non-R&D innovation expenditure which captures the components required for innovation, such as machinery, as a percentage of total turnover displays a medium negative correlation ($r = -.39$, $R^2 = .16$, $p < 0.05$).

Tab. 2: Analysis: Investments

| Descriptor | r | R ² | t-statistic | Stan. Err. |
|--|--------|----------------|-------------|------------|
| 2.1.1 R&D expenditure in the public sector | .13 | .02 | .64 | .25 |
| 2.1.2 Venture capital investments | .68*** | .47 | 4.78 | .06 |
| 2.2.1 R&D expenditure in the business sector | .02 | .00 | .11 | .66 |
| 2.2.2 Non-R&D innovation expenditure | -.39** | .16 | -2.19 | .39 |
| 2.2.3 Enterprises providing ICT training | .32 | .10 | 1.73 | 8.26 |

*** $p < 0.01$ ** $p < 0.05$

Source: Data were taken from the European Commission (2018) and Eurostat (2018); own analysis

3.3 Innovation Activities

In the section of innovation activities, there appears to be a significant positive correlation ($r = .51$, $R^2 = .26$, $p < 0.01$) of the number of foreigners in a country and the relative number of small and medium enterprises (SMEs) with marketing or organizational innovations (non-technological). The reasons for the correlation could be manifold as, considering the R^2 value of 0.26 only a part of the relationship can be explained. Yet, the linkage of cultural diversity and innovation in SMEs could be assumed to be the result of the positive impact of cultural distance in multicultural work teams. Hence, SMEs in nations with a higher share of foreigners would tend to be made up by culturally more heterogeneous groups, enhancing their innovative potential.

Yet again, the data does not allow for a distinction towards the extent of cultural distance (Zhan et al., 2015) and would hence benefit from further analysis with more detailed data sets. Large firms were excluded in the EIS as most of them are assumed to innovate in-house (European Commission, 2018).

The regression analysis further indicates a significant positive correlation ($r = .65$, $R^2 = .42$, $p < 0.01$) with the number of trademark applications, measured per million GDP but adjusted through purchasing power standards (PPS) in the EU. This could potentially be

linked again to the positive effects of multicultural work teams, however, needs further attention.

Tab. 3: Analysis: Innovation Activities

| Descriptor | r | R ² | t-statistic | Stan. Err. |
|--|--------|----------------|-------------|------------|
| 3.1.1 SMEs with product or process innovations | .25 | .06 | 1.34 | 11.73 |
| 3.1.2 SMEs with marketing / organisational innovations | .51*** | .26 | 3.00 | 11.09 |
| 3.1.3 SMEs innovating in-house | .30 | .09 | 1.59 | 10.30 |
| 3.2.1 Innovative SMEs collaborating with others | .12 | .01 | .61 | 6.58 |
| 3.2.2 Public-private co-publications | .05 | .00 | .23 | 42.72 |
| 3.2.3 Private co-funding of public R&D expenditures | .19 | .04 | -.97 | .03 |
| 3.3.1 PCT patent applications | .05 | .00 | .25 | 2.45 |
| 3.3.2 Trademark applications | .65*** | .42 | 4.35 | 8.33 |
| 3.3.3 Design applications | .34 | .12 | 1.86 | 2.64 |

***p<0.01 ** p<0.05

Source: Data were taken from the European Commission (2018) and Eurostat (2018); own analysis

3.4 Impacts

The results in the fourth and last section of the EIS are strongly related to knowledge-intensive activities, with a significant positive correlation of the percentage of foreigners to employment in knowledge-intensive activities ($r = .66$, $R^2 = .44$, $p < 0.01$) and the export of these resulting services ($r = .54$, $R^2 = .29$, $p < 0.01$). As knowledge-intensive activities require new ways of thinking and diverse sets of knowledge, this could also be a result of the positive impacts of culturally diverse teams.

The findings, however, are not in line with Ozman and Erdil (2013) who identify knowledge growth as being enhanced by low levels of knowledge diversity and cultural diversity, hence in homogeneous teams. They conclude that the impact of cultural diversity on innovation is determined by the existence of technological opportunities and the distribution of knowledge among agents, and hence a multicultural composition would be a retarding factor.

The country report of the Czech Republic in the EIS (European Commission, 2018) points out that the export of knowledge-intensive activities in the Czech Republic has improved since 2010, but is only at 50.6% of the EU average. This could be another indicator for the advantages of effective diversity management in this context. As Egerová et al. (2013) conclude the willingness to employ foreign employees is significantly higher of companies with higher

proportion of foreign capital in the Czech Republic. They stress that Czech firms were rather reluctant, showing a clear area for improvement. Yet, there appears to be a comparably high share of value added by foreign-controlled enterprises with 24.9% in comparison to the EU average of 12.5% (European Commission, 2018).

Tab. 4: Analysis: Impacts

| Descriptor | r | R ² | t-statistic | Stan. Err. |
|--|--------|----------------|-------------|------------|
| 4.1.1 Employment in knowledge-intensive activities | .66*** | .44 | 4.48 | 2.67 |
| 4.1.2 Employment fast-growing firms innovative sectors | .17 | .03 | -.88 | 1.98 |
| 4.2.1 Medium & high tech product exports | .06 | .00 | -.28 | 11.66 |
| 4.2.2 Knowledge-intensive services exports | .54*** | .29 | 3.25 | 17.29 |
| 4.2.3 Sales of new-to-market and new-to-firm innovations | .11 | .01 | -.57 | 4.77 |

***p<0.01 ** p<0.05

Source: Data were taken from the European Commission (2018) and Eurostat (2018); own analysis

3.5 Limitations

The presented results, however, are subject to various limitations which need to be considered. Firstly, additional moderating variables need to be explored. What on a company-level can be team size and task complexity (Stahl et al., 2010), could on a country-level be the cultural distance, ethnicity, professional experience and highest education.

Overall, as mentioned before, the results are to be understood as preliminary. The data set taken from Eurostat (2018) on the number of foreign-born population in EU countries does not allow for a precise determination of cultural diversity, as this would require taking into account the actual country of origin and the ethnicity, amongst others. Instead, it is only assumed that the higher the percentage of foreigners in a country, the more the population can be seen as culturally diverse. As Zhan et al. (2015) point out, only ethnic diversity can, in “the context of national innovative capacity building” (p. 1031) be counterproductive. Therefore, the results need to be interpreted with care.

Conclusion

By correlating the relative percentage of foreigners in EU states to their respective innovation score in the European Innovation Scoreboard (European Commission, 2018), the presented study finds significant positive correlations especially in relation to academic research activities, venture capital investments, SMEs with marketing and organisational innovations, trademark applications, as well as knowledge-intensive activities and their export. The correlation of cultural diversity and non-R&D innovation is significant and negative.

Overall, the findings indicate that increasing cultural diversity based on the relative number of foreigners in a country enhances the organizational performance in a variety of areas. This carries various implications for practitioners, yet, further research is necessary to further investigate each finding. It appears to be necessary, however, to include the demographic composition stronger into innovation measurements such as the European Innovation Scoreboard for future analysis.

As Gross-Gołacka et al. (2017) conclude, there appears to be some backlog demand for stronger diversity management in the Czech Republic. By using the faster-growing population through migration, cultural diversity of work teams could be enhanced by strategically assembling the team composition. As the Czech Statistical Office (2018) displays, this seems to partly happen already, with a sharp increase of foreigners registered at labour offices in the past years in the Czech Republic. This could, ultimately also allow exploiting and further developing innovative potential, so as to improve in a country-level comparison, too.

Further research could utilize more detailed data samples which would then allow for stronger generalisability and drawing more precise conclusions on the respective impact. This would also enable a more precise deduction of appropriate organizational strategies to foster the positive impact of cultural diversity through strategic approaches. Analysing the specific cultures present in a country by their norms and values, as suggested in the cultural framework taken into account in the EIS exploratory report C (European Commission, 2018), could then yield additional valuable insight.

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SOCIAL ENTREPRENEURSHIP AND THE HONOURABLE BUSINESSMEN: OLD ETHICAL BUSINESS PERFORMANCE IN A NEW COAT?

Hartmut-Heinrich Meyer

Abstract

Purpose: Publications on business ethics or social entrepreneurship make often references to the honourable businessman for the definition of ethical values in entrepreneurship. In reviewing the essence of the contribution, one arrives to the impression that the ethical values determining entrepreneurial behaviour are only presented in a new coat. For this reason the two types of entrepreneurs have been compared to analyse whether the ethical values have changed in its meaning as guidelines to conduct entrepreneurship.

Design/methodology/approach: The objectives of the paper were achieved by a qualitative content analysis of 25 different sources in the literature dealing with corporate social responsibility, social entrepreneurship and the honourable businessman. The method employed was based on a qualitative research method of Mayring.

Findings: The prime difference can be found in the constitutional relationship between the entrepreneur and society. Whereas the honourable businessman performs a business to build up a personal fortune and to redistribute some of it later in the form of donations, the social entrepreneur starts to seek more a mutual benefit between the business and itself. However, both types of entrepreneurs seek long-term business relationships with their business partners.

Research/practical implications: The image of an honourable businessman which has been partly transferred to a social entrepreneur could set new standards within entrepreneurial marketing to promote entrepreneurial interest and intentions. As society values sustainability and ethical standards highly, the image of the honourable businessman could set guiding marks for entrepreneurship during start-up as well as setting up sustainable business relationships.

Originality/value: The main value of the study is the systematic evaluation of ethical values in as determinants of entrepreneurial behaviour in a qualitative holistic approach.

Keywords: Business Ethics, Social Entrepreneurship, Honourable Business Man

JEL Codes: L26, N00, O35

Introduction

In the contemporary literature the honourable businessman and the social entrepreneur find considerable attention. Due to the financial crisis in 2007 – 2010 and other economic scandals, there is an upcoming request by the society that entrepreneurs should base their entrepreneurial behaviour more on ethical standards (Prabhu 1999, Spear 2006). In reference to a highly globalized world, importance of an intercultural management and various possibilities of real and virtual interaction, people appear to look for guiding principles as landmarks for their behaviour. (Schwalbach 2012).

The spirit of the discussions refers back to the image of the honourable business man of the 12th century. The image of a honourable and respectable businessman appears to set still yardsticks for the evaluation of entrepreneurial behaviour and is deeply grounded in the German image of entrepreneurship and its institutions (IHK 2012, Risch 2011). In particular, the values of responsibility and financial reliability set a number of ethical standards which still count today as guiding principles for entrepreneurs (Abelshausen, 2004).

The definition of social entrepreneurship is based on social values of responsibility and sustainability in the conduct of interaction between the society and entrepreneurship..

In innovation driven economies, a number of business ventures were developed in the area of social welfare, health, education in order to cope with the effects of e.g. demographic change, migration or environmental changes. These business activities are classified as social entrepreneurship and describe a new business relationship between the society and entrepreneurship. At a first glance, it appears that the concept of social entrepreneurship has been revived traditional values of responsibility and sustainability within a new framework of entrepreneurship. The current discussion of ethical standards on conducting businesses lead to an attitude of the society that ethical standards in conducting business were highly valued and its performance could lead to a competitive edge for enterprises (Momberger, 2015).

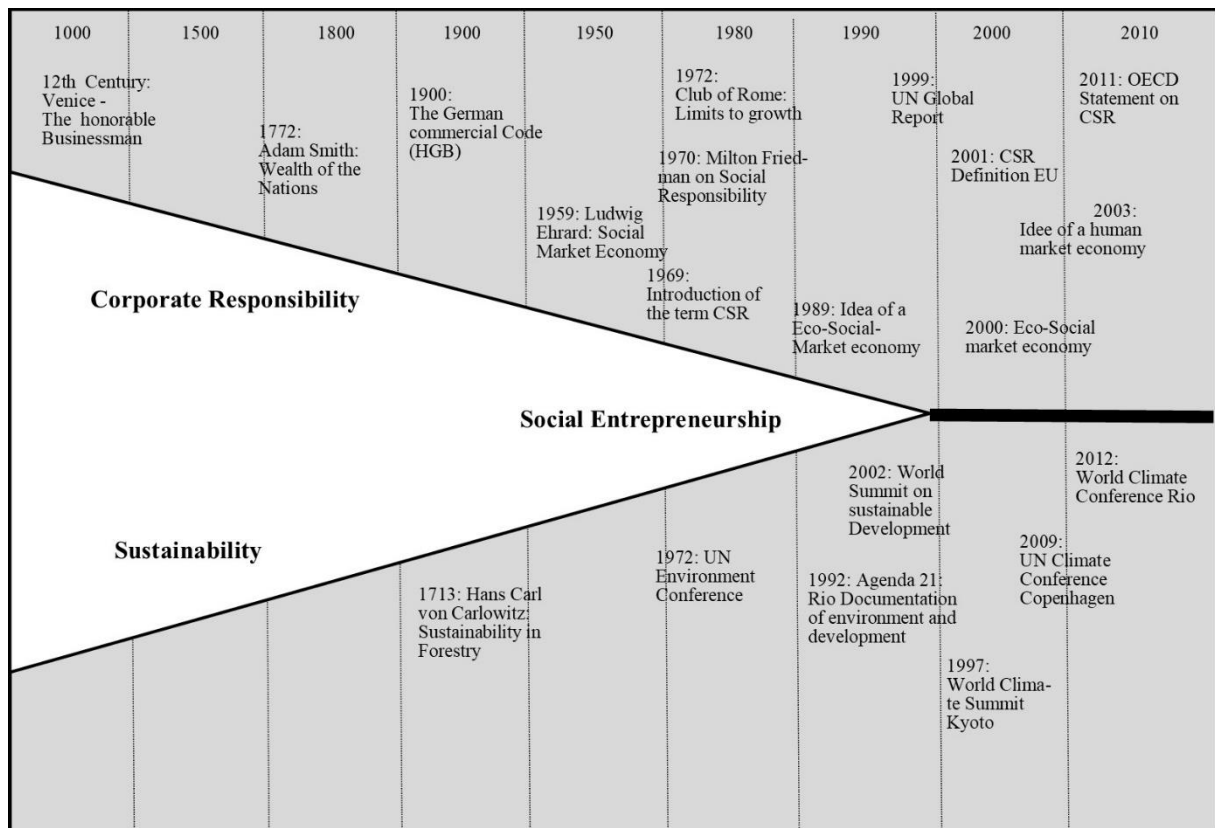
This paper attempts to compare the two types of entrepreneurs with the objective to answer the question whether the traditional values have only been revived by the person of a social entrepreneur or not. While analysing these two personalities in a qualitative literature review, the ethical standards and values will be determined and analysed with the objective how the interpretation of these values has changed. The results of the analysis should give new impulses to the discussion of ethical values determining entrepreneurial behaviour and how the values can contribute in the promotion of entrepreneurship in innovation driven economies.

1 Historical routes leading to social entrepreneurship

1.1 Understanding the values responsibility and sustainability by the historical roots of the honourable businessman and social entrepreneurship.

Social entrepreneurship is defined by the approach to offer social services on an individual private basis and mutual benefit (Abereijo 2016; Momberger, 2015; Tibor, 1999). The development of social entrepreneurship business ideas can be grounded on an increasing attitude of social responsibilities and the willingness of the society to accept entrepreneurial services in this area (Spear 2006; Barnard and Mthembu, 2019). Social entrepreneurship allows the society to close service gaps in a cost-effective and commercial way. On the other side allows new sources of income generation income and job generation (Momberger, 2015; Freiling, 2006). As outlined in figure 1, the development of social entrepreneurship can historically explained on the values of responsibility or corporate responsibility and sustainability.

Fig. 1: The streams of responsibility and sustainability leading to social entrepreneurship



Source: Walker et al. (2011) with own amendments

The image of the honourable businessman is based on a charismatic person, driven by ethical values in a Schumpeterian sense (IHK 2012; Schwalbach 2012; Schumpeter 1934). This image refers back to the 12th century where businessman developed trade on the grounds of trust. Therefore the values to protect trust become guiding principles in the formation of the “Hanse” and the development of the commercial Code (Handelsgesetzbuch or HGB) in Germany (Abelshauser, 2004). The responsibility to protect trust and fairness, the “ehrbare Kaufmann” (respectable or honourable businessman) has formed the charisma of a reliable and a correct businessman in the conduct of his business (Triebel & Hafner, 2010). The image of the honourable businessman received considerable recognition at the peak of industrialisation (la belle epoch) where the bourgeoisie gained a future and seeking own values in contrast to royal values (Abelshauser, 2004). Especially fairness in businesses and the achievement of a mutual benefit for the contract partners guided entrepreneurial behaviour. Especially this value has been considered in the British and German commercial law.

One central behavioural aspect in order to comply with these demands was to exercise modesty. This was historically understood to perform a proper administration in conducting business and conceal personal fortune (Klink, 2010). In particular, the financial accounting standards set precise standards on a reliable documentation and information policy for its creditors. These ideals found later entrance in the commercial law to protect creditors by the principle of prudence and reliable documentation (Triebel, 2010). It forces entrepreneurs for an fair evaluation of fortune and to report only profits which have been realized. The objective to protect the equity capital of creditors found further implications within the credit and insolvency law in Germany as well as in the constitutional framework of the German economy (the concept of social market economy or soziale Marktwirtschaft by Müller and Armark). The motivation was here to set a framework where the competition should be based on innovation rather than on institutional power.

The second development leading to social entrepreneurship was the demand of sustainability. Up to 1970 was this demand more subject in the area of forestry and agriculture. The UN Conference in 1972 set up an awareness that the resources of the world are limited and industrial production or consumption should be supervised in order to save the climate and standard of living. The discussed environmental issues lead to a review of the relationship between the industry, society and environment (Crane & Glozer, 2016).

The combination of responsibility in the form of corporate responsibility and sustainability leads to various forms of social entrepreneurship in order to combine the needs of the society and the upcoming discussion of civil willingness to take own responsibilities.

as well as a new interpretation of moderation. As a result, the current discussion lead to a model of sustainability, which is based on the pillars incorporating environmental issues (pollutions, energy), social issues (responsibility towards society and employees) and economic issues (e.g. sustainable business ideas, contracts on the basis of a mutual benefit) (Brooks, 2009; Risch, 2011).

The graph shows further that the concern of the society concerning ecological sustainability and sustainable economic development laid 1970 the foundation for social responsibility (CSR). The social and environmental conduct of an enterprise became competitive positions apart from the development of new business chances within an upcoming sharing economy (Bikse, Rivza and Riemere 2015). The routes of this development refer back to the paper of Milton Friedman, Club of Rome, or UN Global Report and the demand to exercise modesty. The idea of corporate social responsibility also had a major impact for the social conduct of an enterprise, especially in the service and trade industry. Ethical aspects or the fair distribution of income, social welfare of employees and provision of a work life balance become success factors in the market. However, these values defining corporate social responsibility recall the picture of an honourable businessman.

1.2 Definition of guiding values for the comparison of the two concepts

In the literature, the guiding values characterising entrepreneurial ethical behaviour can be summarized in the first place by individual and collective values of justice and responsibility. Schwalbach (2012) outlined through a historical review that success in business has been subject for conducting individual justice and responsibility in the interaction with the market participants. Collective justice and interaction has been more subject to set standards of the society in the conduct of a competition. Nevertheless, both aspects need to find entrance to leadership to comply with the demand of corporate social responsibility (CSR).

The discussions on determinants of ethical values to guide business behaviour reflect more the relationship between the entrepreneur and his business. Here Lütje (2017) started to classify this discussion into individual and regulatory ethics. Individual ethics questions the attitude towards income generation and the development of a personal fortune. It refers back to the ancient claim of modesty. The regulatory ethics refers more back to moral in the market in order to set up standards in the conduct of competition. As growth in competitive markets can only be obtained through squeezing out other market participants and a redistribution of demand, there is a clear demand of fairness on the grounds of innovation and own competitive edges. Above all, it demands to concentrate on the structure of the market and not to abuse own

market positions of power. In summary of these guiding values, one needs to evaluate the relationship between the entrepreneur and the society. The latter aspect suggests an analysis of this performed market behaviour as well as the perceived role within the society.

2 Methodology

The methodology used in this paper was explanatory and is based on a structured review of existing contributions. On the basis of different categories, the objective was to identify ethical values determining the entrepreneurial behaviour and how these values are interpreted and reviewed. The material for the analysis has been selected by various online-library services as well as the social media forum research gate. Keywords used have been honourable businessman, social entrepreneurship, business ethics. In total 25 sources have been identified, including also publications by the chamber of commerce and the club of the honourable business man in Germany as outlined in table 1. The main objective in selecting the papers was to follow a discussion on ethical values in conjunction with the honourable businessman, social entrepreneur and cooperative social responsibility.

The method to analyse the material refers back to a qualitative approach of Mayring (2004). This approach allows to analyse a bulk of information and to reduce the material by various categories. The problem of this research was that the material in itself was written with different objectives and scope. Therefore it was difficult to employ a strict quantitative content analysis in order to quantify the importance of different ethical values by frequencies. Here the objective was more to analyse the material in a holistic way in order to allow stronger an comparison and interpretation of the ethical values within the setting of two different types of entrepreneurs.

Nevertheless, also Mayring requires a strict structural approach in the analysis to comply with scientific standards. For this reason the research question was operationalized by various categories to allow a scientific approach for the analysis without threatening the objective of openness in the interpretation. Although Mayring build up on various elements of a quantitative analysis, it requires not to quantify observations. This was also not possible due to the heterogeneity of the material.

In order to allow for a structured approach, the selected categories for the analysis have been deducted from the guiding values in building up ethical standards. The material has been read and arguments have been extracted according to the theoretical based categories. This process can be done in two steps in order to achieve a degree of abstraction of the given

arguments. In particular the extraction allows stronger to reduce the arguments to its meanings and in the end to set these meanings into the context of the suggested behaviour.

Tab. 1: Employed references for the analysis

| No | Name and Year | Contribution-Type | Major approach and Content |
|----|---|-----------------------|--|
| 1 | Lütje 2011 | Book Chapter | Conceptional discussions and historic review on the relationship of the honourable businessman and social responsibility |
| 2 | Schwalbach/Klink 2015 | Book Chapter | Historical Review of the honourable businessman and its application to CSR-Research |
| 3 | Roca 2008 | Journal Article | Discussions of ethics in business education, |
| 4 | Beschorner/Haiduk 2015 | Book Chapter | Discussion on the honourable businessman and the influence of creating shared values in CSR-management |
| 5 | Beschorner 2016 | Journal Article | Discussion on the honourable businessman in the literature |
| 6 | Klink 2010 | Book Chapter | The role of the honourable businessman in research |
| 7 | Triebel/Hafner 2010 | Book Chapter | The role of the honourable businessman in the German law |
| 8 | Wegmann/Ziebig/Zilkens | Book Chapter | The honourable businessman and trust |
| 9 | Abelshauer (2004) | Book | Review of the German economic history and its entrepreneurs |
| 10 | Carton/Meeks (1988) | Conference Paper | The role of the social entrepreneur in society |
| 11 | Danke/Brunner (2010) | Journal Article | The state of the art of social entrepreneurship research |
| 12 | Freiling (2006) | Book | Book on Entrepreneurship and social Entrepreneurship. Here the particular reference to entrepreneurial personality has been used |
| 13 | IHK Nord Westfalen (2012) | Book | Analysis of the principals of the honourable business man |
| 14 | Momberger (2015) | Book | Social entrepreneurship, personalities and market strategies |
| 15 | Prabhu (1999) | Journal Article | Leadership of social entrepreneurs |
| 16 | Spear (2006) | Journal Article | Business Models and business approaches of social entrepreneurs |
| 17 | Bikse/Rivza/Riemere (2015) | Journal Article | The social entrepreneur as a promotor of social developments within the society |
| 18 | Crane/Glozer (2016) | Journal Article | Contemporary review of corporate social responsibility research |
| 19 | Walker/Gronza/May (2011) | Journal Article | Consumer responses to CSR activities and social entrepreneurship. |
| 20 | Irawan/Suryanto/Mashud (2019) | Journal Article | Research on social entrepreneurship personality |
| 21 | Pomeratz (2019) | Conference Paper | Research on the development of social entrepreneurship and its values |
| 22 | Amini/Arasti/Bagheri (2018) | Journal Article | Definition of social entrepreneur competences and research on social entrepreneur personalities |
| 23 | Barnard/Mthembu (2019) | Book Chapter Preprint | Definition of objective, innovation behaviour and the impact to society |
| 24 | Deutsche Industrie- und Handelstag (DIHT) (German Chamber of Commerce) | Homepage of the DIHT | Values of the honourable businessman |
| 25 | Versammlung des Vereins des ehrbaren Kaufmanns (VEEK) (Club of the honorable Businessman) | Homepage of the VEEK | Statues of the honourable businessman |

Source: Own table

The categories for the research framework have been built up by 3 entities for the analysis describing the relationship between the society and the entrepreneur, his business or

market approach and entrepreneurial personality. These entities have been operationalized by 5 different research categories and statements as outlined in table 2. These categories have been selected on the basis of the earlier review to explain how these values determines entrepreneurial behaviour.

Tab. 2: Research Categories for the analysis

| Category | Measurement and analysis of the category |
|-----------------------------|---|
| Justice and responsibility | The main differentiation the sources how justice and responsibility has been obtained. Either through an own interpretation of both values or set up by external sources. |
| Entrepreneurial personality | The nature how entrepreneurial personality forms the conduct. |
| Competition | The way of interaction with the market in order to obtain income. |
| Fortune | The way fortune is treated by the different concepts. |
| Leadership | The approach to formulate decisions and role of employees. |

Source: own table

The material was analysed and the data has been reduced by the mentioned to tier approach. The complete table of the analysis can be obtained from the author of this paper by request. The identified ethical values were evaluated with the perspective to outline similarities and difference between the two types of entrepreneurs. The question for the analysis was how a certain variable influence the standards of entrepreneurial behaviour.

3 Results of the comparison between the social entrepreneur and the honourable businessman

3.1 Justices and responsibility

The items concerning entrepreneurial justice and responsibility refer back to the understanding of individual and a collective approach towards ethics. Within the material it could be found that for the honourable businessman these issues are often connected with the value of personal honour and trustworthiness. These values have been rated highly throughout the material for the honourable business man. Sources can be found in the area of financial reporting, solvency and reliability. The values are performed as a personal attribute or self-responsibility rather than an organisational attribute (Beschoner 2016; Schwalbach, Klink 2015, IHK Nord Westfalen 2012).

Although these values are not explicitly denied within the material for the social entrepreneur, one does not find here clear forwarded arguments. Here one finds more that collective values to conduct responsibility are forwarded as individual and organizational competences. Responsibility finds here more entrance in the service design and in the conduct of leadership /Crane, Glozer 2016; Amini, Arasti, Bagheri 2018).

The comparison showed that these ethical values are defined clearly for the honourable businessman. In social entrepreneurship the value of justice appears to be seen in conjunction with responsibility. A high grade of responsibility is interpreted in conjunction with justice and fairness in the conduct with business partners. On the other hand, both concepts apply responsibility to maintain competitiveness of the organisation and for the financial conduct of the enterprise.

3.2 Entrepreneurial Personality

In this section the various items describing the personality of both types of entrepreneurs have been analysed. Within the material there appears to be a clear picture of the personality for the honourable businessman (IHK Nord Westfalen 2012; Beschorneer 2016; Freiling 2006). He is uniramously described as a

- liberal minded person and a global thinker,
- has a strong emphasis towards his word, a handshake is binding,
- has a good competence of commercial judgement and cautioned action.

The analysis of the material demonstrates a clear picture of a highly charismatic person in the interaction with the stakeholder of his business.

The social entrepreneur is more described as an entrepreneur in a classical sense who solves social problems through the conduct of business activities. The principal entrepreneurial behaviour is guided by the approach to combine sustainability with a mutual benefit between the business and his stake-/shareholders (Danke, Brunner 2010, Walker, Gronza, May 2011). Nevertheless, one finds in the literature only little specific characteristic features. Here it is always only assumed that the person of a social entrepreneur is prioritising social needs before individual needs.

On the other hand, the material offers more suggestions on the required competencies of a social entrepreneur as e.g. (Irawan, Suryanta, Mashud 2019; Danke, Brunner 2010):

- the ability of networking
- to attract finance
- to perform managerial duties
- to perform effective communication between various stake- and shareholders.

The comparison demonstrated that features of personalities have been replaced by competences in the case of social entrepreneurship. There is an attempt to alter a traditional trait approach up with an approach where the competences can be trained to perform an entrepreneurial behaviour.

3.3 Competition

The ethical approach to interact with the market has been evaluated in the relationship with competitors and market behaviour. Within the material one finds that market behaviour of the honourable businessman is guided by his personal faith and principals. In this respect one could find that the honourable businessman has a strong attitude of his role to maintain economic and social order within the market (Beschoner, Haiduk 2015; Lüttje 2011). These values are also transferred towards the conduct of international businesses. For this reason, the honourable businessman regards himself as an outstanding person within the society or the market. This attitude has been transferred to his expectation of a competitive behaviour which should be based on the grounds of quality, reliability and innovations (Wegmann, Ziebig & Zilkens 2009).

The material for the social entrepreneur suggest that he does not perceive himself in a direct competitive environment due to his service design (Spear, 2006). As the social entrepreneur seeks more integration through communication and networking, he places his organisational values more into focus. Nevertheless, in the relationship to the market and to the society, the social entrepreneur aims to change behavioural structures through the services offered (Irawan, Suryanto & Mashud, 2019). The main focus here to set standards through the services offered rather than through individual behaviour. Hence, the analysis of the material suggests that he perceives himself more as an ordinary member of the market without outstanding values. This allows him to compete on the basis of innovation or in market niches where no direct competition is expected. One core argument often used is that the social entrepreneur is more offering his services in market areas sheltered from competition through the specific services offered.

3.4 Fortune

The analysis of the material suggests that both types of entrepreneurs are driven by the motivation to create an income and to build up a fortune which is demonstrated on a low profile. Whereas the honourable business man is primarily focused to build up the a fortune and to redistribute a part at a later stage, the social entrepreneur is aiming for a mutual benefit in the first place (Lütje 2011; Schwalbach and Klink, 2015). The behaviour of the social entrepreneur is measured by the proportion he reinvests profits for social projects within the organisation (Crane and Glozer 2016). Although within the honourable businessman values of personal reliability and trustworthiness overrule his behaviour, both concepts refer to the need for modesty. Within the associations of the honourable businessman, one finds also a moral attitude to fortune with a pride of dignity. This means that one is more hiding the personal fortune and lives more in closed groups rather than to present the fortune (see web-sides of the honourable businessman). The social entrepreneur tends more to demonstrate the fortune through the publication of social projects which have been financed.

Both types of entrepreneurs are motivated by the objective to create an organisation with a lasting value creation process (Bikse, Rivza & Riemere 2015; Beschorner & Haiduk 2015). This aspect appears to dominate the performance of an entrepreneur. Nevertheless, the honourable businessman is measuring this achievement by his fortune and also this later ability of sponsoring. The social entrepreneur, in contrast, is measuring it more by its effects to the society through the conduct of various projects.

3.5 Leadership and Business Models

The honourable businessman is pictured more as a charismatic person who regards himself as a leader and being exemplary in his actions (Schwalbach and Klink 2015; Beschorner 2016). He is known by his fairness and his objective to create conditions for an honourable acting. This objective are long-term business engagements and assignments in a sustainable way. Therefore the business models are built upon high values of a reliable financing and solvency. The management style is based on a strong own involvement and hands on approach. He is highly value orientated and performance orientated. In addition, his personal values become also corporate culture values. The business models are traditional trade or production orientated with little interaction with the customers or clients.

The social entrepreneur here is often more characterized as an integrative person and a highly professional person towards leadership (Prabhu, 1999). Here one finds a clear picture. The ability to perform management tools determines his approach to leadership. Thereby the business models start to integrate various stakeholders in order to offer target orientated services. The comparison showed also that both types of entrepreneurs are driven by the motivation to build up a sustainable organisation and to seek long term business relationships.

Conclusion

In summary, the analysis of the material showed that the honourable businessman stands for decency, honesty, reliability and responsibility in the conduct of his business. The performed ethical values are strongly personal based and one finds a unit between the honourable businessman and his organisation. The differences between the two types of entrepreneurs needs to be seen in the relationship between the organisation of a social entrepreneur/honourable businessman and the society. The honourable businessman regards himself more as an outstanding and of an explanatory nature, whereas the social entrepreneur seeks more the integration. However, both analysed personalities seeking long-term relationships of mutual benefit.

The research question can be not unitarily answered whether the social entrepreneur has been a revitalized honourable businessman (Beschoner and Haiduk, 2015). In context to the literature, the discussions showed in some points that values of responsibility and leadership have been lifted into the current state of the art of performing an enterprise in competitive markets. In particular the focus changed from a personal view of entrepreneurship towards more an organisational approach towards entrepreneurship. Nevertheless, these observations need further be evaluated in the context of the selected branch of the enterprise. This aspect appears not considered sufficiently within the current discussions and guide the analysis of future research on this question (IHK Nord Westfalen 2012; Crane & Glozer 2016).

In conjunction with the contemporary challenges of protective developments of economies, the identified values do not find a revival not only for social entrepreneurship. Therefore, the picture of an honourable businessman should be further transferred into an guiding principles for all types of entrepreneurship. Besides all, the honourable behaviour and social commitment should be integrated into an entrepreneurial marketing in order to support the attractiveness of entrepreneurship. In particular the Generation Y and Z appear to be highly

attracted by the idea to conduct social responsibility without a high degree of external determination. Besides all, this is the core of entrepreneurship.

This type of research has always the risk of starting to stereotype entrepreneur for a better classification and understanding. Nevertheless, the content of the presented discussions provided enough evidence of the value of ethical standards as a success factor in conducting entrepreneurship. In order to maintain interpersonal trust between business partners, strong entrepreneurial characters are required and here old ethical values of conducting businesses can provide a guiding line in a developing virtual world.

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NASCENT SOCIAL VENTURES AND THEIR QUEST FOR LEGITIMACY: AN EXPLORATORY STUDY OF ORGANIZATIONAL EMERGENCE

Moriah Meyskens

Abstract

Purpose: This study examines why some social ventures become organizations and others do not by examining the relationship between the conforming and strategic processes to start a social venture and venture launch.

Design/methodology/approach: This is a longitudinal study of 48 nascent social ventures that participated in entrepreneurship competitions in the United States from 2005 to 2009. Based on a legitimacy perspective, the study assess the factors that predict organizational emergence by conducting a content analysis of social venture business plans, a follow-up survey, and then hierarchical logistic regression to examine the hypothesized effects.

Findings: The exploratory findings suggest that elements of both conforming and strategic legitimacy individually predict organizational emergence. Particularly lead entrepreneur, organization team, and impression management behaviors are important. While prior research on nascent commercial ventures finds strategic legitimacy important and a diminished role of conforming legitimacy, this study suggests that conforming legitimacy at the earliest stages increases the likelihood of social venture launch, which might be due to the more complex and unknown institutional environment of social ventures. Nascent social ventures might rely more on the lead entrepreneur and organizational team to successfully emerge.

Research/practical implications: The findings suggest initial evidence into the important role of conforming legitimacy and impression management for the organizational emergence of nascent social ventures. It suggests that the lead entrepreneur and organization experience as well as understanding how to manage impressions are important skills for nascent social venture organizational emergence. Future studies might analyze the role of conforming and strategic legitimacy of ventures and their institutional context and their role in organization emergence.

Originality/value: This study contributes to scholarship on social entrepreneurship by providing one of the few longitudinal empirical studies of nascent social ventures, while providing insight into the role of process dimensions on organizational emergence in social ventures.

Keywords: Social Entrepreneurship, Legitimacy, Organizational Emergence, Social Ventures

JEL Codes: L26, L31, O35

Introduction

Overcoming the liabilities of newness and smallness are one of the greatest challenges a nascent venture faces. Until stakeholders view an entity as legitimate, nascent ventures - defined as businesses at the early stages of development in the start-up process have difficulty acquiring the resources they need to develop sufficiently enough to emerge as an operational organization (Tornikoski and Newbert, 2007). Leveraging a legitimacy perspective, research has focused on understanding why some nascent commercial ventures are able to achieve these ends and make the transition to operational organizations and others do not (Delmar and Shane, 2004; Tornikoski and Newbert, 2007).

Scholarship on legitimacy has highlighted individually the role of organizational characteristics conforming to institutional norms (e.g., DiMaggio and Powell 1983). Research on organizational emergence has also simultaneously explored the value of two forms of legitimacy, referred to as *conforming legitimacy* - the passive resource endowments such as the founding entrepreneur - and *strategic legitimacy* - the active engagement in behaviors such as networking and impression management (Tornikoski and Newbert, 2007). In the context of nascent commercial ventures, research has found conforming resource endowments were not only less likely to confer legitimacy than strategic behaviors but also that conforming endowments were considered to be less important for a nascent organization's ability to emerge (Tornikoski and Newbert 2007).

While such findings contribute to our understanding of emergence of nascent commercial ventures, they may not fully explain how legitimacy affects the organizational emergence of nascent social ventures, as research in the area of social ventures has sometimes found different or even contradictory results to studies conducted on commercial ventures (e.g., Kistruck et al., 2013). Social ventures engage in a wide range of initiatives as for-profit, non-profit, and hybrid organizations who differ from commercial ventures, as their primary purpose is to create social benefit (Krlev et al., 2014; Phillips et al., 2015). Although scholarship on social ventures is increasing, much of this research focuses on defining social entrepreneurship, social innovation or on examining the theoretical framing or nature of existing social ventures (Kistruck et al. 2013; Krlev et al., 2014; Phillips et al., 2015). While this work has been important, scholars know little about how nascent social ventures can successfully develop into new organizations (Katre and Salipante 2012; Nga and Shamuganathan 2010). To better understand organizational emergence, this study examines the role of legitimacy for social ventures. This study seeks to replicate in part an existing study on legitimacy in nascent

commercial ventures (Tornikoski and Newbert, 2007), in order to better understand the relationship between the entrepreneurial process and organizational emergence for social ventures. Recent research calls for more studies to understand how business and social innovations differ and better understanding of the process to undertake social innovation (Phillips et al., 2015) as well as the relationship between social innovation activities and performance (Krlev et al., 2014). To address this gap in the literature, this study focuses on the following research question: Which conforming characteristics and strategic behaviors are important to organizational emergence for nascent social ventures?

This study seeks to contribute to the literature in three ways. First, the study increases our knowledge of organizational emergence by providing an initial examination of how legitimacy contributes to the emergence of social ventures. Specifically, the results suggest that conforming legitimacy and strategic legitimacy individually are related to the emergence of social ventures. Second, the study extends the research of organizational emergence by highlighting an increased understanding of the context in which organizational emergence occurs. While prior research on nascent commercial ventures finds a diminished role of conforming legitimacy (Tornikoski and Newbert 2007), this study finds initial evidence of an important role of conforming legitimacy for the organizational emergence of nascent social ventures, suggesting an important role of context. Finally, this study adds to the understanding of social entrepreneurship through empirical analyses on nascent social ventures processes and their organizational emergence. In this way, this study responds to calls for more empirical work in social entrepreneurship, as well as suggestions for understanding social venture processes and outcomes (Krlev et al., 2014). From a practical perspective, this study identifies some of the legitimacy antecedents of social venture creation that can inform decisions made by social entrepreneurs and investors, which may potentially reduce resources invested in nascent social ventures that may be unlikely to emerge as organizations.

1 Hypothesis Development

1.1 Conforming Legitimacy

Theorists identify four types of factors that characterize and shape organizational legitimacy that are particularly relevant for nascent ventures: the entrepreneur's characteristics, the organization's characteristics, the environment's characteristics, and the process by which the organization builds its perception of legitimacy (Gartner, 1985).

Individual. The individual generally refers to the person founding or starting the venture. In order for this individual to be deemed legitimate, they must be viewed as trustworthy and they must have the personal characteristics and skills to launch the venture (Tornikoski and Newbert 2007). The founding or lead entrepreneur's relevant industry and start-up experience, knowledge, personality, education, and general human capital are found to be important to nascent venture development, launch, and survival (Nga and Shamuganathan 2010).

Organization. Although lead entrepreneurs are important to a nascent venture, most organizations are actually composed of multiple individuals, so organizational-level characteristics also play a role in establishing legitimacy. These organizational characteristics are important to attaining external legitimacy in the environment. The management team's education, experience, industry competence, and founding team completeness and size are all found to play a role in venture development and launch. In this way, the founding team's organizational capital facilitates exchanges with potential stakeholders, access to resources, and potential emergence.

Environment. Environmental competitiveness is an important factor for the development and emergence of organizations. Nascent ventures are more likely to garner legitimacy in the eyes of stakeholders when they are able to differentiate themselves within their environmental context. Such differentiation may be achieved through a higher perceived competitive advantage of the product, market, and / or business model of the nascent venture in the competitive environment (e.g., Tornikoski and Newbert, 2007). The perceived competitive advantage provides signals to resource providers that the nascent organization may be able to emerge and compete within a given environment. In a qualitative study, Katre and Salipante (2012) find that nascent social ventures with differentiated product / service offerings within their competitive environment were more successful.

Conforming legitimacy is represented by the individual founder's education and professional experience, the organizational founding team's professional and start-up experience, and by the environmental competitiveness characterized by having a competitive advantage in the market and a good product or service with a degree of innovation. These characteristics are important to resource gatekeepers and stakeholders in perceiving a nascent venture as legitimate. Although nascent social ventures differ from commercial ventures in that they have a mission related primary goal that generates social benefit, they often are evaluated by their stakeholders by the same standards (although maybe not to the same degree of rigor) as commercial ventures.

Therefore:

H1: Conforming legitimacy is positively related to organizational emergence for nascent social ventures.

1.2 Strategic legitimacy

The strategies, activities, and behaviors in which nascent ventures engage all contribute to the process of development. These behaviors augment nascent ventures compliance to institutionalized expectations and can enhance perceived legitimacy (Pfeffer and Salancik, 2003). Nascent ventures engage in resource combination, networking, and impression management behaviors during the start-up process in order to be perceived as legitimate by their stakeholders or resource gatekeepers (Delmar and Shane, 2004; Tornikoski and Newbert, 2007).

Resource combination behaviors involve combining resources to develop products, services, or other outputs that are more tangible to external stakeholders like developing a prototype and purchasing equipment or raw materials. Social ventures are characterized by operating in communities with limited access to resources. Therefore, social ventures must be innovative in their use and combination of limited resources to achieve their financial and social goals. Katre and Salipante (2012) find that all successful nascent social ventures develop a “prototype and share it with industry experts, prospective customers, investors, and financiers”, while only 14% of struggling nascent social ventures do the same.

Networking represents engaging in multi-dimensional exchange relationships with external parties (Pfeffer and Salancik, 2003). Networking behaviors are important as relationships with external stakeholders and potential clients can signal the quality of a nascent venture and help lessen uncertainty and liabilities of newness associated with a nascent venture. Katre and Salipante (2012) find that all successful nascent social ventures focus on developing relationships and building networks, while only 25% of struggling nascent social ventures do the same. Social ventures exist in a social innovation system (Phillips et al., 2015) and engage in networking in order to enhance their legitimacy and viability.

Impression management legitimizing behaviors focus on portraying structures and actions in a way intended to create, protect, or maintain one’s image held by a target audience. Organizations seek to maintain the impression that they are legitimate. These impressions make a nascent venture appear more like a fully functioning organization to their stakeholders and involve completing certain founding activities. These activities include preparing a business

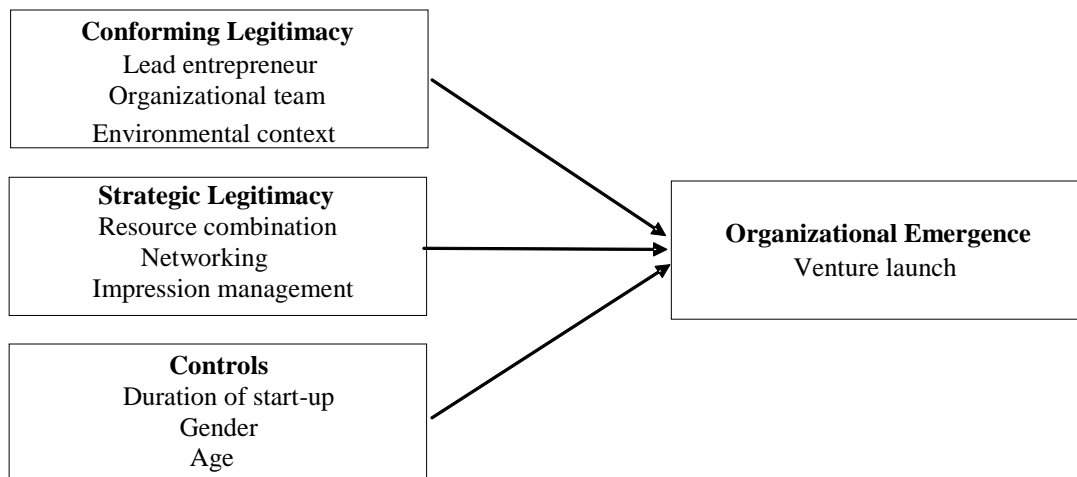
plan, starting marketing efforts, applying for a patent, and opening a bank account (Delmar and Shane, 2004; Tornikoski and Newbert, 2007).

These resource combination, networking, and impression management behaviors enhance legitimacy, viability, and chances of survival. Similar to commercial ventures, to the extent that nascent social ventures engage with other organizations to attain resources, they are able to convince these other entities and their stakeholders that they are legitimate. Outside stakeholders might also be interested in the level of social value that a social venture is creating, but they would affiliate these strategic legitimacy behaviors with success/organizational emergence. This enhances their ability to attain resources and develop as a venture. Therefore:

H2: Strategic legitimacy is positively related to organizational emergence for nascent social ventures.

The Figure 1 below illustrates the conceptual model for this study.

Fig. 1: Conceptual Model of the Influence of Legitimacy on Organizational Emergence



2 Methods

2.1 Sample, Survey Instrument and Measures

This study is part of a larger study that assesses the role of partnerships in social venture value creation. The sample for the current study consists of 177 nascent social ventures participating in nine different social entrepreneurship competitions in the United States from 2005 to 2009. A survey instrument was sent in 2010 to follow-up with the individuals that participated in these entrepreneurship competitions. Completed responses were received for 48 social ventures. The

dependent variable, “venture launch” as well as the control variables came from the survey. The independent variables came from concepts coded in the business plans of the social ventures using content analysis. Table 1 includes the variables and their definitions.

Tab. 1: Variable Definition and Source

| Variable | Definition | Source |
|---|--|---------------|
| <i>Dependent variables</i> | | |
| Venture launch | Did you launch the venture? Yes or No - Dichotomous | Survey |
| <i>Independent Variables</i> | | |
| <i>Conforming Legitimacy</i> | | |
| Composite variable - sum of z-scores of 2 variables below | | |
| <i>Lead entrepreneur</i> | | |
| Sum of two variables below | | |
| Start-up experience | How many total ventures have you founded? | Survey |
| Working experience | Number of years of work experience of lead entrepreneur | Survey |
| <i>Organizational team</i> | | |
| Composite variable - sum of z-scores of 2 variables below | | |
| Professional experience | Collective work experience of the management team | Bus Plan |
| Start-up experience | Collective number of ventures started by management team | Bus Plan |
| <i>Environmental competitiveness</i> | | |
| Degree of environmental competitiveness of the product or service being offered by the nascent venture. | | |
| Location | Venture location a competitive advantage | Bus Plan |
| Niche market | Serve special or niche market is a competitive advantage | Bus Plan |
| Quality goods/services | Quality goods or services is a competitive advantage | Bus Plan |
| Technologically advanced | Technology of product is a competitive advantage | Bus Plan |
| <i>Strategic Legitimacy</i> | | |
| Continuous variable - sum of four variables below | | |
| <i>Impression management</i> | | |
| Patent filed | Filed or has been granted a patent | Bus Plan |
| Website built | Built a website | Bus Plan |
| Incorporate venture | Incorporated or started incorporation process | Bus Plan |
| Hire professional | Hired a lawyer or accountant | Bus Plan |
| <i>Resource combination</i> | | |
| Continuous variable - sum of three variables below | | |
| Prototype | Initiated or developed prototype | Bus Plan |
| Space secured | Rented or secured a physical space, but not home office | Bus Plan |
| Materials purchased | Purchased materials, inventory or office equipment | Bus Plan |
| <i>Networking</i> | | |
| Continuous variable - sum of two variables below | | |
| Potential client | Identified, surveyed or spoke to potential client | BusPlan |
| Partnership | Venture has partnerships | BusPlan |
| <i>Control variables</i> | | |
| Gender | Male or Female | Survey |
| Duration of start-up | Age of start up at time of Survey | Survey |
| Age | Age of lead entrepreneur | Survey |

Tab. 2: Hierarchical Logistic Regression Results

| Variable | Model 1 | Model 2 | Model 3 | Model 4 |
|------------------------------|---------|----------|---------|----------|
| Constant | -0.89 | 1.91 | -2.85 | -0.07 |
| Conforming Legitimacy | | | | |
| Lead entrepreneur | | 0.85 * | | 0.76 * |
| Organizational team | | 0.54 * | | 0.42 |
| Environmental comp. | | 0.29 | | 0.44 |
| Strategic Legitimacy | | | | |
| Resource combination | | | 0.51 | -0.03 |
| Networking | | | 0.70 | 0.43 |
| Impression management | | | 0.78 * | 0.74 |
| Control variables | | | | |
| Duration of startup | -0.03 | 0.10 | -0.17 | 0.13 |
| Gender | 0.22 | -0.23 | -0.28 | -0.51 |
| Age | 0.15 | -0.96 | 0.37 | -0.71 |
| N | 48 | 48 | 48 | 48 |
| χ^2 | 0.44 | 15.49 ** | 10.65 * | 20.71 ** |
| $\Delta \chi^2$ | | 15.05 ** | 10.22 * | 20.27 ** |
| -2 Log Likelihood | 65.35 | 50.30 | 55.14 | 45.00 |
| R ² (Nagelkerke) | 0.01 | 0.37 | 0.27 | 0.47 |

* $p < 0.05$; ** $p < 0.01$

2.2 Results and Discussion

Hierarchical logistic regression is used to examine the hypothesized effects given the dichotomous dependent variable. As seen in Table 2, Hypothesis 1 is partially supported that conforming legitimacy is positively related to organizational emergence.

Both the lead entrepreneur coefficient and the organizational team coefficient are significant ($p < .05$), suggesting conforming legitimacy of the individual and of the team are positive and significant predictors of launch. However, the environmental competitiveness variable is not significant in predicting launch. Since the impression management ($p < .05$) coefficient is significant, this suggests partial support for Hypothesis 2. Resource combination and networking are not significant predictors in the model. Additional analysis suggests that

when both conforming and strategic legitimacy behaviors are combined in Model 4, only the conforming legitimacy lead entrepreneur variable is significant ($p < .05$).

Although the analyses provides some initial insight into the hypotheses, the study has several limitations and biases that must be mentioned. First, the sample only includes 48 social ventures, thus this study is merely exploratory and future more robust analyses should be conducted. In addition, the content analysis only measures the presence of these measures not their effectiveness, the data is self-reported in business plans by founders who participated in business plan competitions in the United States. Thus the generalizability of the results outside a competition setting and in other countries could be further analyzed. Future research should also examine these results with a larger sample if possible.

Nevertheless, this study contributes to scholarship on social entrepreneurship by providing one of the few longitudinal empirical studies of nascent social ventures, while providing insight into the process dimensions of organizational emergence in social ventures (Krlev et al., 2014; Tornikoski and Newbert, 2007). While prior research on nascent commercial ventures finds a diminished role of conforming legitimacy (Tornikoski and Newbert 2007), this study suggests that conforming legitimacy at the earliest stages increases the likelihood of social venture launch. This study also finds similar to the organizational emergence of nascent commercial ventures, that the emergence of social ventures is predicted by the strategic legitimacy processes of impression management actions, like incorporating a venture and filing a patent. These findings might be because in a more established institutional context, the cognitive legitimacy of commercial ventures may already possess a certain taken-for-granted element. Thus, this opens up an avenue for future research to gain a more complete understanding of organizational emergence focusing on combined legitimacy mechanisms (passive and active) and the degree of institutionalization of the context in which the mechanisms are employed and how this might differ for social and commercial venture.

Conclusion

The purpose of this study is to better understand the role of legitimacy in explaining organizational emergence in the context of nascent social ventures. The study assesses how the passive characteristics of conforming legitimacy (at the individual, organizational, and environmental levels) and the active behaviors or processes of strategic legitimacy (resource combination, networking, and impression management) inform why some nascent social ventures emerge and others do not. This longitudinal study finds initial evidence that both

conforming and strategic legitimacy individually predict the emergence of nascent social ventures. These results complement prior findings on the relationships between legitimacy and organizational emergence of nascent ventures, inform practical considerations, and open up new areas of inquiry.

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URBANIZATION DYNAMICS OF EUROPEAN COASTS: IMPLICATIONS FOR INNOVATION POLICY

Andrey S. Mikhaylov

Abstract

Purpose: Article focuses on studying the worldwide patterns of coastalization and urbanization in the scope of Europe. The research objective is to verify the hypothesis of increasing density of population and economic activity taking place across European coasts, providing the facts and figures for regional development and innovation policies.

Design/methodology/approach: The study is based on analyzing the development dynamics of 172 coastal regions of 29 European countries over a five-year period. The scale of regions considered corresponds to the second level of a common classification of territorial units for statistics of the European Commission. The indicators considered include data on average annual population and gross regional product (GRP) in purchasing power parity (PPP), as well as labor productivity dynamics and regional land use efficiency.

Findings: The results confirm an inflow of population to coastal areas, which is slightly above the total average. The labor productivity values are also higher than the total average, indicating a greater share of high value-added activities. However, the identified growth in population is accompanied by decreasing share and growth rates of GRP (PPP) values.

Research/practical implications: The development dynamics identified suggests the residential and industrial favorability of the coastal zone. Regional development and innovation policies should be place-sensitive and adaptive, focusing on retaining leadership in marine expertise for supporting ocean and maritime economy with high-tech services.

Originality/value: Growth of concentration in human activity across coastal areas is considered in national and pan-European policy papers. Yet, there is little evidence on the deployment of coastal sprawl specifically in the context of Europe. Current paper fills this gap by providing data on urbanization dynamics of European coasts.

Keywords: Coastal Economy, Coastal Region, Coastal Cluster, Sustainable Cities

JEL Codes: O31, R11, R12

Introduction

Spatial inequality in regional development is found to be a worldwide pattern, featuring social, economic and innovation dimensions. Urbanization and industry clustering is especially manifested in coastal regions. At least half of all metropolises with a population of over five million people each are located within 100-kilometre wide coastal area, including Dhaka (Bangladesh), Jakarta (Indonesia), Karachi (Pakistan), Lagos (Nigeria), Mumbai (India), New York (USA), Sao Paulo (Brazil), Shanghai (China), Tokyo (Japan). The entire coastal districts being formed, resulting from the urban sprawl along the coastal strip (e.g. national – the Central Coast of California, the Tokaido coast along the ‘Taiheiyō Belt’, and poly-national – Gulf coastal plain, Tijuana–San Diego Pacific coastal region).

Studies suggest that coastal plains are three times more densely populated as compared to interior territories and host two-thirds of world population (Amos et al., 2013; Small and Nicholls, 200). The concentration of human and financial resources, localization of advanced infrastructure in coastal cities and agglomerations foster an increased inflow of investments, industrialization, and labor migration, causing a technology gap between regions. Researches using a spectrum of statistical indicators point out a steady increase in the development level of coastal territories; e.g. projections on coastal population suggest raise by up to 75% of the world’s population (Bulleri and Chapman, 2010; Cetin et al., 2008).

The coastalization patterns identified are observed on a global scale (especially in East and South-East Asia; e.g. see Aroca et al., 2018), whereas the development patterns of individual countries and regions might differ. National history, climate and natural environment (e.g. terrain, natural resources), international relations, state development policy and other particularities affect the exposure of human activity along the coast. The current study is designed to verify the global trend of the accelerated development of coastal areas in the scope of Europe and discuss the implications for regional development and innovation policy.

1 Research background

Our recent studies suggest that coastal regions of Europe occupy 45% of land area and account for 42% of the total population and 43% of cumulative gross regional product (Mikhaylov et al., 2018a). This data largely coincides with earlier studies held by European Commission in the narrow scope of 27 states of the European Union, displaying the results of 43% terrestrial area and 41% of the population (Collet and Engelbert, 2013). Scholars note a strong regional divergence in the manifestation of coastalization effect across Europe, with countries such as

Denmark, Finland, Greece, Italy, Spain, and Sweden representing the strongest impact of the coast. Countries of predominantly continental settlement structure have the share of coastal population under 10% (e.g. Romania, Germany), while island states account for 100% as being classified as coastal – e.g. Cyprus, Malta (Baztan et al., 2015). For instance, the Russian Federation is often referred to as ‘land of sea’, underlying its vast terrestrial area and harsh climate of the Arctic.

The identified indicator values are far below individual estimations falling beyond three-quarter of population and economic activity. However, the percentage is significant, especially taking into consideration the peripheral location of marine and ocean coasts. Given the global average growth rate of coastal occupancy, coastal regions might soon become the central regions of Europe in terms of population and industry density. Especially large increase in population is expected in cities of south-east coast of the Mediterranean Sea, raising sustainability issues for ‘life below water’ (Bell et al., 2013; Salvati and Forino, 2014).

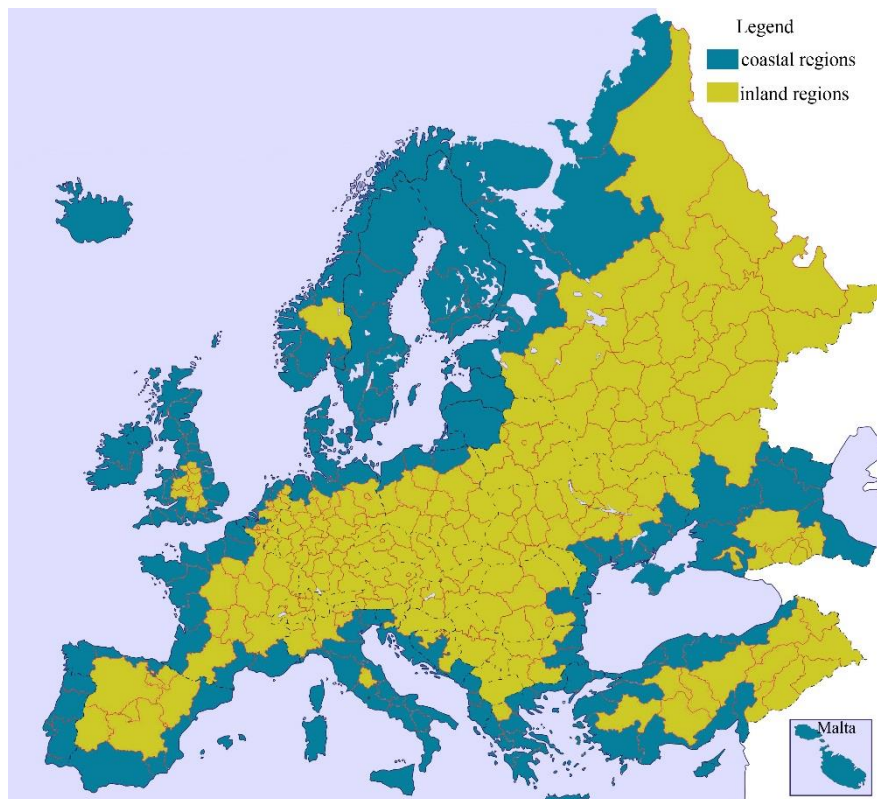
Coastal location (i.e. coastal geoeconomic position) is often regarded as a competitive advantage that provides many economic benefits. Companies enjoy improved transportation links, advanced industrial and public infrastructure, an open-minded society (due to migration flows and labor mobility), extensive international linkages in trade, integration in global value chains, etc. The general institutional and socio-economic openness of coastal regions imply an increased possibility of cross-fertilization – obtaining synergies by engaging in cooperation with actors of related industries (incl. collaboration in research and development). Companies get access to non-price competition factors – i.e. wealth-creating knowledge, which is being acquired in course of doing business in technologically advanced regions (Lunduall and Borrás, 1997; Mikhaylova, 2015).

The related variety scheme for sourcing new knowledge, skills and competencies required for radical innovations is especially vivid in densely populated coastal urban agglomerations. In addition to traditional economic sectors, coastal regions are strongly integrated into the marine economy and ocean economy. While the marine sector was historically characterized by low levels of employment and production opportunities, it is recently transformed into a focal point for many innovative activities, including alternative energy, marine biotechnology and mariculture, marine technology and other (Morrissey, 2015). Thus, apart from being the innovation gateway, coastal regions are expected to localize many new innovation activities, generating growth of adhering territories.

2 Research methodology

The study is based on analyzing the development dynamics of 172 coastal regions of 29 European countries, including Albania, Belgium, Bulgaria, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Latvia, Lithuania, Malta, Monaco, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Turkey, Ukraine, United Kingdom, and the European part of Russia (west of the Ural Federal District). The scale of regions considered corresponds to second level of a common classification of territorial units for statistics of the European Commission – NUTS 2 (Fig. 1). These regions represent holistic socio-economic systems, with a high degree of economic and institutional self-sufficiency, and the official statistics required.

Fig. 1: Coastal regions of Europe



Source: Compiled by the author

The statistical database has been formed for a five-year period of 2010-2014. The indicators considered include statistical data on the average annual population of registered residents per region (excluding the seasonal change due to tourism); gross regional product (GRP) in purchasing power parity (PPP) in euro; ratio of the population density and the GRP (PPP) values evaluated per 1 km² of the territory of the regions used as an indication of the

regional land use efficiency. The data sources are the national statistical offices and the Statistical Office of the European Union (Eurostat). Additional sources of statistical data are the database of the United Nations, the World Bank, and the International Monetary Fund. All of the data on coastal regions is being compared to the average values for the total sum of European regions (Mikhaylov et al., 2018b).

3 Research results

In 2010 as many as 322.2 million people lived in the coastal regions of Europe, which is 41.2% of total population. For a five-year period the number of population increased by 5.1 million people, reaching the share of 42.1% of the total population of European countries in 2014 (Table 1).

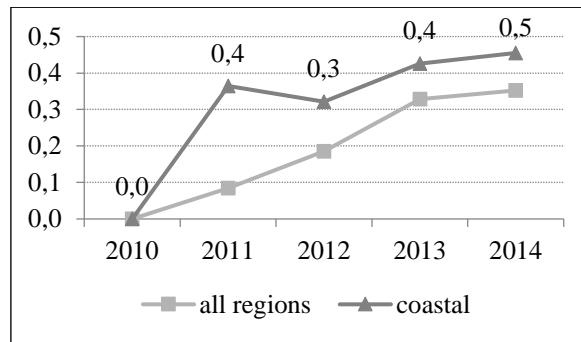
Tab. 1: The development dynamics of coastal regions

| Indicator | Year | Total regions | Coastal regions | Share of coastal regions, % |
|--|-------------|---------------|-----------------|-----------------------------|
| Average annual population, million people | 2010 | 769.8 | 322.2 | 41.9 |
| | 2011 | 770.4 | 323.4 | 42.0 |
| | 2012 | 771.8 | 324.4 | 42.0 |
| | 2013 | 774.4 | 325.8 | 42.1 |
| | 2014 | 777.1 | 327.3 | 42.1 |
| Average annual population growth rate, % | 2010 - 2014 | 1.0 | 1.6 | - |
| GRP (PPP), billion Euro | 2010 | 15.9 | 7.0 | 43.8 |
| | 2011 | 16.4 | 7.1 | 43.5 |
| | 2012 | 17.1 | 7.4 | 43.4 |
| | 2013 | 17.2 | 7.5 | 43.3 |
| | 2014 | 17.7 | 7.7 | 43.2 |
| GRP (PPP) growth rate, % | 2010 - 2014 | 11.4 | 9.7 | - |
| Labor productivity, thousand PPP per capita | 2010 | 20.7 | 21.7 | - |
| | 2011 | 21.3 | 22.1 | - |
| | 2012 | 22.1 | 22.8 | - |
| | 2013 | 22.3 | 22.9 | - |
| | 2014 | 22.8 | 23.4 | - |
| Labor productivity growth rate, % | 2010 - 2014 | 10.3 | 8.0 | - |
| Total area, thousand sq. km | 2014 | 10635.8 | 4780.2 | 44.9 |
| Regional land use efficiency, billion Euro per thousand sq. km | 2010 | 1.5 | 1.5 | - |
| | 2011 | 1.5 | 1.5 | - |
| | 2012 | 1.6 | 1.5 | - |
| | 2013 | 1.6 | 1.6 | - |
| | 2014 | 1.7 | 1.6 | - |
| Regional land use efficiency growth rate, % | 2010 - 2014 | 11.4 | 9.7 | - |

Source: Calculations based on data (Mikhaylov et al., 2018b)

Population growth rates in the coastal areas noticeably exceed the same rates in general for all regions of Europe (Fig. 2). This data corresponds to the research results held on a global scale and confirm the hypothesis on the urban sprawl of coastal areas (i.e. the coastal sprawl).

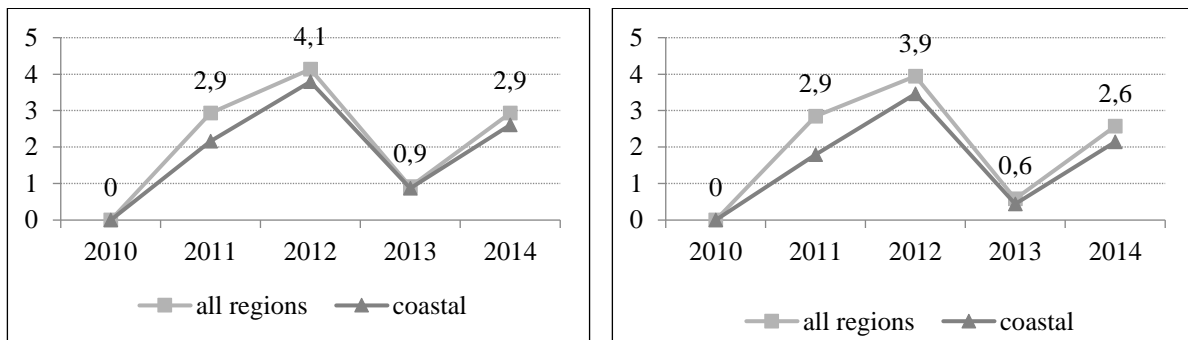
Fig. 2: Average annual population growth rate, %



Source: Calculations based on data (Mikhaylov et al., 2018b)

Despite of the population growth, the annual increase in GRP (PPP) of coastal regions is lower than the average European values. This fact has largely affected the dynamics of labor productivity, which is also modest in coastal regions (Fig. 3-4).

Fig. 3: Annual GRP (PPP) growth rate, % **Fig. 4: Labor productivity growth rate, %**



Source: Calculations based on data (Mikhaylov et al., 2018b)

At the same time, the absolute values of labor productivity in coastal regions are higher than the average for all regions of Europe, which may indicate a higher efficiency in the use of human resources. However, the efficiency of land use is similar for both coastal regions and total values.

Discussion and conclusion

Clustering of economic activity in coastal areas is registered around the globe, featuring spatial concentration of communities of people and a population of firms. Studies generally report that coastal regions worldwide host over half of world population living within 100 kilometers distance of the shoreline. This immense concentration of resources and human capital is described to be the driving force behind the development of regional and national innovation systems. Yet, lack of studies on European coastal dynamics raises an issue of applicability of

the global coastalization trend to pan-European reality. Moreover, coastal shift is predominantly described in terms of settlement patterns, while economic factor is left aside.

Current study suggests that while coastal regions are not dominant in terms of population numbers, their share is significant. The population density is also high and raising as do the population figures. Average annual population growth rates indicate an accelerated development of coastal territories, although the pace of growth is not extremely above the total average – the difference of less than 1%. Thus, despite the moderate lead of coastal territories, the hypothesis on increased population figures of the coast is generally confirmed.

Labor productivity values, as measured in thousand PPP per capita, are constantly higher in coastal regions as compared to total average. This fact proves the statements of numerous scholars on the economic dimension of coastalization effect. The efficient use of human resources might indicate a sufficient share of high value-added activities, including high-tech production and advanced services. Somewhat surprising in this regard is the decreasing share in GRP (PPP) of coastal territories, as well as lower growth rate values of GRP (PPP) and labor productivity, partly reflecting the results of cohesion policies.

The research results reflect the attractiveness of the coast – the thalasso-attractiveness (Druzhinin, 2017), both with respect to residential and industrial favorability. The general socio-economic statistical data provide indirect evidence on the superiority of coastal regions in the context of a learning economy, as areas of enhanced territorial capital. Regional development and innovation policies should be place-sensitive and adaptive, acknowledging and integrating the latest developments of coastal zone management and sustainable development goals for cities and urban communities.

A partial decrease in industrial activity taking place in the coastal zone should be filled by high-tech services and creative industries. Coastal economies should compete for retaining the supporting services for the ocean and maritime economy of high added value: marine biotechnology, high-tech ocean engineering, alternative energy, food science, health tourism and medical treatment, etc. These are the promising development areas, which are being increasingly outsourced to capital cities and major national urban agglomerations. Thus, while sculpting the new knowledge-based economies coastal regions should give maximum effort in retaining leadership in marine expertise, either industrial or tertiary sector.

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SPATIAL PATTERNS OF INNOVATION GEOGRAPHY: KNOWLEDGE GENERATION DOMAIN IN RUSSIA

Andrey S. Mikhaylov – Irina Yu. Peker

Abstract

Purpose: The study is designed to capture the patterns in the spatial distribution of knowledge generation domain in the Russian Federation. The main objective of the paper is to assess the level of regional divergence in the context of the knowledge economy and to evaluate the integration of public higher education institutions (HEIs) into regional innovation systems.

Design/methodology/approach: The study is based on quantitative and qualitative analyses of statistical data of the National university ranking and the Russian cluster observatory project. The HEIs are clustered into quartiles by the aggregate score acquired in the ranking and grouped by regions. Knowledge capital of regions is compared to industry clusters.

Findings: Results confirm a significant accumulation of knowledge capital in the two major cities of the country – Moscow and Saint-Petersburg, both in terms of quantity and quality. With that, all major urban agglomerations feature HEIs in the ranking. Some regions actively involve HEIs in collaboration with industry, while others are not despite similar focus.

Research/practical implications: Publicly funded HEIs are a major resource of regional authorities to strategize on innovation development. Awareness of complementarities and involvement of knowledge-generating institutions and industry clusters enables to grasp the actual status of the regional innovation system, and enable adaptive policy measures.

Originality/value: This is the first empirical study in the context of Russia that uses the data on quality assessment of national HEIs from the knowledge geography perspective. Universities are considered as the contributors to the knowledge capital of regional innovation systems, while the methodological approach applied enables to evaluate their potential and actual inclusion in collaboration with industry clusters.

Keywords: Knowledge Economy, Innovation Geography, University Research, Innovation Space

JEL Codes: I25, O31, R12

Introduction

National innovation space is a complex constellation of regional innovation systems, which are driven by local clusters of excellence – networks of vertically and horizontally semi-integrated actors. The accumulation and constant circulation of knowledge, competencies, skills, capabilities, know-how, ideas between a heterogeneous set of organizations representing different institutional helices – academia, business, non-profit organizations, public agencies, form the unique regional profile in the context of the knowledge economy.

Knowledge being defined in its codified and tacit forms is the major resource for growth and innovation development. Despite a significant volume of industrial R&D, university research remains a major source of radical innovation (predominantly due to publically funded basic research). Government initiatives on creating an enabling locus for innovation activity should consider interplay of universities as knowledge generating institutions and industry clusters, as knowledge commercialization domain.

The aim of the paper is to evaluate regional divergence of the knowledge generation domain of the national innovation system of Russia by analyzing the spatial distribution of leading higher education institutions (HEIs) and their engagement in regional industry clusters.

1 Research background

The process of knowledge co-creation in university-industry collaboration is extensively studied throughout the world (Ferreira et al., 2018; Ketikidis and Solomon, 2018). Best practice case studies on leading regional innovation systems continuously prove the vital importance of sustainable and casual linkages between regional actors responsible for different sectors of the non-linear innovation process. Universities are increasingly perceived as knowledge production centers, disseminating state-of-the-art technologies to regional stakeholders as knowledge users (Fongwa and Marais, 2016; Mikhaylova, 2016).

Active engagement of HEIs in innovation development strategies reflects win-win logic for the entire regional community. A coherent development policy between universities and industry boosts the demand for scientific research, engineering services, research facilities, patents, etc. Functional integration of academia and the business community supports knowledge spillover effects, creates prerequisites to innovative start-ups (Di Nauta et al., 2018; Kamenskikh, 2018).

The role of HEIs is especially significant in peripheral regions where universities are the major resource for innovative growth (Benneworth, 2018; Mikhaylova, 2016). Availability

of strong research universities does not guarantee economic growth per se (Motoyama and Mayer, 2017). However, top HEIs (research universities) tend to act globally, overseeing constraints of the local territorial capital. Universities can be perceived as global knowledge ‘pipelines’ (Bathelt et al., 2004; Capdevila, 2018) serving as science and technology hubs for the local innovative milieu. Implementation of the knowledge capital requires a clear institutional support for merging the two highly impartial worlds – academic and entrepreneurial, based on cognitive proximity and complementarity.

2 Research methodology

The study is based on analyzing quantitative and qualitative data on the spatial distribution of major institutions responsible for knowledge generation and commercialization across the Russian Federation. Universities are considered as institutions predominantly responsible for knowledge generation, while industry clusters are perceived to focus on knowledge absorption and commercialization, i.e. the innovation activity.

The statistical data on higher education institutions (HEIs) is sourced from the National university ranking of the Russian Federation over the period of nine years – from 2009/2010 to 2017/2018 academic years. The ranking is a reliable source of data on leading universities of the country. It was established in 2009 with the support of the Federal Service for Supervision in Education and Science (Rosobrnadzor) of the Ministry of Education and Science of the Russian Federation and operated by CJSC “Inform-Invest” – a subsidiary of Interfax Ltd. news agency. The public contract implied the development of independent quality-evaluation system for HEIs and the formation of first universities’ ranking in Russia.

The data on industry clusters is acquired from the cluster mapping initiative of the Higher School of Economics – the “Russian cluster observatory” project. Other statistical information is sourced from the “Regions of Russia: social and economic indicators, 2018” yearbook of the Russian Federation Federal State Statistics Service (Rosstat).

The data assessment includes spatial distribution of universities and industry clusters in terms of their geographical location and specialization (Natural sciences; Engineering; Health and medical sciences; Agricultural sciences; Social sciences; Education and pedagogics; Humanities; Arts and culture), as well as the analysis of their collaboration. Universities are grouped into quartiles by the score achieved in latest ranking year available – 2017/2018. Further assessment includes the actual engagement of HEIs in collaboration with industry clusters of the region. This is done by studying the membership list of each cluster organization.

The potential involvement is considered via matching the specialization profiles of universities and clusters located in the same region.

Regions are divided into three groups by the average annual population and ranked in terms of HEIs load (1,000 population per HEI). This enables to obtain a more adequate picture for benchmarking assessment by leveling out the extreme cases – densely and sparsely populated territories. Additional data is the ratio of clusters to 10,000 small and medium-sized enterprises (SMEs) showing representativeness of official cluster initiatives registered, and the total number of enterprises available per 1,000 people that shows the industrial potential of the region. The study hypothesis to be tested is that the knowledge generation domain of the national innovation system of Russia is highly divergent being highly dependent on the host region type – its socio-economic profile.

3 Research results

Since the first National University ranking held in 2009 there are 315 HEIs evaluated, covering all major universities of the country, including 10 federal universities and 29 national research universities. Over the years the number of universities considered annually has grown from 50 in 2009 to 288 in 2018. Some of the universities have merged over the studied period during the establishment of federal universities. The HEIs considered are located in 103 cities and 80 administrative subjects of the Russian Federation (Fig. 1).

Fig. 1: Spatial distribution of knowledge generating institutions

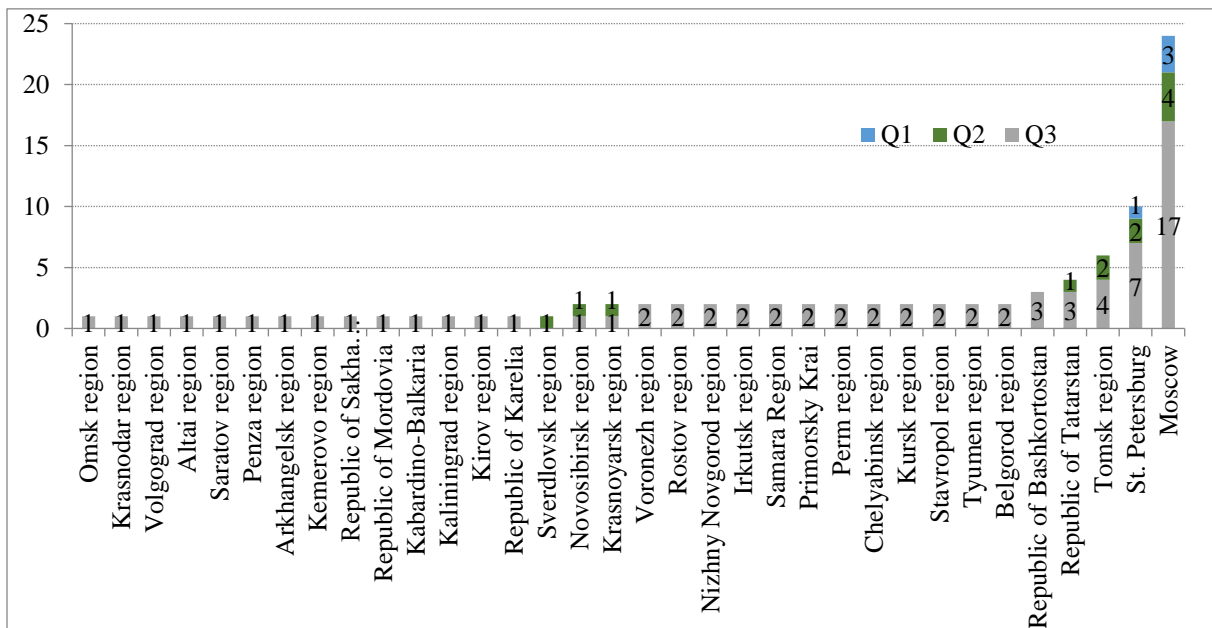


Source: Based on National University Ranking (2018). URL: <https://academia.interfax.ru/ru/ratings>

The overwhelming majoring of HEIs is densely concentrated in the capital city of Moscow and the Saint-Petersburg – the federal status city and the previous capital of the country. These are nearly a quarter of all HEIs of the country – 15.6% in Moscow and 8.3% in Saint-Petersburg. Novosibirsk is the third largest conglomerate of top universities, being the knowledge hub of central Russia – 3.1% of the total. The Republic of Tatarstan, the Republic of Bashkortostan, the regions of Irkutsk, Khabarovsk, Krasnodar, Nizhny Novgorod, Omsk, Rostov, Sverdlovsk, Tomsk, and Voronezh all have 6-7 universities included in the ranking.

Of particular interest is the distribution of HEIs by their excellence. Universities are clustered into four groups by quartiles according to the overall score achieved in six quality dimensions: Education (20% of total score), Research (20%), Innovation and entrepreneurship activity (15%), Social engagement (15%), Internationalization (15%), and Public opinion over the brand value (15%). Figure 2 shows the spatial distribution of HEIs by quality quartiles.

Fig. 2: Distribution Q1-Q3 level HEIs across regions of Russia



Note: The figure excludes HEIs of Q4

Source: Based on National University Ranking, 2018. URL: <https://academia.interfax.ru/ru/ratings>

Universities of the first quartile (Q1) with the highest overall score are available only in Moscow (Moscow State University, National Research Nuclear University MEPhI, and Moscow Institute of Physics and Technology MIPT) and Saint-Petersburg (Saint Petersburg State University) – 3 and 1 HEIs respectively. They represent only 6% of universities located in these cities and under 2% of all population in the ranking. The second quartile (Q2) is not

numerous – 4.2% of the total, and is also heavily dominated by Moscow – a third of all HEIs in the group. With that, Q2 includes two universities from Saint-Petersburg, three in Western Siberia (Tomsk region – 2, Novosibirsk region – 1) and one in Eastern Siberia (Krasnoyarsk Krai), one university per Sverdlovsk region and the Republic of Tatarstan. The third quartile includes a quarter of all HEIs with $\frac{1}{3}$ being located in Moscow (23%) and Saint-Petersburg (9.5%). Regional leaders by the number of HEIs included are Tomsk region, the Republic of Tatarstan and the Republic of Bashkortostan. The fourth quartile is the largest, with 69.1% HEIs. There are 50 regions with 1-2 universities included in the ranking of best national universities. Of all HEIs located in Moscow and Saint-Petersburg, the share of Q4 is 50.7%. Seven out of nine HEIs of Novosibirsk region are in this group, as well as all six universities of the Khabarovsk region.

Assessment of the spatial distribution of knowledge creating institutions by specialization suggests that there is only one region covering full spectrum considered – the city of Moscow. The second widest share is represented in Saint-Petersburg and Novosibirsk region, which have six each, lacking HEIs in the Humanities and Arts and culture. However, more important is the conformity of universities profile with industry clusters specialization, as well as their actual collaboration. Table 1 shows data on the number of industry clusters in a region, which actually involve HEIs in intra-cluster network – active collaboration, or correspond to their specialization profile – potential collaboration.

Tab. 1: Potential and actual inclusion of HEIs in collaboration with industry clusters

| Region | Clusters* | HEIs | Collaboration, % | |
|-----------------------------|-----------|------|------------------|-----------|
| | | | Active | Potential |
| St. Petersburg | 10 | 24 | 8.3 | 66.7 |
| Rostov region | 9 | 6 | 33.3 | 66.7 |
| Moscow | 6 | 45 | 13.3 | 64.4 |
| Republic of Tatarstan | 6 | 7 | 57.1 | 42.9 |
| Voronezh region | 5 | 6 | 50.0 | 83.3 |
| Altai region | 5 | 5 | 60.0 | 40.0 |
| Moscow region | 4 | 4 | 0.0 | 0.0 |
| Lipetsk region | 4 | 3 | 33.3 | 33.3 |
| Penza region | 4 | 3 | 0.0 | 100.0 |
| Vologda region | 4 | 2 | 50.0 | 100.0 |
| Novgorod region | 4 | 1 | 100.0 | 0.0 |
| Omsk region | 3 | 6 | 16.7 | 66.7 |
| Perm region | 3 | 4 | 75.0 | 25.0 |
| Tomsk region | 3 | 6 | 16.7 | 66.7 |
| Ryazan region | 3 | 3 | 0.0 | 33.3 |
| Oryol region | 3 | 2 | 50.0 | 50.0 |
| Samara region | 3 | 5 | 20.0 | 80.0 |
| Arkhangelsk region | 3 | 2 | 100.0 | 100.0 |
| Smolensk region | 3 | 1 | 0.0 | 0.0 |
| Volgograd region | 2 | 5 | 60.0 | 60.0 |
| Irkutsk region | 2 | 6 | 16.7 | 33.3 |
| Murmansk region | 2 | 2 | 0.0 | 0.0 |
| Tula region | 2 | 2 | 100.0 | 50.0 |
| Ulyanovsk region | 2 | 2 | 50.0 | 0.0 |
| Kemerovo region | 2 | 2 | 100.0 | 50.0 |
| Republic of Sakha (Yakutia) | 2 | 2 | 0.0 | 50.0 |
| Kaluga region | 2 | 1 | 0.0 | 0.0 |

* data presented includes regions with at least two clusters

Source: Based on National University Ranking, 2018. URL: <https://academia.interfax.ru/ru/ratings> ; Russian cluster observatory (2018). URL: <https://map.cluster.hse.ru/list>

A total of 121 clusters are identified, featuring 47 out of 80 regions. Territories with the highest share of clusters are St. Petersburg – 8.3% of the total number of clusters, Rostov region – 7.5%, Moscow – 5.0%, Republic of Tatarstan – 5.0%, Voronezh region – 4.2%, Altai region – 4.2%. Eight regions reflect a 100% active involvement of regional HEIs in industry clustering, these are Arkhangelsk region, Astrakhan region, Chuvash Republic, Kemerovo region, Kurgan region, Novgorod region, The Republic of Buryatia, and Tula region. The universities in question are highly focused, with 1-2 specialization areas.

The potential collaboration dimension shows the share of HEIs corresponding to the focus area of available clusters. For example, there are two HEIs in the Vologda region that fully comply with the focus area of available clusters, but only one university is officially engaged in cluster initiative (i.e. member of the cluster organization). Another example is

St. Petersburg, having a significant correlation in specialization – 67%, only 8% of HEIs are active in university-industry collaboration.

Comparison of the territorial heterogeneity in the distribution of HEIs has to be done by taking into account the average annual population of the regions. However, in order to more adequately assess this distribution, we divided all the subjects of the Russian Federation into three groups by population size: up to 1 million people, from 1 to 2 million people, over 2 million people. This made it possible to avoid false estimates of the proportion of universities in the population, when regions with a small population and a single university sustained predominantly as a social factor are in the lead over more developed regions with a larger number of universities and a stronger science and research profile against greater population numbers.

The group with the largest population numbers includes 23 subjects of the Russian Federation. By the number of universities per million people there are top-three regions: St. Petersburg (4.5), Moscow (3.6), Novosibirsk region (3.2). Similar distribution is found by the number of enterprises per thousand people: Moscow (80.9), St. Petersburg (65.9), Novosibirsk region (45.0). These are strong educational, scientific and industrial centers of Russia with active industry clustering. Therefore, it is natural that universities from groups Q1 and Q2 are concentrated mainly in these regions. Intermediate position is occupied by the regions of Altai, Irkutsk, Saratov, Volgograd, and Voronezh, each featuring 5-6 HEIs of Q3-Q4 and a relative value of 2-2.6 universities per million people (Table 2). The first two regions – Altai and Irkutsk, represent a combination of strong industrial profile and a scientific center. Irkutsk region has over 30 research institutes of the Russian Academy of Science, while the leading HEIs of Altai region located in the city of Barnaul enjoy close proximity to Novosibirsk. Universities in Saratov, Volgograd, and Voronezh are industry focused, with the leading HEIs in Saratov holding a major role in R&D for aeronautics industry dominated by large public enterprises.

Tab. 2: Innovation systems of regions with largest population numbers

| Region | Avg. annual population | HEI load (1,000 people) | Clusters per 1,000 SMEs | Enterprises per 10,000 people |
|--------------------|------------------------|-------------------------|-------------------------|-------------------------------|
| St. Petersburg | 5,316,757 | 222 | 4.3 | 65.9 |
| Moscow | 12,443,566 | 277 | 1.1 | 80.9 |
| Novosibirsk region | 2,784,202 | 309 | 1.2 | 45.0 |
| Voronezh region | 2,334,588 | 389 | 13.5 | 25.2 |
| Irkutsk region | 2,406,548 | 401 | 5.2 | 26.3 |
| Altai region | 2,357,880 | 472 | 14.5 | 23.3 |
| Saratov region | 2,471,105 | 494 | 0.0 | 19.3 |
| Volgograd region | 2,528,239 | 590 | 7.0 | 19.4 |

* data presented includes regions with at least two HEIs per million inhabitants

Source: Based on National University Ranking, 2018. URL: <https://academia.interfax.ru/ru/ratings> ; Russian cluster observatory, 2018. URL: <https://map.cluster.hse.ru/list> ; Rosstat – Russian Federation Federal State Statistics Service. Regions of Russia: social and economic indicators, 2018 URL: http://www.gks.ru/bgd/regl/b18_14p/Main.htm

The second group of regions with a scale of average annual population ranging from 1 to 2 million people includes 30 subjects of the Russian Federation. The group can be further divided into three groups. Tomsk region with 5.6 HEIs per mln people is a major competitor for Novosibirsk region. The two regions have strong collaboration spanning across basic and applied research. Khabarovsk and Omsk regions are important borderland region for international cooperation and trade with China and Kazakhstan. Ivanovo region is the leader in the share of light industry and enjoys close proximity to Moscow. Most other regions are located in southern part of European Russia that concentrate industrial and agricultural activity. These are central regions with the oldest cities of the country.

Tab. 3: Innovation systems of regions with intermediate population numbers

| Region | Population | HEI load (1,000 people) | Clusters per 1,000 SMEs | Enterprises per 10,000 people |
|----------------------|------------|----------------------------|----------------------------|----------------------------------|
| Tomsk region | 1,078,585 | 180 | 13.6 | 31.2 |
| Khabarovsk region | 1,330,798 | 222 | 3.6 | 32.9 |
| Ivanovo region | 1,018,908 | 255 | 0.0 | 32.3 |
| Omsk region | 1,966,382 | 328 | 9.8 | 24.5 |
| Tambov region | 1,036,939 | 346 | 0.0 | 17.4 |
| Kursk region | 1,119,065 | 373 | 0.0 | 20.5 |
| Ryazan region | 1,124,107 | 375 | 16.0 | 27.7 |
| Primorsky Krai | 1,918,076 | 384 | 0.0 | 36.0 |
| Lipetsk region | 1,153,211 | 384 | 27.7 | 19.4 |
| Yaroslavl region | 1,268,210 | 423 | 0.0 | 36.5 |
| Penza region | 1,336,591 | 446 | 25.3 | 19.6 |
| Republic of Udmurtia | 1,514,935 | 505 | 3.9 | 26.8 |

* data presented includes regions with at least two HEIs per million inhabitants

Source: based on National University Ranking (2018). URL: <https://academia.interfax.ru/ru/ratings> ; Russian cluster observatory, 2018. URL: <https://map.cluster.hse.ru/list> ; Rosstat – Russian Federation Federal State Statistics Service. Regions of Russia: social and economic indicators (2018) URL: http://www.gks.ru/bgd/regl/b18_14p/Main.htm

The third group of regions with an average annual population being under 1 million people includes a total of 32 subjects of the Russian Federation. These are regions with 1-2 HEIs of Q3-Q4 that predominantly responsible for education rather than research and development. Some universities are industry focused and operate under the supervision of industry-specific authorities (e.g. Federal Agency for Fishery). The only exception is Amur region with four HEIs that are highly developed due to intensive cooperation with China, similar to Khabarovsk region.

Tab. 4: Innovation systems of regions with smallest population numbers

| Region | Population | HEI load (1,000 people) | Clusters per 1,000 SMEs | Enterprises per 10,000 people |
|----------------------------------|------------|-------------------------------|----------------------------|-------------------------------------|
| Magadan region | 144,831 | 145 | 0.0 | 34.0 |
| Kamchatka Krai | 315,143 | 158 | 0.0 | 34.3 |
| Jewish Autonomous region | 163,116 | 163 | 0.0 | 20.1 |
| Amur region | 800,088 | 200 | 0.0 | 20.3 |
| Republic of Kalmykia | 276,608 | 277 | 0.0 | 16.3 |
| Republic of Tyva | 320,136 | 320 | 0.0 | 11.5 |
| Republic of Mari El | 683,509 | 342 | 0.0 | 21.8 |
| Republic of North Ossetia-Alania | 702,513 | 351 | 0.0 | 14.3 |
| Oryol region | 751,032 | 376 | 32.9 | 21.2 |
| Murmansk region | 755,589 | 378 | 17.2 | 24.6 |
| Republic of Mordovia | 806,799 | 403 | 14.2 | 20.0 |
| Republic of Komi | 845,713 | 423 | 9.0 | 24.0 |
| Republic of Kabardino-Balkaria | 865,141 | 433 | 0.0 | 14.7 |
| Sevastopol | 432,712 | 433 | 0.0 | 25.1 |
| Republic of Adygea | 453,371 | 453 | 0.0 | 16.2 |
| Republic of Karachay-Cherkess | 466,369 | 466 | 0.0 | 14.6 |
| Republic of Altai | 217,535 | 472 | 0.0 | 27.5 |
| Republic of Sakha (Yakutia) | 963,582 | 482 | 17.7 | 27.3 |
| Republic of Ingushetia | 484,259 | 484 | 0.0 | 10.6 |
| Sakhalin region | 488,763 | 489 | 0.0 | 34.8 |
| Kaliningrad region | 990,430 | 495 | 0.0 | 54.7 |

* data presented includes regions with at least two HEIs per million inhabitants

Source: Based on National University Ranking (2018). URL: <https://academia.interfax.ru/ru/ratings> ; Russian cluster observatory, 2018. URL: <https://map.cluster.hse.ru/list> ; Rosstat – Russian Federation Federal State Statistics Service. Regions of Russia: social and economic indicators (2018) URL: http://www.gks.ru/bgd/regl/b18_14p/Main.htm

Discussion and conclusion

There are 1,171 higher education institutions in the Russian Federation, with less than $\frac{1}{3}$ being listed in the National University ranking league tables as the best HEIs of the country. Spatial distribution of these HEIs follows the settlement pattern of the country that gravities towards south-western territories. Large urban agglomerations feature the highest share of universities, both in terms of number and quality – 1-2 quartiles. Moscow has a significant lead, being in a league of its own, followed by the northern capital – St. Petersburg. Strong regional centers are located in Siberia (e.g. Tomsk, Novosibirsk, Irkutsk), resulting from the prior Soviet resettlement strategy directly related to defense strategy. These regions exhibit strong research universities adjacent to the institutes of the Russian Academy of Science.

Most regions with the highest number of HEIs included in the ranking are strong industrial economies focused on heavy machinery, military complex, and extraction and processing of natural resources (e.g. oil and gas, ore). Universities located in these industrial centers are traditionally linked to large production complexes, operating in public-private partnership. Fourth quartile HEIs are mostly located in less developed regions and focus on teaching rather than research and development (incl. the northern dimension of Russia, as well as most of the southern Republics).

University-industry collaboration analysis suggests that less developed regions acknowledge the necessity of combining the capacity of all regional actors in order to gain additional competitive advantage. Entrepreneurs outsource some of their R&D functions and employee training, while universities gain additional funding (including an increased index of the federal budget). Universities in Moscow and St. Petersburg are among the least integrated with industry clusters. These HEIs are focused on large corporations not being present in SME-dominated clusters, as well as directly involved in state order.

Regional innovation dynamics is highly dependable on interconnectedness of heterogeneous stakeholders of the innovative milieu. Universities responsible for three missions – research, education, and social development, are an important element for regional growth and innovation security. Awareness of the spatial distribution of knowledge-generating institutions is critical for assessment of the territorial capital of regions, while the integration of HEIs with industry clusters is the key to regional innovation development strategy.

Further research has to discover the input of HEIs in regional development by evaluating the patent activity, university spin-offs, industry-funded R&D, the volume of advanced professional training, and other industry related indicators. The hypothesis to be tested is the variable role of top-charts universities in sustainable territorial development of different types of regions. For instance, peripheral regions are more reliant on local HEIs and exhibit deeper integration with industry as opposed to highly developed industrial centers, where HEIs are predominantly focused on global research agenda.

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SPATIAL ECONOMETRICS: SUSTAINABLE URBAN DEVELOPMENT - TRANSPORT INFRASTRUCTURE DEVELOPMENT AND REAL-ESTATE VALUES

Györgyi Nyikos – Attila Béres – György Jablonszky – Tamás Laposa

Abstract

Purpose: M4 metro line has been the biggest transport infrastructure project in Budapest in the past decades. Taking into consideration the size and importance of the project, scientific literature owes the evaluation of its economic impacts yet. This paper seeks to address this need with the exploration of the impact of the new metro line on real estate prices.

Design/methodology/approach: To assess the economic effect of the M4 projects on the value of nearby properties, the method of counterfactual impact evaluation was combined with measuring the utility increase with the change of property prices. The research sample covers ten subway stations and more than 25.000 dwellings in five districts of Budapest, the analysis was made for the 2007-2015 period.

Findings: When examining the nearby properties at the M4 metro line stations in Budapest, we have found mixed results for the property prices. The new stations exert a positive effect only in those areas which were not connected directly to the existing underground lines

Research/practical implications: It is worth to consider using these results when adopting a decision on further directions of transport development in Budapest. Nevertheless there is room for future research focused on the sophistication of distance measurement, the quality of the apartments and the examination of other, especially private development processes besides the metro investment.

Originality/value: The paper presents original research in the field of economic effects of the M4 subway project. As it has been shown in the case of the M4 line, several stations have failed to generate additional economic value. This information is most useful for the planning of future transport infrastructure projects.

Keywords: Public Infrastructures, Urban Transportation Analysis, Sustainability

JEL Codes: H54, C01, O18

Introduction

The cohesion policy of the European Union strengthens economic, social and territorial cohesion within Union and it is aimed at reducing regional disparities. Realistic regional convergence also requires the elimination of obstacles such as the level of development of the basic transport infrastructure. This objective is frequently carried out via the development of urban public transport systems and facilities.

Beside their undoubted effects on mobility, these interventions can alter the spatial distribution of urban property values. Studies suggest that economic impacts can vary significantly depending on the type of interventions, the locations and geographical areas served, pre-existing market conditions and other policy and planning factors. The impact of urban infrastructural developments has been studied in other countries by several scholars and researchers whereby papers pay a special attention to underground projects. Research on sustainability and market value has received considerable attention in research in recent years, which has led to a rapidly evolving body of research. For the measurement of the real estate values the literature presents several methodologies from the domain of spatial econometrics.

In 2014, a new metro line was opened for the public in Budapest and the project was co-financed by European development funds. The new line is seen as a milestone in the life of Hungarian capital city, nevertheless, its economic impacts has not been covered by detailed research. This paper seeks to address this need and widen the scientific discourse of spatial econometrics and cohesion policy with the exploration of the impact of the new metro on real estate prices. The new metro line also intended to steer the surface, non-line infrastructure public transport traffic to underground. Increasing accessibility of remote parts of the city and decreasing the pollution from urban transport are very important aspects in the sustainable development of Budapest.

It is conceivably hypothesized that subway development causes a rise in real estate prices. This paper presents a method to monetize these effects by measuring the change in real estate prices by using different regression techniques (*propensity score matching, difference-in-differences*) in order to compare dwelling prices before and after the above operation.

Nevertheless the methodology applied has two main limitations. First, these regression techniques do not take into account the processes of general equilibrium. Second, our research database did not contain any information on the quality of dwellings, so the calculations made are solely based on location data.

1 Conceptual background

The efficiency of public spending has been an important issue throughout the course of history, and in the current economic and financial climate, the questions of on what and how the scarce resources available are spent, and what the impact of this spending is are of particular significance. The issues of whether the use of public funds is justified, which areas require development and where the best result can be ensured (value for money principle) (Nyikos, 2011; 2013) carry utmost importance. Greater welfare can be achieved by increasing the GDP components and one of the investment category of the various investment interventions is infrastructural measures increasing state or corporate capital. The objective of cohesion policy is to increase economic performance in the regions (Nyikos, 2013, p.164), in particular with respect to GDP, employment, productivity, investments and the foreign trade equilibrium. Within the framework of the policy, significant amounts of public funds are utilized to support the necessary infrastructure and moreover to stimulate private investment, which could significantly speed up the convergence process. Realistic convergence requires the elimination of growth obstacles such as the level of development of the basic infrastructure and need to increase mobility. Thus one of the efficient channels of the medium and long-term sustainable impacts of EU cohesion policy is the funding of broadly interpreted public infrastructural investments (Nyikos, 2013). The European Union's structural and cohesion funds play a major role in the funding of Hungarian economic agents.

The effect of infrastructure investment could be multidirectional and in several cases controversial (Horkay et al., 2006). Transportation infrastructure is known to affect the value of real estate property by virtue of changes in accessibility. The impact of transportation facilities is highly localized as well, and it is possible that spillover effects result from the capitalization of accessibility (Dorantes et al., 2011).

Public mass transit systems can alter the spatial distribution of urban property values²⁹ (Lerman et al., 1978). In other cases, literature regarding the impact of transit on land values reports mixed results concerning the economic benefits of accessibility to subway stations, specifically regarding commercial properties (Kim et al., 2005)³⁰. A Scandinavian study is

²⁹ The magnitude of this effect is likely to be highly parcel-specific, and changes in real estate values may occur both prior to and after a transit system's construction. Nevertheless access to the transit system and the implementation schedule of metro line construction were found to be significant determinants of parcel transaction prices in the US case

³⁰ The Korean study suggests a possible explanation for the mixed results: transit's discrimination impact on land values by location in a built-up urban area.

stating that the distance to the city center and the proximity of metro stations constitute two of the factors which significantly affect the market price of dwellings (Laakso, 1992)³¹. The Spanish case indicated that better accessibility to Metrosur stations (Madrid) had a positive impact on real estate values and that this effect was marked in cases in which a house was put up for sale (Dorantes et al., 2011)³². The results of the Portugal study (Martínez et al., 2009) and the Polish study (Bazyl, 2009) also suggest that the proximity to one or two metro lines leads to significant property value changes. However, an important factor is, that in the case of the Jubilee Line Extension and the Madrid Metrosur positive economic benefits occurred most frequently around the stations where there had already been enforceable land use plans and complementary policies in place to increase urban densities and encourage mixed land uses, alongside restricted car and good walking access to stations (Mejia-Dorantes et al., 2014).

For the measurement of the real estate values the literature presents several methodologies: hedonic Multiple Linear Regression models (MLR), spatial autoregressive hedonic models (SAR), spatial autoregressive hedonic in the Error Term Models (SEMs) and spatial Durbin hedonic models (SDMs) in order to estimate house price variations in metropolitan areas as a result of changing environmental and accessibility conditions (Ibeas et al., 2012).

Studies suggest that economic impacts can vary significantly depending on the type of interventions, the locations and geographical areas served, pre-existing market conditions and other policy and planning factors. However, another issue for evaluation is the extent to which the different studies that are available are comparable in terms of their methodologies, which makes the synthesis of research findings across different case studies extremely difficult (Mejia-Dorantes et al., 2014).

The relationship between sustainability and market value has received considerable attention as well. The majority of research to date investigating the relationship between sustainability and value has been categorized into the following themes to allow critical analysis and examine the applicability of the theory or study for valuation practice: discussion and analysis of stakeholders' perceptions and sentiments; normative studies that suggest the

³¹ Researchers emphasize that the positive and negative effects of the recently constructed metro line have capitalized into the market value of property in the vicinity and in feeder transport areas.

³² The results also showed the presence of submarkets, well defined by geographic boundaries, and transport fares, which implied that the economic benefits differed across municipalities

relationship “should” be present; case studies used to demonstrate normative theory; quantitative studies to quantify the effect of sustainability (Warren-Meyers, 2012).

2 Methodology

Measuring the utility of large transport infrastructural projects is a challenge in Cohesion Policy: the standard tools are cost-benefit analysis (CBA) and passenger counting, however these techniques often fail to measure the real added value of these types of projects.

The main challenge is to construct a solid counterfactual analysis exploring what would have happened in the lack of the investment. Our idea was to borrow a widely spread technique of counterfactual impact evaluation from human development and SME development evaluations. This method (Khandker et. al., 2010) was combined with the idea of Robert Lucas on measuring the utility increase with the change of property prices (Lucas, 1988). According to the approach of this research methodology, useful public infrastructural developments have a positive effect on the value of the nearby properties. It is reasonable to assume that easier access to downtown areas can be an added value, but the increased traffic, crowd or noise may outweigh these positive impacts. To explore the economic impacts of the M4 project, this article follows the following methodological steps.

The **research database** has been provided by the National Tax and Customs Administration. The initial dataset contained the location data of the properties sold in the capital city. These data could be used to calculate one of the research variables, the **distance** of dwellings from the metro stations. In this step two difficulties were faced. First, the records of the dataset included ZIP codes, city and street names without house numbers due to data protection requirements. Second, the addresses were provided in a semi-structured format (free text fields) that contained many abbreviations and typos to be unified in some degree; in the absence of house numbers it was necessary to apply a simplification in order to ensure adequate granularity. To manage these, a list containing ZIP codes and unique addresses was created, excluding undefinable cases. To address the second challenge, street midpoints were used for distance measurement. In case of addresses concerning more than one ZIP code, ZIP code level midpoints were calculated to improve accuracy. This approach may result in some inaccuracies; it has been assumed that such approximations can fit the purpose of the research. To accomplish any distance measurement, it was necessary to convert addresses to geo-coordinates. The above list of street midpoints was used for geocoding via the HERE Geocoder API called from a Python script. This step provided X and Y coordinates for all street midpoints so distance

measurement could have been accomplished. The calculation of distances was based on Euclidean distances between stations and street midpoints. For these purpose the Haversine formula was used providing distance variables in meters (Brummelen et al., 2013). As a further step, the shortest distance had been defined between metro stations and street midpoints.

We choose to use a double propensity score matching (for the propensity score matching technique, see Rosenbaum and Ribin, 1983) technique **to evaluate the utility** of the M4 metro line development in Budapest, through the change of property values. We created a “treated” group, from sold properties close enough to the metro stations (we estimated a 7 minutes' walking distance from the new metro stations as the treated area, which is cca. 580m), and created a “control” group, which the new metro stations had no effect on (more than 15 minutes' walking distance from any of the newly built metro stations, which is cca. 1250m). We compared the change of the values of the property prices before and after the investment. The main challenge here is that properties are very rarely sold twice (before and after the investment), so first we created pairs of the properties with very similar characteristics in the treated and the control groups, sold before and after the investment. This has been done with a one-to-one nearest neighbor propensity score matching.

To find the average treatment effect on the treated, we analyzed the results of three models: a one-to one nearest neighbor matching without the per square meter starting property prices; kernel matching with the per square meter starting property prices; kernel matching without the per square meter starting property prices.

3 Results and discussion

3.1 The new subway line of Budapest

The newest M4 metro line of Budapest has been on the political agenda since 1990. The plans, however, are even older: the majority of them were created in the 70's. It was thoroughly and long discussed whether the metro line would fit either into the structure of the existing Budapest public transportation network or into the reasonable future development scenarios thereof. The aim of the M4 project was to establish a metro line with modern, automated, air-conditioned trains that run even every 1,5 minutes, with modern, airy and less draughty stations, where passengers can wait for the new metro trains on uniquely built platforms. The investment have to facilitate the reconstruction of the surroundings of every station and change the life of Budapest. (DBR Metró Projekt Igazgatóság, 2018). Metro 4 is a relatively short line (7.34 km),

connecting two major railway terminals with a heavy metro line. The overall budget of the first section comprised the creation of 10 stations, to relieve the downtown area and connect Kelenföld with Baross Square, i.e. south Buda with north Pest. The Cohesion Fund application of the project referred to this first section. The comparative data of the Budapest metro lines are shown by Table 1.

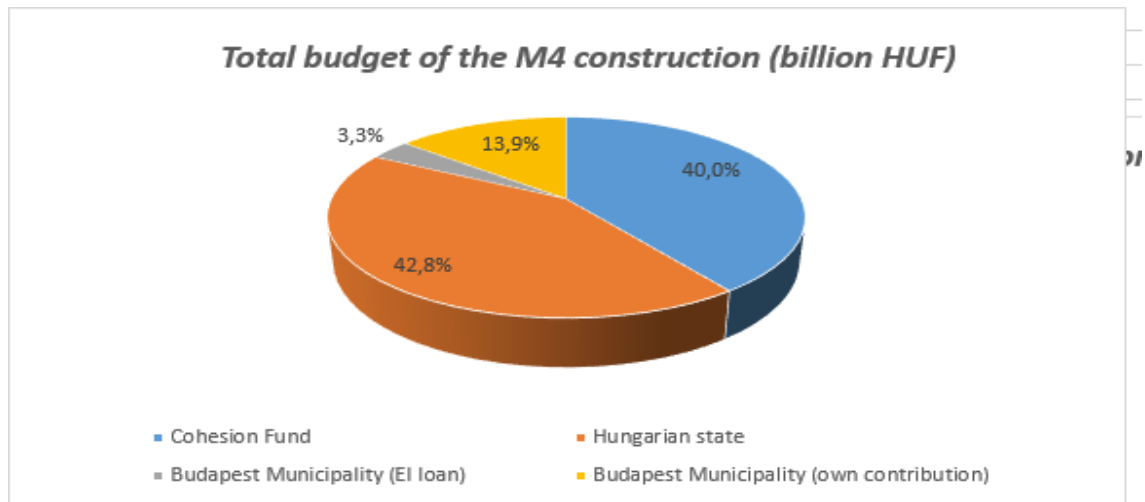
Tab. 1: Comparison of the four metro line in Budapest

| Description | Millennial Underground Metro line | Line 2 (East-West) | Line 3 (North-South) | Line 4 (DBR) |
|---|-----------------------------------|--------------------|----------------------|--------------|
| Surface section length (km) | 0 | 1.4 | 1.3 | 0 |
| Line length (useful, km) | 4.2 | 10.1 | 16.6 | 6.7 |
| Line length (total, terminal to terminal - km) | 4.4 | 10.3 | 17.06 | 7.4 |
| Number of stations | 11 | 11 | 20 | 10 |
| Vehicle number (cars) | 23 | 135 | 252 | 64 |
| Transport capacity in peak hours (capacity/h/direction) | 6 185 | 23 790 | 26 326 | 20 100 |
| Highest passenger number in peak hours (pass./h/dir.) | 5 170 | 14 755 | 16 710 | 15 700 |
| Highest passenger number in peak hours (pass./abs. peak hour/direction) | 5 170 | 15 885 | 17 300 | 16 480 |
| Train pairs per hour running in peak hours | 32.7 | 26.66 | 24.0 | 30.0 |
| Daily number of travel starts (thousand pass./working day) | 107 | 425 | 610 | 421 |

Source: DBR Metró Projekt Igazgatóság

The overall project budget was 353 billion HUF, from which the eligible amount was 292 billion HUF and Budapest requested EU financial assistance of 224 billion HUF. (DBR Metró Projekt Igazgatóság, 2018) The detailed budget of the intervention is shown by Figure 1.

Fig. 1: Detailed budget of the M4 construction (billion HUF)

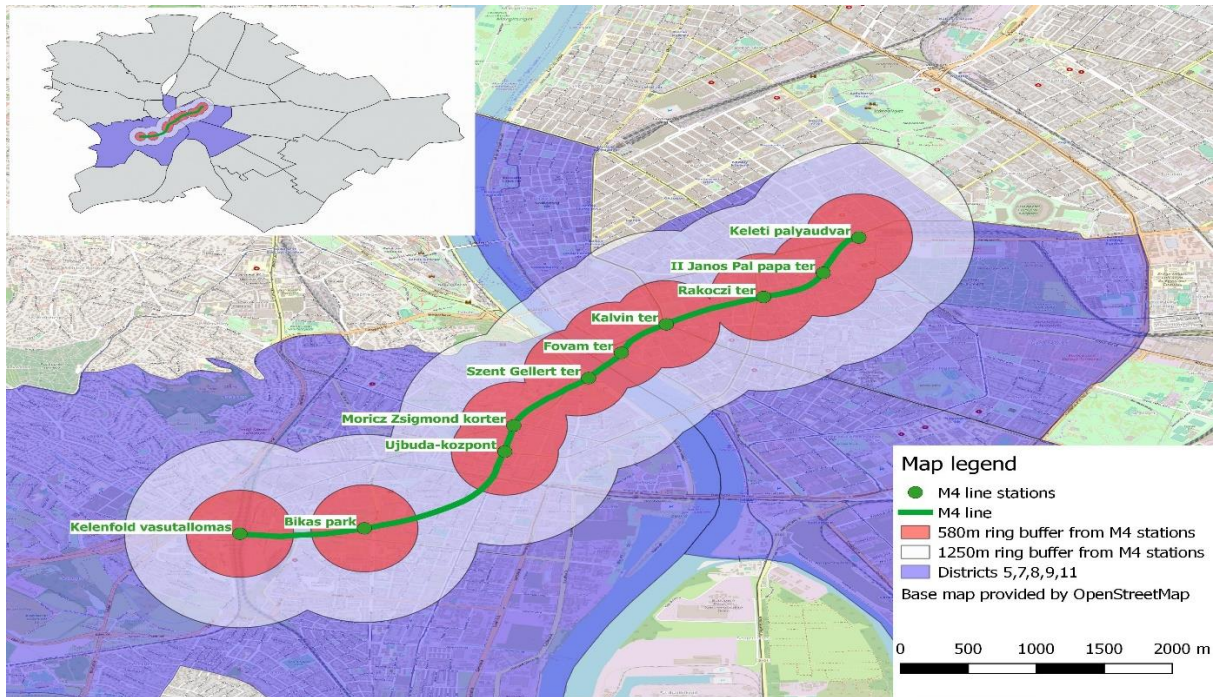


Source: DBR Metró igazgatóság

Eventually the construction of the first section of metro 4 line received 180,8 billion HUF EU funding, which is - although not the expected maximum amount – an outstanding magnitude of assistance to the financing of the project.

We examined the economic effects of the M4 project and the change of the property prices in more steps:

The first matching was based on the location (district) and the size (in square meters) of the apartments. We matched the “before investment” period (2007-2008) with the “after investment” period (2015-2015) property selling transactions. The new metro line affected five districts in Budapest: V., VII., VIII., IX., XI. We chose to set the treated area within the 580m radius of the new stations and the control area in more than 1250m radius from the stations, but within the affected districts. We also decided to set up an area between 580m and 1250m radius of the stations, to employ a neutral area, where we do not measure the effect of the prices (see Figure 2). The undertaking of serious surface level developments and restorations in some of the most deprived urban areas (e.g. Rákóczi square and II. János Pál pápa square) along with the new stations must be noted, as well.

Fig. 2: Map of the new metro stations, the treated and the control area


Source: SPSS

We had 13,805 observations for the treated properties (5,222 property prices before and 8,583 after the M4 investment) and 13,935 observations for the control properties (5,370 property prices before and 8,565 after the M4 investment). We managed to find 5,214 matches in the treated and 5,369 matches in the control groups. The results of the matching are shown by Table 2.

Tab. 2: The results of the one to one propensity score matching for before and after the M4 investment

| Variables | Treated | | Control | |
|--------------------------------|-------------------------|---------|-------------------------|---------|
| | Coefficient (Std. Err.) | p-value | Coefficient (Std. Err.) | p-value |
| Constant | -0.2241 (0.0458) | 0.000 | -0.3763 (0.0395) | 0.000 |
| Size of the apartment (in sqm) | -0.0019 (0.0004) | 0.000 | -0.0008 (0.0004) | 0.044 |
| VII district dummy | 0.0170 (0.0463) | 0.713 | 1.3197 (0.2811) | 0.000 |
| VIII district dummy | 0.0264 (0.0417) | 0.528 | 0.1581 (0.0443) | 0.000 |
| IX district dummy | 0.0399 (0.0563) | 0.478 | 0.0931 (0.0327) | 0.004 |
| XI district dummy | 0.0237 (0.0425) | 0.577 | 0.2348 (0.0340) | 0.000 |

Source: SPSS

Tables 3-4 show that for the treated properties the percentage share of the sold apartments between the different districts was very similar before and after the M4 investment,

nonetheless the average size of the sold apartments increased significantly. This phenomenon is not very surprising, while the selection of the treated properties was based on their distance from the new metro stations before and after the investment. For the control properties, both the geographical location and the size of the apartments were significantly different.

Tab. 3: Comparison of the before and after matching values for the treated properties

| | Before matching | | | After matching | | |
|-----------------------|------------------------------|-----------------------------|------------------------|------------------------------|-----------------------------|------------------------|
| | Mean - before (Std. Err.) | Mean - after (Std. Err.) | p-value (Wald test) | Mean - before (Std. Err.) | Mean - after (Std. Err.) | p-value (Wald test) |
| Size of the apartment | 56.78 (0.3981) | 59.46 (0.3298) | 0.0000 | 56.57 (0.3856) | 56.51 (0.3826) | 0.9131 |
| V district dummy | 0.0816 (0.0038) | 0.0880 (0.0031) | 0.1817 | 0.0813 (0.0038) | 0.0846 (0.0039) | 0.5462 |
| VII district dummy | 0.1676 (0.0052) | 0.1672 (0.0040) | 0.9551 | 0.1676 (0.0052) | 0.1669 (0.0052) | 0.9164 |
| VIII district dummy | 0.3734 (0.0067) | 0.3696 (0.0052) | 0.6497 | 0.3736 (0.0067) | 0.3759 (0.0067) | 0.8082 |
| IX district dummy | 0.0672 (0.0035) | 0.0664 (0.0027) | 0.8543 | 0.0667 (0.0035) | 0.0641 (0.0034) | 0.5793 |
| XI district dummy | 0.3102 (0.0064) | 0.3087 (0.0050) | 0.8557 | 0.3107 (0.0064) | 0.3086 (0.0064) | 0.8158 |

Source: SPSS

Tab. 4: Comparison of the before and after matching values for the control properties

| | Before matching | | | After matching | | |
|-----------------------|------------------------------|-----------------------------|------------------------|------------------------------|-----------------------------|------------------------|
| | Mean - before (Std. Err.) | Mean - after (Std. Err.) | p-value (Wald test) | Mean - before (Std. Err.) | Mean - after (Std. Err.) | p-value (Wald test) |
| Size of the apartment | 55.93 (0.3895) | 57.43 (0.3119) | 0.0025 | 55.88 (0.3869) | 55.48 (0.3766) | 0.4583 |
| V district dummy | 0.1423 (0.0048) | 0.1794 (0.0041) | 0.0000 | 0.1421 (0.0048) | 0.1429 (0.0048) | 0.9121 |
| VII district dummy | 0.0041 (0.0009) | 0.0006 (0.0003) | 0.0001 | 0.0041 (0.0009) | 0.0041 (0.0009) | 1.0000 |
| VIII district dummy | 0.1058 (0.0042) | 0.0998 (0.0032) | 0.2619 | 0.1058 (0.0042) | 0.1039 (0.0042) | 0.7528 |
| IX district dummy | 0.4196 (0.0067) | 0.4427 (0.0054) | 0.0071 | 0.4196 (0.0067) | 0.4215 (0.0067) | 0.8450 |
| XI district dummy | 0.3283 (0.0064) | 0.2774 (0.0048) | 0.0000 | 0.3284 (0.0064) | 0.3276 (0.0064) | 0.9345 |

Source: SPSS

The initial significant differences between the before-after the M4 investment property characteristics disappeared after the matching. Then we took the pairs of the sold properties before and after the M4 investment and performed second propensity scores with three different models (summarized in Table 5). In the models the treatment variable was always the distance from the new stations (1 if within 580m and 0 if more than 1250m radius, but within the affected districts).

Tab. 5: Models of the secondary propensity score matching

| | | |
|--|---|--|
| 1. nearest neighbor matching with the covariates: a. the size of the apartment in square meters (sqm); b. VII district dummy; c. VIII district dummy; d. IX district dummy; e. XI district dummy. | 2. kernel matching with the covariates: a. the size of the apartment in sqm; b. the before investment per sqm property prices; c. VII district dummy; d. VIII district dummy; e. IX district dummy; f. XI district dummy. | 3. kernel matching with the covariates: a. the size of the apartment in sqm; b. VII district dummy; c. VIII district dummy; d. IX district dummy; e. XI district dummy. |
|--|---|--|

Source: Authors

The treatment effect was measured in the change of the per square meter property prices before and after the M4 investment (results of the three measurement scenarios are shown in Tables 6-8).

Tab. 6: Average treatment effects on the treated, housing price-growth difference, before and after (in HUF), model 1

| Metro stations | Treated | Control | Difference | Std. Err. | T-stat | N of obs | N of treated |
|---------------------------|---------|---------|------------|-----------|--------|----------|--------------|
| Overall effect | 45.931 | -7.250 | 53.182** | 53.182 | 2.20 | 10.583 | 5.125 |
| Kelenföld | 179.199 | -16.133 | 195.333*** | 63.859 | 3.06 | 3.385 | 301 |
| Bikás Park | 105.911 | -12.364 | 118.276* | 65.997 | 1.79 | 2.180 | 420 |
| Újbuda-Centre | 88.622 | -35.798 | 124.421*** | 27.145 | 4.58 | 3.854 | 770 |
| Móricz Zsigmond square | 75.009 | -12.926 | 87.935*** | 23.172 | 3.79 | 3.741 | 656 |
| Szent Gellért square | 108.016 | 46.215 | 61.801* | 33.682 | 1.83 | 4.910 | 121 |
| Fővám square | 75.425 | 30.051 | 45.374* | 25.265 | 1.80 | 6.040 | 671 |
| Kálvin square | 60.593 | 25.145 | 35.447* | 19.724 | 1.80 | 6.290 | 921 |
| Rákóczi square | -1.790 | -22.275 | 20.485 | 20.504 | 1.00 | 6.727 | 1.355 |
| II. János Pál pápa square | -2.300 | -25.123 | 22.823 | 20.761 | 1.10 | 6.704 | 1.332 |
| Keleti railway station | 18.618 | 32.725 | -14.107 | 109.834 | -0.13 | 4.524 | 854 |

Significance levels * 10%, ** 5%, *** 1%

Source: SPSS

Tab.: Average treatment effects on the treated, housing price-growth difference, before and after (in HUF), model 2

| Metro stations | Treated | Control | Difference | Std. Err. | T-stat | N of obs | N of treated |
|---------------------------|---------|---------|------------|-----------|--------|----------|--------------|
| Overall effect | 45.296 | 51.813 | -6.517 | 8.502 | -0.77 | 10.583 | 5.139 |
| Kelenföld | 179.199 | 132.966 | 46.233*** | 9.073 | 5.10 | 3.385 | 301 |
| Bikás Park | 105.472 | 120.028 | -14.555* | 8.448 | -1.72 | 2.180 | 421 |
| Újbuda-Centre | 88.622 | 98.984 | -10.362 | 6.940 | -1.49 | 3.854 | 770 |
| Móricz Zsigmond square | 75.009 | 91.676 | -16.667** | 7.218 | -2.31 | 3.741 | 656 |
| Szent Gellért square | 108.016 | 81.297 | 26.719 | 21.752 | 1.23 | 4.910 | 121 |
| Fővám square | 75.635 | 11.506 | 64.129*** | 14.464 | 4.43 | 6.040 | 670 |
| Kálvin square | 61.014 | 48.719 | 12.294 | 10.174 | 1.21 | 6.290 | 920 |
| Rákóczi square | -225 | 25.086 | -25.311*** | 8.395 | -3.01 | 6.357 | 1.296 |
| II. János Pál pápa square | -2.290 | 22.179 | -24.469*** | 8.593 | -2.85 | 6.704 | 1.329 |
| Keleti railway station | 12.254 | 17.132 | -4.878 | 32.926 | -0.15 | 4.524 | 737 |

Significance levels * 10%, ** 5%, *** 1%

Source: SPSS

Tab. 8: Average treatment effects on the treated, housing price-growth difference, before and after (in HUF), model 3

| Metro stations | Treated | Control | Difference | Std. Err. | T-stat | N of obs | N of treated |
|---------------------------|---------|---------|------------|-----------|--------|----------|--------------|
| Overall effect | 46.089 | 35.356 | 10.732 | 13.028 | 0.82 | 10.583 | 5.119 |
| Kelenföld | 179.199 | 64.928 | 114.271*** | 8.135 | 14.05 | 3.385 | 301 |
| Bikás Park | 105.911 | 72.717 | 33.914*** | 7.333 | 4.53 | 2.180 | 420 |
| Újbuda-Centre | 88.622 | 62.606 | 26.016*** | 6.968 | 3.73 | 3.854 | 770 |
| Móricz Zsigmond square | 75.009 | 62.040 | 12.968* | 7.259 | 1.79 | 3.741 | 656 |
| Szent Gellért square | 108.016 | 59.080 | 48.936** | 22.249 | 2.20 | 4.910 | 121 |
| Fővám square | 75.715 | 43.429 | 32.285** | 14.620 | 2.21 | 6.040 | 670 |
| Kálvin square | 61.014 | 41.750 | 19.263 | 11.853 | 1.63 | 6.290 | 920 |
| Rákóczi square | -1.533 | 20.919 | -22.452 | 16.123 | -1.39 | 6.727 | 1.308 |
| II. János Pál pápa square | -2.350 | 18.907 | -21.257 | 16.148 | -1.32 | 6.704 | 1.316 |
| Keleti railway station | 12.254 | 17.132 | -4.878 | 32.926 | -0.15 | 4.524 | 737 |

Significance levels * 10%, ** 5%, *** 1%

Source: SPSS

In the **first model** the growth difference of the treated and the control property prices was significant overall. After analyzing the effects of the individual metro stations, we found, that the stations on the Buda side had more significant effects on the property prices. Three stations' effect were significant (at least 5%):

1. Kelenföld – this station is the Buda side terminus of the M4 metro line with direct connection to the Hungarian Railways. This station seems to have the most added value connecting the surrounding area to Budapest downtown.
1. Újbuda-Központ and Móricz Zsigmond square is still on the Buda side of the Metro line with relatively good surface connections: these are the terminuses of the largest tram lines.

We found no significant effects of the stations at the Pest side.

In the **second model** we controlled for the before investment apartment prices and used a kernel matching method. The effect of the M4 investment on the overall price changes was not significant, but we could find two significantly positive and three significantly negative effects:

- Kelenföld has already been mentioned earlier; Fővám square is first M4 station on the Pest side of the town.
- for Móricz Zsigmond square we found significantly negative effects, probably due to the special composition of the sold apartments. Here the apartments are larger than the average size (around 64 sqm instead of 55 sqm), and the price of those apartments in the control area increased dramatically. Rákóczi square and II. János Pál pápa square are two of the most deprived areas of Budapest, and even the new metro stations seem not to have outweighed the negative processes.

We think, that the most reliable model is the **third** one, where we applied the kernel matching method without using the starting apartment prices. In this model we found lower effects when moving from the Buda to the Pest side, which had already been more linked to the Budapest underground network (especially the M2 and M3 lines).

Our overall results show that the new stations have significant positive effect on the housing prices in the area, which had not been connected to the previously built metro lines (especially in the Buda area). In order to test the robustness of our results, we performed a treatment analysis based on a OLS technique (Wooldridge, 2013), the results are shown by Table 9.

Tab. 9: Robustness check based on an OLS method

| | Results of OLS | | Bootstrapped (based on 1000 bootstrap samples) | | N of obs. | R ² |
|---------------------------|----------------|---------|--|---------|-----------|----------------|
| | Beta | p value | Beta | p value | | |
| Metro stations | | | | | | |
| Overall effect | -2.364 | 0.571 | -2.364 | 0.602 | 27 740 | 0.106 |
| Kelenföld | 19.930 | 0.197 | 19 930*** | 0.003 | 14 708 | 0.078 |
| Bikás Park | -12.449 | 0.342 | -12 449** | 0.045 | 15 018 | 0.082 |
| Újbuda-Centre | 35.888*** | 0.000 | 35.888*** | 0.001 | 15 995 | 0.070 |
| Móricz Zsigmond square | 21.753** | 0.038 | 21.753*** | 0.003 | 15 671 | 0.070 |
| Szent Gellért square | 26.300 | 0.273 | 26.300 | 0.105 | 14 264 | 0.072 |
| Fővám square | 12.468 | 0.244 | 12.468 | 0.297 | 15 750 | 0.077 |
| Kálvin square | 4.296 | 0.640 | 4.296 | 0.641 | 16 403 | 0.069 |
| Rákóczi square | -10.761 | 0.141 | -10.761** | 0.048 | 17 659 | 0.093 |
| II. János Pál pápa square | -30.470*** | 0.000 | -30.470*** | 0.001 | 17 355 | 0.102 |
| Keleti railway station | -21.907** | 0.015 | -21.907*** | 0.001 | 16 261 | 0.088 |

Source: SPSS

The results of this (less sophisticated) analysis³³ show very similar results to the combined DiD and PSM method. The new M4 metro stations showed significant positive effects in the Buda side, and resulted in significant negative effect in the Pest side.

Although benefits may exist, the ability to quantify and assess a relationship between sustainability and market value is somewhat more difficult. Sustainability presents a rapidly-changing dynamic which has varying, complex assessment criteria (Warren-Myers, 2012). Accordingly, as a next step, to assess a relationship between sustainability and market value in property there is a need for extensive analysis of unbiased, evidence-based research in

³³ Our model was the following:

- Dependent variable:
 - price per sqm of the apartment (y);
- Predictors:
 - constant (beta0);
 - after treatment years (delta0);
 - near metro stations dummy (beta1);
 - treatment dummy (delta1: intersection of after treatment and near metro station);
 - other factors:
 - district7 dummy;
 - district8 dummy;
 - district9 dummy;
 - district11 dummy;
 - size in sqm.

individual and broader markets to provide guidance, evidence and knowledge of the implications of sustainability in the valuation of real estate.

Conclusion

Useful public infrastructural developments have a positive effect on the value of the nearby properties. It is reasonable to assume that easier access to downtown areas can be an added value, but the increased traffic, crowd or noise may outweigh these positive impacts. Economic impacts can vary significantly depending on the type of interventions, the locations and geographical areas served, pre-existing market conditions and other policy and planning factors. Increased economic effects are possible, we integrated development projects where the transport development initiative is linked to housing or other real estate development projects.

When examining the nearby properties at the M4 metro line stations in Budapest, we have found mixed results for the property prices. The new stations exert a positive effect only in those areas which were not connected directly to the existing underground lines (especially in the southern Buda area). Our result supports the opinions which stated that on the Pest side the new stations are too close to each other and to the existing and functioning transport network.

Even though the results are providing valuable information for planning forthcoming transport infrastructure in Budapest, there is room for the future development of this analysis as well: eg. using walking distances instead of “as the crow flies” distance or using more sophisticated data considering the quality of the apartments as well as further examination of other, especially private development processes besides the metro investment.

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THE RELATIONSHIP BETWEEN DECISION-MAKING STYLE OF ENTREPRENEURS AND THEIR FINANCIAL LITERACY

Jasmina Okičić

Abstract

Purpose: The objective of this study was to examine the relation between decision-making styles used by entrepreneurs and their respective financial literacy.

Design/methodology/approach: The research was designed as a quantitative study with General Decision-Making Style Inventory (Scott & Bruce, 1995) used. The OECD INFE Core Questionnaire (2011) was mainly used for measuring financial literacy. Using the purposive sampling technique, 51 entrepreneurs were selected. Research was conducted in Bosnia and Herzegovina during the first quarter of 2017. To gain better understanding of relationship between entrepreneurs' financial literacy and their decision making styles we use descriptive statistics, correlation analysis and multiple linear regression analysis.

Findings: Results indicate significant association between rational decision-making style and financial behaviour, attitude and financial goals in business. The available evidence seems to suggest that rational decision making style of entrepreneurs predicts their financial behaviour and financial attitudes.

Research/practical implications: Findings suggest that entrepreneurial activities may be raised via enhancing particular skills in respect to different decision-making tools and techniques. These results may produce useful pieces of information which might be helpful in the creation of entrepreneurship education and training programs.

Originality/value: To date, a considerable body of research has sought to understand the decision-making styles and financial literacy of entrepreneurs. However, the present study is a pioneer attempt dealing with an in-depth analysis of relationship between those two concepts. Findings suggest that entrepreneurial activities may be raised via enhancing particular skills in respect to different decision making tools and techniques

Keywords: General Decision-Making Style Inventory, Financial Literacy, Entrepreneurs

JEL Codes: D91, C10

Introduction

According to the Organisation for Economic Co-operation and Development (OECD), financial literacy can be defined as a combination of awareness, knowledge, skills, attitude and behavior necessary to make sound financial decisions and ultimately achieve individual financial wellbeing. Decision making styles would be particularly useful if they could generally distinguish between good and poor financial decisions. Scott and Bruce (1995) claim that decision-making styles can be understood as a habitual pattern which individuals use in decision-making or as individuals' characteristic mode of perceiving and responding to decision-making tasks.

The objective of this study was to examine the relation between decision-making styles used by entrepreneurs and their respective financial literacy.

The research should result in responses to the following question: Which entrepreneurs' decision making-style influence their financial attitudes, financial behavior and primary financial goals in their business?

Having in mind the above said, the central research hypothesis shall be as follows: Entrepreneurs' financial attitude, behavior and their financial goals are mainly driven by rational, rather than intuitive, dependent, avoidant or spontaneous decision-making style.

Possible limitation of this study is the probable presence of endogeneity and small sample that limits generalization of the findings.

The results of this study could be a good starting point for creating and implementing adequate entrepreneurship education and training programs. The paper is organized as follows. After the introduction, part one gives a short overview of theoretical framework that is relevant to the main objective of the paper. Part two outlines the data and research methodology. Part three is the center of the paper and contains analysis and discussion of the original empirical results. The last part contains some final remarks and conclusions.

1 Theoretical framework

The central issue addressed in this paper is the relationship between entrepreneurs' financial literacy and their decision-making style. So far, a significant number of scientific research has been conducted on the relationship between those two concepts so, the theoretical point of reference of this research will have its central foundation in preceding studies on decision making styles and assessing the level of financial literacy.

Scott and Bruce (1995) identify five decision-making styles: rational, avoidant, dependent, intuitive, spontaneous. *Rational* style is the one where decision maker does previous preparation of the decision. The *intuitive* decision maker is the one who emphasizes a reliance on hunches and feelings. The *dependent* decision maker is the one who is a need of advice and direction from others, i.e. who relies on the support of others. As pointed out by Ogarca (2015), in case of this style, if the decision maker is perceived as participative, the subordinates' reactions can be favourable. On the other hand, if the decision maker is perceived as weak, unprepared, uninformed the subordinates' reactions are not favourable, there is a high probability that such decisions made in such circumstances to failure. The decision maker with the *spontaneous* style is the one who wants to make a decision as soon as possible. On the other hand, the decision maker with the *avoidant* style is the one who is postponing and avoiding decisions.

When it comes to financial literacy, it is good to mention that, according to Ćumurović and Hyll (2016) there are evidence in the literature (Bucher-Koenen & Lusardi (2011), Klapper, Lusardi & Panos (2013), Deuflhard, Georgarakos & Inderst (2015), etc.) that entrepreneurs, or self-employed individuals, are more financially literate than regularly employed. Also, in the context of entrepreneurs, as pointed out by Hussain, Salia and Karim (2018) assessing financial literacy is important because it is an interconnecting resource that mitigates information asymmetry and collateral deficit when evaluating loan applications, therefore financial literacy should be part of school curriculum.

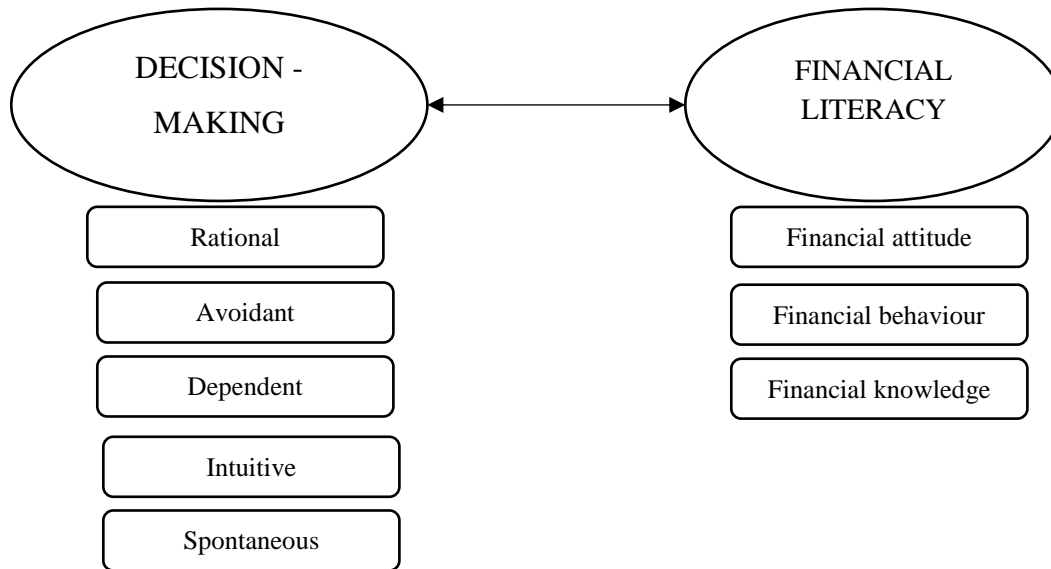
But, what does the term financial literacy actually stand for? It is probably true to say that the majority of literature has been lacking in defining the concept of financial literacy. Aren and Dinç Aydemir (2014) have pointed out that researchers approach this phenomenon from different points of view, where academicians, by examining financial literacy, want to explain economic wellbeing, financial decision-making and behaviour, but they rarely deal with governance and social well-being.

In this research we will use definition of financial literacy given by the OECD INFE (2011) and Atkinson and Messy (2012), where this concept is defined as a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing.

Speaking of decision-making style of entrepreneurs and their financial literacy, to date, a considerable body of research has sought to understand these concepts separately. We, therefore, claim that there is a potential research gap when it comes to understanding of interrelation between those two concepts. Therefore, in this pioneer research, the theoretical

concept (Figure 1) is based on the potential relationship between broad concepts of financial literacy, *i.e.* financial attitude, financial knowledge and financial behaviour (OECD INFE, 2011; Atkinson & Messy, 2011, 2012), and different decision-making styles, *i.e.* rational, avoidant, dependent, intuitive, spontaneous, as proposed by Scott and Bruce (1995) of entrepreneurs.

Fig. 1: Theoretical concept



Source: Author's own work

As pointed out by Ali, Omar, Nasir and Osman (2018) the success of any small and medium enterprises (SME) has been associated with the ability of the entrepreneurs to be financially literate in managing the financial matters, where the task of entrepreneurs does not only focuses on purchasing, allocating, and distributing the resources efficiently, but to be able to understand the running of the business in terms of possessing certain financial knowledge.

However, what generally distinguish between good and poor financial decisions is not only the level of financial knowledge, but also certain individual characteristic of entrepreneurs, such as their decision making style. This is the main premise of the above presented theoretical concept.

2 Methodology

This research builds on existing knowledge in the fields of decision making styles and financial literacy. This is a quantitative study, where we use General Decision-Making Style Inventory (GDMS) developed by Scott and Bruce (1995) with 5 subscales, *i.e.*: Rational, Avoidant,

Dependent, Intuitive and Spontaneous. Instrument used for measuring financial literacy (financial knowledge, financial attitude and financial behaviour) was based on the OECD INFE Core Questionnaire (2011) and some previous work of Atkinson and Messy (2011, 2012) as well as Lusardi and Mitchell (2011).

2.1 Data source and sample

We used snowball sampling technique where participants are recruited by e-mail. The main criterion for the participant selection was entrepreneurial experience. Contacts who decided to take part in the survey were asked to forward the request to their colleagues. The participation in the study was voluntary and anonymous. 51% of the distributed questionnaires (out of 100) were returned. Research was conducted in Bosnia and Herzegovina during the first quarter of 2017. Table 1 gives brief overview of basic characteristics of the sample.

Tab. 1: Overview of basic characteristics of the sample

| Characteristic | | Frequency | Percent |
|--|--------------------------------------|-----------|---------|
| Gender | Male | 44 | 86.3 |
| | Female | 7 | 13.7 |
| The highest level of completed education | Secondary school | 16 | 31.4 |
| | Junior college | 11 | 21.6 |
| | University education, bachelor | 17 | 33.3 |
| | University education, masters degree | 5 | 9.8 |
| | University education, PhD | 2 | 3.9 |
| The origin of business | Started their own business | 38 | 74.5 |
| | Inherited business | 13 | 25.5 |
| The business has emerged out of: | Necessity | 4 | 8.0 |
| | Chance | 46 | 92.0 |
| Financial result in the last fiscal year | Profit | 47 | 94.0 |
| | Loss | 3 | 6.0 |

Source: Author's own work

The number of employees in selected companies is ranging from 1 to 60. The average number of employees is 11.79 with standard deviation of 13.63. Most of the analysed companies are related to service business, *i.e.* 76%, while the rest belong to manufacturing business.

2.2 Variables

In this research two basic variables were used, *i.e.* decision making style of entrepreneurs and their financial literacy. Decision making styles were measured by using by GDMS that contains 25 items using 5-points Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”) with 5 subscales, *i.e.*: Rational, Avoidant, Dependent, Intuitive and Spontaneous. Higher scores in each subscale (the sum of the items) mean that this style is used more frequently.

Financial knowledge was measured by total financial knowledge score. This score was created by summarizing number of correct answers on the financial knowledge test that included following questions: (1) 1.000,00 BAM available today is worth more than the same amount in the future. (2) It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares. (3) Suppose you put 100,00 BAM into a savings account with a guaranteed interest rate of 2% per year. You don’t make any further payments into this account and you don’t withdraw any money. How much would be in the account at the end of the first year, once the interest payment is made? (4) ... and how much would be in the account at the end of five years? (5) Imagine that the interest rate on your savings account is 1 percent a year and inflation is 2 percent a year. After one year, would the money in the account buy more than it does today, exactly the same or less than today? (6) Do investments with higher expected returns come with more risk? (7) Does high inflation mean that the cost of living is increasing rapidly?

Other two components of financial literacy, *i.e.* financial behaviour and financial attitude, were measured by using 5-point Likert scale, ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”). Financial attitude was measured by using following statements: (1) I consider myself a thrifty person. (2) I think I need to give the best of me so my family could have a better life someday. (3) I find it more satisfying to spend money than to save it for the long term. (4) Money is there to be spent. (5) I am willing to risk my money. Financial behaviour was measured by using following statements: (1) I tend to live for today and let tomorrow take care of itself. (2) Before I buy something I carefully consider whether I can afford it. (3) I pay my bills on time. (4) I keep a close personal watch on my financial affairs. (5) I set long term financial goals and strive to achieve them.

As a part of financial behaviour in business, in this research we will also try to examine the possible influence of decision making styles on setting financial goals in business. This dimension, Financial goals in business, was also measured by using 5-point Likert scale, ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”), by using following statements:

(1) My primary financial goal in business is profitability. (2) My primary financial goal in business is liquidity. (3) My primary financial goal in business is efficiency. (4) My primary financial goal in business is stability.

2.3 Methods

To gain better understanding of relationship between entrepreneurs' financial literacy and their decision making styles we use descriptive statistics, correlation analysis and multiple linear regression analysis. Before going any further with the analysis, it is necessary to conduct a reliability analysis, *i.e.* to examine the reliability of used instruments. To see how well selected instruments measure what they really should, we used Cronbach's alpha, α (or coefficient alpha) which is a measure of reliability that ranges from 0 to 1, with values of .60 to .70 deemed the lower limit of acceptability (Hair, Black, Babin & Anderson, 2014). Cronbach's alpha is sensitive to the number of items in a scale. So, a larger number of items can result in a larger, and a smaller number of items in a smaller Cronbach's alpha. Possible limitation of examining relationship between those two concepts is the presence of possible endogeneity. Financial literacy, as an endogenous variable, has already been recognized in the research of Van Rooij, Lusardi and Alessi (2011), Van Rooij, Kool and Prast (2007) and many others. Based on the similar research (Bavořá & Orosová, (2015), Motvaseli & Lotfizadeh (2015), Okičić & Selimović (2017), etc.) we will use following multiple linear regression models as our primarily methodological approach:

$$FA = a + b_1FKS + b_2DMS_A + b_3DMS_R + b_4DMS_I + b_5DMS_D + b_6DMS_S \quad (1)$$

$$FB = a + b_1FKS + b_2DMS_A + b_3DMS_R + b_4DMS_I + b_5DMS_D + b_6DMS_S \quad (2)$$

$$FG = a + b_1FKS + b_2DMS_A + b_3DMS_R + b_4DMS_I + b_5DMS_D + b_6DMS_S \quad (3)$$

In the previous models, *FA* refers to financial attitude; *FB* to financial behaviour, *FG* is the notation for financial goals in business; *FKS* is financial knowledge score and *DMS_A*, *DMS_R*, *DMS_I*, *DMS_D*, *DMS_S* refer to avoidant, rational, intuitive, dependant and spontaneous decision making style, respectively. To estimate the models, we used regression analyses procedures using SPSS version 21.

2.4 Instrument validity

The scores for each subscale were calculated as total score for the items representing each dimension, i.e. decision making style, financial behaviour, financial attitude and financial goals in business. However, before that we assessed whether the subscales had satisfactory reliability (Table 2).

Tab. 2: Scale statistics

| Measure | N | Number of items | Mean | Standard deviation | Cronbach's Alpha |
|--|----|-----------------|-------|--------------------|------------------|
| General Decision Making Style Inventory: Avoidant | 51 | 5 | 15.10 | 3.62 | .69 |
| General Decision Making Style Inventory: Rational | 51 | 5 | 20.45 | 3.15 | .81 |
| General Decision Making Style Inventory : Intuitive | 51 | 5 | 18.57 | 3.01 | .78 |
| General Decision Making Style Inventory: Dependent | 51 | 5 | 17.52 | 3.25 | .77 |
| General Decision Making Style Inventory: Spontaneous | 51 | 5 | 15.27 | 3.71 | .78 |
| Financial attitude | 51 | 5 | 14.62 | 2.72 | .45 |
| Financial behaviour | 51 | 5 | 19.82 | 3.89 | .82 |
| Financial goals in business | 51 | 4 | 16.98 | 2.12 | .69 |

Source: Author's own work

All subscales, except Financial attitude, had acceptable levels of reliability. Therefore, one needs to be careful when interpreting the data related to this construct.

2.5 Research design

The research is organised in three phases. The first phase brings an analysis of basic parameters of descriptive statistics of the selected variables. These results have been considered of immense importance in terms of proper understanding of specificities of the sample. In the second phase, we will use an independent-samples t-test to examine the difference in the characteristics different groups of respondents. In the last phase, the empirical results of the research have been presented.

3 Results and discussion

According to the empirically assessed, previously mentioned, financial knowledge score ($M = 5.71$, $Mdn = 6.00$, $SD = 1.35$), we have identified two categories of entrepreneurs, i.e. category of entrepreneurs with average and below average (maximum 6 correct answers) and above average (more than 6 correct answers) financial knowledge. 70.6% entrepreneurs from the sample had an average or below average financial knowledge score, while the other 29.4% had above average financial knowledge score. An independent-samples t-test was conducted to compare decision making style score in different financial knowledge categories. There was no statistically significant difference between the two groups with respect to their decision making style. Results of correlation analysis between decision making styles and financial literacy of entrepreneurs are presented in the following table.

Tab. 3: Correlation matrix

| | Rational | Intuitive | Dependent | Avoidant | Spontaneous | Financial attitude | Financial behaviour | Financial goals in business | Financial knowledge |
|-----------------------------|----------|------------------|-------------------|-------------------|-------------------|--------------------|---------------------|-----------------------------|---------------------|
| Rational | 1 | .287** (.041) | .283** (.047) | .126 (.378) | -.294** (.036) | -.346** (.014) | .628*** (.000) | .559*** (.000) | -.100 (.484) |
| N | | 51 | 50 | 51 | 51 | 50 | 50 | 50 | 51 |
| Intuitive | | 1 | .296*** (.037) | .467*** (.001) | .274* (.051) | .021 (.883) | -.049 (.733) | .255* (.074) | .175 (.218) |
| N | | | 50 | 51 | 51 | 50 | 50 | 50 | 51 |
| Dependent | | | 1 | .326** (.021) | .008* (.057) | -.144 (.324) | .180 (.215) | .378*** (.007) | .165 (.253) |
| N | | | | 50 | 50 | 49 | 49 | 49 | 50 |
| Avoidant | | | | 1 | .101 (.482) | .108 (.454) | -.101 (.487) | .137 (.341) | -.072 (.616) |
| N | | | | | 51 | 50 | 50 | 50 | 51 |
| Spontaneous | | | | | 1 | .278* (.051) | -.463*** (.001) | -.107 (.460) | -.004 (.980) |
| N | | | | | | 50 | 50 | 50 | 51 |
| Financial attitude | | | | | | 1 | -.443*** (.001) | -.116 (.427) | .055 (.704) |
| N | | | | | | | 49 | 49 | 50 |
| Financial behaviour | | | | | | | 1 | .387*** (.006) | -.103 (.475) |
| N | | | | | | | | 49 | 50 |
| Financial goals in business | | | | | | | | 1 | .069 (.634) |
| N | | | | | | | | | 50 |
| Financial knowledge | | | | | | | | | 1 |

Note: */**/** significantly different from 0 at the 0.1/0.05/0.01 levels, respectively, two-tailed test.

Source: Author's own work

Results of the Pearson correlation indicated that there was a significant association between rational decision making style and financial behaviour, attitude and financial goals in business. This is very interesting result because it leads to conclusion that, when it comes to financial decision making, entrepreneurs emphasize a thorough search for and logical evaluation of alternatives.

A stepwise multiple regression was conducted to evaluate whether both financial knowledge score and decision-making styles were necessary to predict financial attitude, financial behaviour and financial goals in a business.

At step 1 of the analysis rational decision-making style score, $b_3 = -.29$, $p = .018$, entered into the regression equation and was significantly related to financial attitude of entrepreneurs $F(1,48) = 6.01$, $p = .018$. The multiple correlation coefficient was .35, indicating approximately 12.25% of the variance of the financial attitude could be accounted for by rational decision making style. All other variables, *i.e.* financial knowledge score, intuitive, dependent, avoidant, and spontaneous decision-making style scores did not enter into the equation at step 2 of the analysis.

Furthermore, at step 1 of the analysis rational decision-making style score, $b_3 = .80$, $p = .000$, entered into the regression equation and was significantly, related to financial behaviour of entrepreneurs $F(1,47) = 35.74$, $p = .000$. The multiple correlation coefficient was .66, indicating approximately 43.20% of the variance of the financial behaviour could be accounted for by rational decision-making style. At step 2, both, rational, $b_3 = .67$, $p = .000$, and spontaneous, $b_4 = -.44$, $p = .000$, decision-making style scores entered into the regression equation and were significantly related to financial behaviour of the entrepreneurs $F(2,46) = 32.26$, $p = .000$. The multiple correlation coefficient was .76, indicating approximately 58.40% of the variance of the financial behaviour could be accounted for by rational and spontaneous decision making style scores. All other variables, *i.e.* financial knowledge score, intuitive, dependent and avoidant decision-making style scores were excluded from the analysis.

Finally, at step 1 of the analysis rational decision-making style score, $b_3 = .39$, $p = .000$, entered into the regression equation and was significantly related to financial goals in business $F(1,47) = 24.32$, $p = .000$. The multiple correlation coefficient was .58, indicating approximately 34.10% of the variance of the financial goals in business could

be accounted for by rational decision making style. All other variables did not enter into the equation at step 2 of the analysis.

The results of the regression indicated that rational decision making style score statistically predicted all three dimensions, *i.e.* financial attitude financial behaviour and financial goals. Besides rational, spontaneous decision making style, when entrepreneurs emphasize a desire to get through the decision-making process as soon as possible, statistically predicted financial behaviour.

In general, decision making styles would be particularly useful if they could generally distinguish between good and poor financial decisions. The **available evidence** seems to suggest that rational decision making style of entrepreneurs predicts their financial behaviour and attitudes. Rational decision making is the opposite of intuitive, and it basically represents the process of systematically selecting among possible alternatives that is based on reason and facts.

In a rational decision making process, an entrepreneur will often employ a series of analytical steps to evaluate alternatives before choosing a particular course of action. This style, is characterized by the search for and logical evaluation of alternatives. Therefore, as decision making tools and techniques, such as market research, decision matrix, cost-benefit analysis, feasibility study, *etc.*, are possible to acquire, findings suggest that entrepreneurial activities may be raised *via* enhancing these particular skills. This is in accordance with the findings of Ćumurović and Hyll (2016) who claim that as financial literacy is acquirable, entrepreneurial activities may be raised via enhancing financial knowledge. Similar to findings of Hussain, Salia and Karim (2018), the results of this study advocate target support for SMEs to acquire financial management skills in order to mitigate information asymmetry between lenders and borrowers.

Conclusion

To date, a considerable body of research has sought to understand the decision making styles and financial literacy of entrepreneurs. However, this pioneer research was dealing with an in-depth analysis of relationship between those two concepts.

The analysis results have revealed that an entrepreneurs' financial attitude, behaviour and their financial goals are mainly driven by their rational decision making style rather than intuitive, dependent, avoidant or spontaneous decision making style.

Since rational decision making style emphasizes a thorough search for and logical evaluation of alternatives, findings suggest that entrepreneurial activities may be raised *via* enhancing particular skills in respect to different decision making tools and techniques, such as market research, decision matrix, cost-benefit analysis, feasibility study, *etc.*

Although this empirical research was conducted on a relatively small sample size and the limited territory of Bosnia and Herzegovina, these results may produce useful pieces of information which might be helpful for decision makers in Bosnia and Herzegovina in the process of creation of entrepreneurship education and training programs.

For future research, we propose a greater and more representative sample of entrepreneurs and the inclusion of more detailed information about their profile such as demographic characteristics, cognitive ability, type of business that they are involved in, *etc.*

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THE PHENOMENON OF ENTREPRENEURSHIP AMONG STUDENTS

Karolina Palimąka

Abstract

Purpose: The aim of the study was to answer the question what factors determine the tendency to set up their own business among students of the University of Information Technology and Management in Rzeszów (Poland) – both in the group of students declaring the willingness to start a company, and among the undecided. In addition, the answer to the question whether there is a relationship between the declaration of willingness to establish a company and gender, or, according to them, professional experience, appropriate education and the market are an indispensable criterion determining the establishment of their own company.

Design/methodology/approach: Data collected during the among 447 students in May 2017 at the University of Information Technology and Management in Rzeszow. Only 394 responses were used for analyses, which were subjected to cross-checking according to the relevant variables. The chi-square test were used to verify the occurrence dependence of variables.

Findings: The conducted research shows that there is a dependence between the declaration of starting own business and gender, but professional experience or adequate education is not an essential criterion that determines the decision to start up a business. Among the surveyed students, the idea and the desire to be independent have the biggest impact on the decision.

Research/practical implications: The obtained results determine the decision to continue the research in order to get an answer to the question - if the motives to set up your own company are the same from the perspective of people determined to set it up, and those who are not interested in this option - which has an even greater impact on such declaration. The results of the analyses carried out in this way will allow to adapt educational activities towards the increase in interest in starting their own business.

Originality/value: The research presented here uses its own set of data. In addition, they are a pilot experiment of a conducted research in the international field.

Keywords: Entrepreneurship, Starting a Business, Students, Poland

JEL Codes: L26, A20

Introduction

Entrepreneurship is a very popular problem in literature, no wonder, because this phenomenon applies to everyone. Economists underline the significant role of entrepreneurial people in the process of economic development as the driving force of the global economy. Entrepreneurship contributes to the improvement of competitiveness, increase in the number of jobs, and thus increase of well-being among the community (Lichniak, 2011, p. 11). For many decades, this concept has been evolving, but so far there is no single definition, mainly due to its interdisciplinary nature. The issue of entrepreneurship appears not only in the field of economics and is not understood only as a phenomenon of establishing companies or generally understood self-employment. They are also not only financial aspects, this issue goes beyond these areas - it touches on the subject of management (management methods), psychology (entrepreneurial personality, entrepreneurial intentions (Crant, 1996)), and is analysed in terms of skills (e.g. skills of being able to forecast and see what's happening in the industry as an important skill of an effective entrepreneur (Lang and Liu, 2018), ways of education (economic education – knowledge and shaping attitudes) or innovation – and because of diversity this topic is interesting. Entrepreneurship can be understood as both establishing companies, as well as attitude, behaviour, and “a way of thinking” (Krueger, Reilly and Carsrud, 2000; Turker and Selcuk, 2009). Combining this two approaches is a relatively new perspective of entrepreneurship in the literature. When talking about entrepreneurship and creating companies, it is necessary to take into account such aspects as personality, motivations for being entrepreneurial, willingness to set up your own business, as well as the surroundings of the potential entrepreneur, including the influence of family and friends on the undertaken activities (people who grow up in the environment where the enterprise is run or used to be run in the family, they more often decide to involve in their own entrepreneurial activities (Indrasari, Purnomo, Syamsudin and Yunus, 2018; Rachwał and Wach, 2016 or Zellweger, Sieger and Halter, 2011). The decision to start a business is a consequence of many factors. The paper attempts to verify the factors that explain the tendency to set up their own business among the surveyed students declaring their willingness to start a company and the undecided students (as the second group) and criteria characterizing the work in their own company according to both groups of students. In addition, it was verified whether there is a relationship between the willingness to lead and gender. This is just the introduction to wider research on willingness to start a company and personality traits in the area of entrepreneurship, which will be helpful for those who are responsible for expansion these traits among young people.

1 Entrepreneurship among students

The subject of entrepreneurship from the perspective of students is widely discussed in the literature. The main analysed issues include, above all, activities in the field of effective entrepreneurship education among students (including in particular the scope of knowledge transferred within course of study or effectiveness of already existing ones (Nabi et al., 2016), developing skills necessary for running your own business, identifying motives that guide students wishing to set up their business and the necessary skills that a young person entering the labour market should have to be an entrepreneur (Lang and Liu, 2018). In addition, researchers also analyse attitudes, approach to entrepreneurship, and starting and running a company from the perspective of students, thereby emphasizing that being entrepreneurial is not enough alone knowledge, but also the right skills or demonstrated intentions (Gartner, 1990). These are undoubtedly complementary to the above topics, predictors of entrepreneurial intentions (Crant, 1996), determinants of intentions to set up own business, including the dependence of willingness to start their own business with variables such as gender, education, entrepreneurs in the family, or even different character traits (Crant, 1996).

2 Research method

The work uses the data collected during a survey conducted among 447 students of various subjects of study at the University of Information Technology and Management in Rzeszów (of around 3,500 students at all, during May 2017). The questionnaire was developed based on literature review in the field of entrepreneurship and previous research in this area. For further analysis, only 394 responses to respondents who declared their willingness to be an entrepreneur and those who do not want to run their own business were left behind in the presented results. Then selected variables were subjected to cross-analysis, and in order to verify the occurrence of dependencies between variables specified in the research hypotheses, the chi-square test was used – the most common test of compliance of qualitative variables. The analysis was carried out using the IBM SPSS Statistics program.

3 Findings and discussion

Among all the surveyed students there were two distinctive groups of students – declaring their willingness to start their own business (nearly 48% of respondents) and those who did not want to have their own business (about 41% of respondents).

Tab. 1: The number of students according to the declaration of willingness to set up their own company.

| | Number | Percentage |
|--|------------|--------------|
| Already run their own company | 28 | 6.3 |
| Want to start their own business | 212 | 47.4 |
| Do not want to have their own business | 182 | 40.7 |
| Undecided | 25 | 5.6 |
| Altogether | 447 | 100,0 |

Source: Own elaboration.

In the light of the above, further analyses were carried out on a group of 394 students, of which just over half are people who want to run their own company after graduation (54% of them are women), the rest of respondents are not interested in this type of professional activity (including nearly 2/3 it's women).

Tab. 2: The number of students according to the declaration of willingness to set up their own company, divided by gender.

| | | Want to start their own business | Do not want to have their own business | Altogether |
|-------------------|--------------|----------------------------------|--|-------------------|
| Gender | Women | 115 | 123 | 238 |
| | Men | 97 | 59 | 156 |
| Altogether | | 212 | 182 | 394 |

Source: Own elaboration.

Since there are no cases smaller than 5 in the table, the Chi-square variables can be applied. For the chi-square test, the following hypotheses were specified:

H0: Gender and Willingness to set up your own business (yes / no) are independent.

H1: Gender and Willingness to set up your own business (yes / no) are not independent.

At the significance level of 5%, the statistical group in the surveyed group there is a dependence between gender and willingness to start own business, i.e. the p-value = 0.007 is lower than the assumed level of significance, so statistically there are grounds for rejecting the null hypothesis in favour of the alternative hypothesis.

The main goal of the research was to verify the factors that determine the decision to set up own company. In the first place, students were asked to indicate the criteria that they think are necessary to set up their own company (the respondents could point to a maximum of 3 criteria). In the group of people who declared the will to establish a company, the most people indicated that the most important criterion necessary to start a business is an idea (nearly 3/4 of those surveyed), then more than 2/3 of surveyed students chose capital. The next criterion was a good business plan, but this element was indicated by less than half of students planning to start their own business. The remaining criteria (i.e. professional experience, market knowledge, relevant education, knowledge of the basics of accounting or place headquarters) were indicated by less than 1/3 of students from this group. Among people who declared that they are not interested in their own company, the first three criteria that were like those, who are willing to start a business – i.e. an idea, capital and a good business plan respectively, with the idea and capital being indicated by a slightly higher percentage of people. Other elements in this group were also significant for a significantly smaller group of people (see Table 3).

Tab. 3: The number of students according to the declaration of willingness to set up their own business divided by individual criteria necessary to establish a company.

| | Want to start their own business | | Do not want to start their own business | |
|--|----------------------------------|------------|---|------------|
| | Number (max. 212) | Percentage | Number (max. 182) | Percentage |
| Idea | 153 | 72.17% | 134 | 73.63% |
| Capital | 143 | 67.45% | 133 | 73.08% |
| Good Business plan | 101 | 47.64% | 85 | 46.70% |
| Experience | 77 | 36.32% | 55 | 30.22% |
| The knowledge of the market | 76 | 35.85% | 83 | 45.60% |
| Proper education | 35 | 16.51% | 33 | 18.13% |
| Knowledge of the basics of accounting | 27 | 12.74% | 16 | 8.79% |
| Headquarters | 25 | 11.79% | 31 | 17.03% |

Source: Own elaboration.

Secondly, students were asked to indicate factors that would motivate them to start and run their own business. In the first place, both in the group of people declaring the willingness to start a company and those who are not interested in it, chose the "willingness to be independent". Nearly 3/4 students from the first group, and 2/3 students from the second group

(i.e. uninterested). Students declaring the willingness to start a company are motivated by the possibility of pursuing their own interests (more than half of the respondents) and, to a similar extent, relatively greater financial benefits. About 1/3 of respondents (determined to start a company) are motivated by flexible working time, and similarly the idea that no one had before. Other factors, such as the need to use knowledge, willingness to take risks, fear of not finding a job or family traditions, were chosen by a relatively small number of people. The situation is similar in the case of people from the group not interested in their own company, with slight differences in the percentage share (see Table 4). Therefore, it should be concluded that the motives that drive students to start their own business are to some extent not the only variable that determines their behaviour. This is the reason to further research towards answering the question – if the motives for starting your own company are the same from the perspective of people determined to create it, and those who are not interested in it – which has an even greater impact on such and no other declaration.

Table 4: The number of students according to the declaration of willingness to start their own business divided by individual motives determining the willingness to set up a company.

| | Want to start their own business | | Do not want to have their own business | |
|---------------------------------------|----------------------------------|------------|--|------------|
| | Number (max. 212) | Percentage | Number (max. 182) | Percentage |
| The desire to be independent | 155 | 73.1% | 120 | 65.9% |
| Possibilities to pursue own interests | 116 | 54.7% | 94 | 51.6% |
| Relatively higher financial benefits | 113 | 53.3% | 108 | 59.3% |
| Flexible working time | 73 | 34.4% | 67 | 36.8% |
| An idea that no one has ever had | 71 | 33.5% | 74 | 40.7% |
| The need to use knowledge | 34 | 16.0% | 33 | 18.1% |
| "I like taking risks" | 33 | 15.6% | 22 | 12.1% |
| Fear of not finding a job | 14 | 6.6% | 22 | 12.1% |
| Family traditions | 8 | 3.8% | 14 | 7.7% |

Source: Own elaboration.

Conclusion

As shown by the results of the analyses based on research conducted among students of the UITM in Rzeszów, there is a relationship between the declaration of starting a business and gender. The main objective of the work was to verify which criteria determine the willingness to set up their own business, and contrary to the initial assumptions, it turns out that according to students, professional experience or appropriate education is not an essential criterion that determines the decision to set up an enterprise. Among the surveyed students, the idea and the desire to be independent have the greatest impact on the decision. Surprisingly, the obtained results show no differences between the motives that drive students to set up their own company in both groups, which leads to deeper research for verification – what determines the decision to set up their own company. Above conclusions points to the lack of such a great need for education in the field of entrepreneurship and allow to think that shaping entrepreneurial traits is more desirable by young people than the knowledge of running a company. In conclusion, most of scientist suggests that people decided to build constantly their entrepreneurial career where they are relatively young, when they formed their entrepreneurial attitudes (Shirokova, 2016), so it is needed to extend research to verify more factors relevant to building entrepreneurial attitudes to help young people be more effective in their entrepreneurship.

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INNOVATIONS FOR SUSTAINABLE PROTEIN SYSTEMS

Ari Paloviita

Abstract

Purpose: Introduction of new, alternative protein sources and products for replacing conventional animal products requires many innovations at the product level and the system level. However, less attention has been given to analyzing the emergence of entrepreneurial and business responses to sustainable protein system. The purpose of the paper is to analyze the opportunities and challenges in food processing related to sustainable protein systems from the perspective of sustainable innovations and sustainable entrepreneurship.

Design/methodology/approach: Thematic qualitative interviews were conducted in Finnish food manufacturing companies during the first half of 2018. Nineteen (19) interviews were conducted, of which sixteen (16) were face-to-face and three (3) by telephone using a semi-structured guide. Half of the companies represented traditional and established protein industry, whereas the other half represented alternative smaller-scale protein industry. The tape-recorded interviews were transcribed, coded and analyzed using qualitative content analysis and abductive coding scheme.

Findings: The interviewees of the traditional protein industry generally favored incremental innovations, adjustments and improvements, whereas the interviewees of alternative protein industry emphasized more radical and systemic innovations. It was generally agreed that the global long-term challenges, including climate change and population growth, will provide increasing opportunities for a more diverse variety of protein sources and products.

Research/practical implications: Sustainable protein innovations can be incremental, radical, sustaining or disruptive, but their contribution to sustainable protein system differ. Future research could study in more detail the practices of providers of sustainable protein innovations and investigate spatial and cultural embeddedness of protein innovations.

Originality/value: Academic implications of the study lie in the exploration of the relevance of protein issues in the context of sustainable innovation and entrepreneurship literature. Practical implications of the study relate to raising awareness towards sustainable protein innovations in terms of new business models, value offerings and entrepreneurial practices.

Keywords: Sustainable Innovations, Sustainable Entrepreneurs, Protein System, Food Industry

JEL Codes: L66, Q01, O31

Introduction

Food systems are extremely vulnerable to a significant number of long-term challenges including climate change, water scarcity, natural resource scarcity, pollution, population growth and unsustainable consumption habits. On the other hand, a major proportion of the global environmental burden is caused by food-related human activities (de Boer et al., 2006). Promoting dietary shifts towards mostly plant-based foods is listed in the article *World Scientists' Warning to Humanity: A Second notice*, as one of the major steps to transition to sustainability, signed by 15 364 scientist from 184 countries (Ripple et al., 2017). However, animal products, such as meat and dairy products, are major dietary sources of protein in Europe and North America. (Beverland, 2014). Hence, replacing animal products requires alternative protein sources and new solutions. Food manufacturing companies are crucial actors in inventing new sustainable products and mainstreaming plant-based diets and the use of alternative protein sources in developed economies. Plant-based protein sources, such as fava beans, peas, quinoa, blue lupin, buckwheat, seed flax, turnip, rape and hemp can be used to meet the increasing protein demand more sustainably. In addition, mushrooms, insects, underutilized fish species and algae have significant potential to contribute to sustainable dietary shifts. At the same time, improvements in sustainability performance within the meat and dairy industry are urgently needed. This paper examines opportunities and challenges related to sustainable proteins from the perspective of food manufacturing companies. First, the relationship between sustainable protein systems, sustainable innovations and sustainable entrepreneurship is discussed. Second, the empirical results from nineteen thematic interviews among Finnish food manufacturing companies are presented and finally, conclusions on the role of innovations for sustainable protein systems are discussed.

1 Sustainable protein system, innovations and entrepreneurship

Food systems encompass a number of activities, including producing food, processing food, packaging and distributing food and retailing and consuming food (Ingram, 2011). Protein systems can be considered as sub-systems of food systems that focus on producing, processing, packaging, distributing, retailing and consuming proteins. But why is the protein systems approach important? First, proteins are nutritionally crucial as essential macronutrients and as a source of necessary amino acids. Second, proteins are environmentally critical, since the current protein supply in western countries is based on animal-based protein sources with significant global environmental impacts (Lang and Barling, 2013). It can be argued that much

of the global environmental burden of the food systems is associated with the protein chain. The sustainable protein system, in turn, can be defined as a protein system that respects the health and prosperity of humans, communities, animals and the limits of the planet. This is linked to sustainability transition research, which assumes that system innovations and transitions start in niches and that under preferable circumstances, niche actors are capable of becoming mainstream suppliers serving mainstream markets (Boons et al., 2013). Alternative protein entrepreneurs are indeed niche actors aiming to mainstream plant-based diets or diversify protein sources, such as fungi, algae, insects, underutilized fish and lab-grown proteins.

Sustainable innovation can be defined as innovation that improves sustainability performance including ecological, economic and social criteria (Boons et al., 2013). Moreover, sustainable innovation can be considered as a process of developing new ideas, behaviors, products and processes to reach specific sustainability targets (Flores et al., 2008). According to Kuokkanen et al. (2018), practice-based view on sustainable innovation include both provider practices, including business models, value offerings and entrepreneurial practices, and user practices including consumption preferences, expectations and demand. In general, sustainable innovations can be divided into incremental and radical innovations. Incremental innovations are product- or process-based innovations, whereas radical innovations address a larger system. Alternatively, sustainable innovations can be divided into sustaining and disruptive innovations. Sustaining innovations do not create new markets or value networks, whereas disrupting innovations refer to disruptive technologies, business models and product innovations, which aim to create new markets and value networks. In a context of sustainable protein systems, sustainable protein innovation can refer to ensuring sufficient and healthy protein intake, respecting different food cultures, improving animal welfare and producing proteins using environmentally efficient processes. Hence, a rich set of culturally accepted sustainable protein innovations is needed (de Boer and Aiking, 2011).

In order to respect spatial differences in sustainability challenges, Boons et al. (2013) make a clear distinction between developed consumerist economies, emerging economies and so called Base-of-the-Pyramid economies. Developing sustainable protein systems is a challenge especially for developed consumerist economies due to an inherently inefficient conversion of meat protein production from feed to food (de Boer et al., 2006). Alternative protein products can be presented as disruptive sustainable innovations (Kuokkanen et al., 2018), which aim to reduce meat protein intake (Aiking, 2014) and to replace meat proteins with plant, mushroom and algae protein products. In addition, sustainable innovations could

aim to increase the diversity of animal-based proteins by shifting towards underutilized fish species and insects. Sustainable alternatives to animal protein can also be provided by startup companies focusing on new disruptive technologies for accelerating sustainability transitions and creating completely new markets, such as lab-grown proteins and cultivated in-vitro meat. Hence, sustainable innovation is in many cases a radical or disruptive innovation (Schaltegger and Wagner, 2010).

Sustainable entrepreneurship has a clear link to sustainable innovations. Schaltegger and Wagner (2010) present four categories of sustainability-oriented entrepreneurship including ecopreneurship, social entrepreneurship, institutional entrepreneurship and sustainable entrepreneurship. While the core motivation with ecopreneurship is to earn money through contributing to solving environmental problems, social entrepreneurship is concerned with achieving societal goals and securing its funding. On the other hand, institutional entrepreneurs initiate changes that contribute to transforming existing institutions or to creating new institutions. Finally, sustainable entrepreneurs contribute to sustainable development both within and beyond the organization, i.e. sustainable development of the market and society as a whole. In addition, Schaltegger and Wagner (2010) categorize firms according to high, medium or low priority of environmental and social issues as business goals.

2 Research approach

Nineteen (19) thematic qualitative interviews were conducted in Finnish food manufacturing companies, representing two groups: old and new protein system. All interviews were made during the first half of 2018. Half of the companies represented traditional and established protein industry, including meat, dairy, bakery and convenience foods, whereas the other half represented new and alternative smaller-scale protein industry, including the processing of plant proteins, mushrooms, insects and under-utilized fish. Interviewees from the bigger companies were responsibility managers, innovation managers, product group managers, research and development managers, quality managers and product development managers. Interviewees from the smaller companies were mainly CEO's and/or founders. The general themes for all interviewees included the perceptions on the opportunities and challenges related to sustainable protein systems. Interviewees described their understanding of the sustainable protein system, the role of their company in the food system, their perceptions on the future of animal-based, plant-based and other protein sources, consumer attitudes towards their products, institutional and political aspects as well as market circumstances. Since the interviewees of the new protein

system often represented new startup companies and were entrepreneurs themselves, the themes for this group also included perceptions on opportunities and challenges of alternative protein entrepreneurship.

Out of the nineteen (19) interviews, sixteen (16) were conducted face-to-face and three (3) by telephone using a semi-structured guide. The tape-recorded interviews were transcribed, coded and analyzed using qualitative content analysis. The abductive coding scheme recognized both the earlier theory as well as purely data-based codes. Abductive analysis can be viewed as continually moving back and forth between a set of observations (interview data) and theoretical generalizations. Accordingly, the theory of sustainable innovations and sustainable entrepreneurship in a context of the sustainable protein system was analyzed and discussed in the light of empirical observations. The main limitations of the research were the relatively small sample size, subjective selection of respondents and limited national level focus. For example, interviewing only one person in a large organization may lead to data that is biased.

3 Empirical results

Empirical results are here presented according to their relevance for sustainable innovations and sustainable entrepreneurship. Sustainable protein innovations are first discussed within the framework of incremental versus radical innovations and then within the framework of sustaining versus disruptive innovations. Sustainable protein entrepreneurship is analyzed in terms of the priority of sustainability goals. The results are summarized in Tables 1 and 2.

3.1 Sustainable innovations

3.1.1 Incremental versus radical innovations

It was generally agreed that global long term challenges, including climate change and population growth, will provide increasing opportunities for a more diverse variety of protein sources and products. However, the interviewees had considerably different perceptions regarding sustainable protein systems, especially regarding the need of radical innovations in the food system. They commonly agreed that dietary shift towards plant-based foods is currently occurring, but different strategies, policies and methods were suggested in order to achieve a sustainable protein system. Respondents of the old protein system preferred incremental innovations, adjustments and improvements whereas alternative protein entrepreneurs emphasized the need of radical innovations. Sustainable protein systems were

generally associated with environmental sustainability. Some interviewees, alternative protein entrepreneurs in particular, thought that sustainability is operationalized through a shift from animal-based products (secondary protein sources) to plant-based protein sources (primary protein sources). On the other hand, interviewees from meat and dairy companies emphasized the importance of grass-based animal production in Finland and unfavorable climate conditions for legume crop growing in majority of the country. Naturally, all companies of the new protein system were actively developing products based on alternative protein sources, but also all companies of the old protein system were aware of the new protein sources and some of them had already launched new products into market that include alternative protein sources. However, respondents did not believe that global meat consumption will decrease in the near future, but some of them anticipated that meat consumption in western countries may slowly and moderately decrease. Finnish consumers were perceived as ecologically and nutritionally aware, but also rather price-oriented.

3.1.2 Sustaining versus disruptive innovations

Most of the sustainable innovations mentioned by the interviewees were sustaining rather than disruptive in nature. Hence, sustainable innovations were mostly marketed to existing markets. Among the companies interviewed, the most disruptive innovations occurred in a protein technology startup, insect companies and mushrooms companies. A protein technology startup working on lab grown proteins is disrupting the whole existing food system, as its protein does not require agricultural production, fishing, hunting or collecting food. Insect companies, in turn, are disrupting the existing food preferences of western consumers, as attitudes towards eating insects are generally negative in western countries. Mushroom companies disrupt the existing idea of a linear food supply chain by introducing the concept of circular economy, where everything is utilized with zero waste.

3.2 Sustainable entrepreneurship

3.2.1 Sustainable proteins as a core business goal

Most of the respondents within the alternative protein industry could be categorized as sustainable entrepreneurs due to their motivation towards sustainable protein systems. These alternative protein entrepreneurs or sustainable protein entrepreneurs had identified business opportunities related to environmental and nutritional impacts of protein sources, and changing

consumption habits. For example, fish is an excellent source of nutrition and proteins, but there are also environmental concerns and substantial evidence that fish stocks are in a dire state and farmed fish face aquaculture-related welfare issues. Hence, one of the respondents had started to utilize a small, wild and under-utilized lake fish called roach. Among consumers, roach has been undervalued due to lack of attractive roach products. The most important phase according to the entrepreneur was to develop a tasty roach product cost-efficiently. In addition, the entrepreneur emphasized the fact that fishing wild roach also means phosphorous is removed from the lake. Due to nutrient reduction and removal by fishing roach, the eutrophication in the lakes will decrease. Ultimately, the entrepreneur's approach was successful and the innovative product was awarded in national food competitions and found its place in the selections of major retailer chains. In many cases, however, the development of markets for niche products and mainstreaming alternative protein consumption were seen as major challenges by alternative protein entrepreneurs. For example, relatively high price of products based on alternative proteins (compared to animal-based products) was seen as a hindering factor by the respondents. In addition, alternative protein entrepreneurs found competition for shelf space in supermarkets and price-oriented competitive bidding of municipal food services as challenges. Companies focusing on alternative protein sources are generally small and have limited resources for research, product development and marketing. On the other hand, smaller companies have flexibility to make experiments dealing with new protein sources.

3.2.2 Sustainable proteins as complementary to core business

Traditional, old protein industry, did address many sustainability goals regarding their practices, but sustainability goals were typically complementary to core business. Core business was associated with providing tasty and affordable proteins. Sustainability issues were managed by the department of corporate social responsibility or by other administrative practices, such as eco-labels and management systems. Their business models were based on strongly established supply chains from the field to the table as well as strongly established relationships with clients, such as retailers and food services. Reduction of animal-based protein production was not perceived as the major sustainability goal in the food system. Within meat industry, for example, interests towards more creative use of undervalued parts of animals were expressed, but this was motivated more by culinary issues than reduction of food waste. Moreover, improvements in feed efficiency were mentioned, but it was associated to economic efficiency rather than sustainability. In general, traditional companies are more likely followers

rather than leaders in terms of new protein sources, partly due to dependency on large volume requirements and difficulties to operate in the niche markets.

Tab. 1: Incremental and radical, sustaining and disruptive innovations in the sustainable protein system

| | Sustaining innovations | Disruptive innovations |
|-------------------------|--|---|
| Incremental innovations | Traditional protein sources with product/process -based adjustments with existing markets and value networks, E.g. improving feed efficiency in meat supply chains | Traditional protein sources with new markets and new value networks. E.g. new markets for undervalued parts of animals |
| Radical innovations | New protein sources with existing markets and value networks. E.g. replacing meat or milk with plant-based alternatives in familiar products | New protein sources with new markets and new value networks. E.g. plant-based convenience foods, edible insects, undervalued small fish, lab-grown proteins |

Source: The author

Tab. 2: Priority of sustainable proteins as a business goal in terms of business models and value offering

| | Sustainable proteins as complementary to core business | Sustainable proteins as a core business goal |
|----------------|--|---|
| Business model | Business model for sustaining the unsustainable protein system; focuses at the micro level of the company (animal-based model) | Business model for systemic change and outcome (sustainable protein system); focuses at the macro level (e.g. plant-based business model) |
| Value offering | Value offering to existing markets with price/quality -oriented value proposition (cheap/tasty protein-rich products) | Value offering to new markets with environmental and nutritional value proposition (attributes of new protein sources) |

Source: The author

Conclusion

This paper provides insight into the concept of a sustainable protein system for understanding and advancing sustainable protein innovations in the food system. Moreover, the paper investigates sustainable protein innovations in relation to incremental and radical innovations as well as sustaining and disruptive innovations. Since sustainable entrepreneurship is closely linked to sustainable innovations, the paper also discusses sustainable proteins as a core

business goal and as complementary goal to core business. Theoretical implication of the paper is related to further conceptualization of sustainable protein innovation and sustainable protein entrepreneurship. The key managerial implication of the paper is to improve the understanding of different types of sustainable innovations within protein industry as well as the degree of the priority of sustainable proteins with respect to core business.

Suggestions for future research include (1) studying the practices of providers of sustainable protein innovations and (2) investigating spatial and cultural embeddedness of sustainable protein innovations and sustainable protein entrepreneurship. Strengthening desired outcomes for sustainable protein system is dependent on appropriate business models, desired value offerings and innovative entrepreneurial practices. For example, measuring the degree to which a business model is aligned with climate change goals, nutritional goals and animal welfare, identifying variables of sustainable value propositions for alternative protein products and analyzing the relationship between consumers' changing expectations and entrepreneurial practices could be future research avenues. Promoting desired outcomes for sustainable protein system is also dependent on spatial and cultural embeddedness of sustainable protein innovations and sustainable protein entrepreneurship. For example, investigating differences in specific meanings in different contexts related to sustainable proteins and analyzing a range of ecological, economic and cultural conditions affecting national diets could be future studies undertaken. Hence, future research could involve, for example, comparisons of Northern, Southern, Western and Eastern European innovations and entrepreneurial practices for sustainable protein system.

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INTERREGIONAL TOURISM FLOWS MODELING AS THE RESPONSE TO OPTIMISE NATIONAL COMPETITIVENESS

Ekaterina Panarina

Abstract

Purpose: The objective of this research is forecasting regional tourist activities in Russia based on economic-mathematical modeling of interregional tourist flows.

Design/methodology/approach: The study employed a quantitative research methodology using both primary and secondary data drawn from Rosstat (Russian Federal State Statistics Service). For modeling of interregional tourism flows within national economic territory the methods of mathematical application were used with quantitative evaluation and forecasting. A formal model and empirical evidence are presented. To describe domestic tourism, a destination-origin matrix based on Marketing-mix elements is constructed, the coefficients of a tourist attraction for different Russian regions are calculated. Design and methodology were drawn based on the analysis of the numerous thematical research papers of national and international authors.

Findings: As a result of research, the definition of a “tourist region” was specified, tourism development trends studied, a regional touristic competitive rating of Russian territories was compiled. The suggested economic mathematical approach allowed to evaluate interregional changes of tourist flows influenced by growth of population income, tourist services quality and prices.

Research/practical implications: These findings might be used in regional development according to governmental regional social-economic development programs. This work will be interesting for private and state decision makers in tourism and hospitality to help Russia to leverage its huge but greatly under-rated and untapped potential as an attractive tourist destination.

Originality/value: The value of this work is enabling modeling of management decisions towards to the trends in the development of tourism regions in Russia. Using methods of mathematical application, we could build a comprehensive model for evaluation and prediction of interregional tourist competitiveness and obtain the results with a correspondence of the studies’ objective.

Keywords: Tourist Activities, Regional Competitiveness, Tourism Development Trends, Mathematical Modeling in Economics, Modeling of Financial and Investment Decisions

JEL Codes: O18, C1, Z3

Introduction

Global changes in international economic policy, making provisions for sanctions, change of national currency value and economic environment in the world markets of tourism services require Russian state bodies to pay attention to implementing one of top priorities tasks, which is the effective organization of tourism activities within national boundaries.

However, to solve this problem it is necessary to develop project concepts of tourism and recreation areas and regions and to model social-economic processes that taking place at the market. Thus, enable their quantitative evaluation and forecasting. Besides, it also requires creating specific tools, which will ensure their development according to government-defined regional social-economic programs. The research takes into account considerable social-economic asymmetry of regions in Russia that resulted from different natural and climatic, and social economic conditions for business activities.

Results of researching forecasts and effective organization of tourist activities in regions may be found in works by a number of Russian authors (Kafidov, 2010; Lypotova, 2011; Morozov et al., 2014; Rekunova, 2011; Salamatina, 2014; Sheresheva et al., 2016; Tarasova et al., 2013; Tsepkovskaya et al., 2015; Yurkevich, 2012). These papers aim to study theoretical aspects of touristic destinations in Russia and the relative attractiveness of competing tourist destinations based on individual visitors' perceptions.

There are also lots of papers discussing a broad variety of hospitality and tourism issues in emerging markets by foreign authors, positive effects attributed to tourism are pointed out (Sharma and Dyer, 2009; Legrand et al., 2012; Chon et al., 2013; Ghimire, 2013; Ajagunna, 2014; Hussain et al., 2015). Some of them develop modelling of inter- and intra-regional tourism flows within their countries with an econometric approach.

By other authors, a lot of different resources and competencies are needed to provide tourists with combination of experiences, and thus to make a destination attractive. Tourism destination should offer a set of desirable and satisfying products and services (Kwon, Vogt, 2010; Lichrou et al., 2010). In this way, we agree with above researches in their consideration of value-creating.

The aspects of marketing, the relative attractiveness of competing tourist destinations among individual visitors, theoretical methodology and an empirical application were taken by author of the present paper to build an econometric methodology and following up applications. The empirical data for this research was based on data from official governmental statistics agency - Rosstat, the Russian Federal State Statistics Service.

However, the studies of previously mentioned works of foreign and local authors in modeling of tourist processes show that there is no consistent approach which will enable complex modelling and measuring of quality of tourist services based on their value, purchasing power of consumers and tourist flows in the existing circumstances, differentiating conditions of territorial social-economic development of regions. Following these limitations of the previously developed models we decided to offer a new model and to propose a research objective as forecasting regional tourism activities in Russia based on economic mathematical modelling of interregional tourist flows.

1 Tourism and tourist region definition criteria

While studying the role of service sector in the development of world economy, scientists and experts create different explanations and content to define tourist economic models, but what they all have in common is that economic activity of a society starts with agriculture and via industrialization moves towards service economy and tourism activities. With the development of tourism industry several definitions of this phenomenon came into existence, with listed below criteria being the most significant for defining it:

1. Change of location. Here it means travel, being outside of usual environment. Although people travelling between home and place of work or study cannot be considered as tourism, because their travels are within the borders of their usual environment.

2. Stay in another location. The main condition is that a place of stay should not be a place of permanent or long-term residence. Besides, it should not be related to work activities (payment for labour).

3. One more condition is that travellers should not stay in the place of visit for a period of 12 months or longer.

4. Payment for labour in the place of visit. The meaning of this criterion is that the main purpose of the trip should not be to carry out activities paid for from sources in that place of visit. Any person entering any country for work paid for from a source in that country or his own country is considered a migrant, but not a tourist in that country. This is related not exclusively to international tourism, but to tourism within the country as well (Nikolaeva, 2011).

Analysis of scientific literature enables us to define the following categories of tourist activities: “Tourist activity is one of the sectors of economy, a combination of relations, connections and occurrences, associated with travel and stay in places, different from people’s permanent or long-term places of residence, and not connected to their work activities” (Leskov, 2007). With that there can be distinguished the following functions of social influence of tourism: restoration of work ability; reasonable use of free time; creation of work places; development of population life level; ecology safe, etc.

Tourist region (area, cluster) is the territory with specific characteristics. Attractiveness of this activity is ensured by tourist infrastructure and tourism organization system. Tourist regions are differentiated by the following principal characteristics: time of origin; historical specifics of its development; natural, cultural, social and economic background of population development; level of tourist infrastructure development; tourism specialization.

The authors suggest using the term “tourist region” in the national economy. With this, on the region level a series of projects related to tourism development can be implemented. Having systemized known definitions, the following is suggested: “Tourist region” is a geographical, administrative unit of a state offering a specific trip purpose (recreation, business trip, education, culture, etc.), and having necessary infrastructure and unique resources for tourism.

1.1 The parameters affecting tourism in a region and its trends

There are a few aspects that affect tourism could be considered as quality of life, society, education and information, economics, environment protection, ecological stress, politics (Nikolaeva, 2011).

Analysis of specialized sources of world tourism industry shows that the following tourism development trends are distinguished:

- Continuous stable growth. In tourism there are no signs of demand saturation, unlike in other economic sectors;
- Development of this sector is gaining global character due to growth of purchasing power, transport expansion and increase of population and free time;
- Social and cultural integration of people and world cultures (Leskov, 2007; Yurkevich, 2012).

In the world business system, hospitality industry with tourism being a part of it, has leading positions: about 10% of gross product worldwide and 30% of worldwide service trades.

As estimated by World Travel and Tourism Council by 2020 the volume will increase up to 1.589.000.000.000 US dollars (annual growth will be 4,3%) (Maklashina, 2011).

In 2018 the following trends for Russian tourism were observed: decrease in number of international vacation periods, decrease of pricing policy, development of domestic tourism, increase of recreational tourism volume compared to business tourism, communication and promotion of Russian tourism, etc.

New momentum is given to actions aiming to develop state policy in the sphere of tourism. Russian Federation government developed and approved the State program for developing domestic tourism in 2011-2018 named “Development of culture and tourism” (Development of culture and tourism for 2013–2020. State Program, 2014). The main directions for development in the programs are the following: development of tourism and recreation complex in the Russian Federation; improvement of tourist services quality; promotion of Russian tourist products on the international and domestic tourist markets.

However, there is a series of problems related to developing quality of hospitality services, in particularly, on the level of tourist and recreation areas, underdevelopment of some territories and appear to be interest for natural places and innovative tourism activities.

1.2 The Marketing-mix evaluation for tourist regions in Russia

To evaluate competitiveness of tourist regions and make their rating, it is suggested to use principal elements of marketing (price, product (services), location, distribution and promotion channels, personnel, etc.). Competitiveness of tourist activities shall be defined as ability to perform beneficial business activity in competitive environment.

Table 1 shows point-rating evaluation of some regions and locations popular with Russian and foreign tourists in the last years. To determine rating points from 1 to 5, for each direction there were distinguished quantitative and qualitative indicators, which are results of rating by expert committees, consumers and statistical data. As a result of studying the factors affecting competitiveness level, we will be considering average price, optimum service quality level and meeting desires of consumers among those factors, the following groups of indicators can be segregated:

First group – product – rating of the best cities and region. Taken into consideration: number of innovative projects implemented for developing tourist territories with employment of funds from the federal and state budgets, statistical data on number of tourists, amount of implemented services.

Second group – material environment – territory development rating related to infrastructure. The following is taken into consideration: feedback from consumers of services and local population; statistical data on depreciation coefficient and value of main assets in hotels, tourist companies working on the territory, investment climate in the region.

Third group - price. Average price for “all inclusive” package (lodging, meals, basic tours, transfer, minimum insurance, separate additional services).

Fourth group – location. It is recommended to consider natural and climate conditions, number of historic, cultural and other sites, security level.

Fifth group – promotion. Analysis of number of mass media organizations, printing houses, rating of territory promotion, number of expositions, city and regional events held in the region.

Sixth group – personnel. The following aspects are taken into consideration: number of tourist companies, hotels, restaurants, number of people employed in the field; average salary in the tourism business; profitability of enterprises; level of migration; number of higher education establishments offering majors in “Tourism” and “Hotel business”.

Seventh group – service technology. It is characterized by keeping up service standards, culture, corporate identity, customers reviews, involvement of regional companies in different events, competitions, etc.

According to the Constitution, the Russian Federation is divided into 85 federal subjects (units). For the purpose of different geographical and cultural heritage, the mathematical evaluation was made for 8 major regions among 85 regions of the Russian Federation (Sochi and Krasnodar region, The Republic of North Ossetia – Alania, Kazan and Tatarstan, Moscow and Moscow region, Saint Petersburg and Leningrad region, Sverdlovsk region, Novosibirsk region, Primorski krai). These regions are used to unveil the prospects of the major tourism clusters in Russia and provide the attractiveness of the major inbound tourism destinations.

The evaluation was done based on five-point grading scale, where 5 points is high level of marketing mix element, 1 point is low level, also the indicators were adjusted by validity. The research shows that leading positions belong to Moscow and Moscow region (4.53 points), Saint Petersburg and Leningrad region (4.5 points). The lowest competitiveness rating (with due consideration given to the opinion of consumers) belongs to the Republic of North Ossetia – Alania (3.13 points) (Table 1).

Tab. 1: Competitiveness analysis of regions in Russia based on tourism development level with due consideration of consumer value*

| # | Region | Marketing mix elements points / point with validity coefficient | | | | | | | Rating, point / average weighted expert point |
|---|--|---|--------------|--------------|---------------|--------------|-------------|--------------|---|
| | | 1/ 0.2 | 2/ 0.1 | 3/ 0.2 | 4/ 0.11 | 5/ 0.1 | 6/ 0.1 | 7/ 0.2 | |
| 1 | Sochi and Krasnodar region | 1.9/ 0.32 | 3.7/ 0.52 | 3/ 0.45 | 5/ 0.55 | 2/ 0.22 | 3.2/ 0.4 | 3.5/ 0.7 | 22.3/ 3.15 |
| 2 | The Republic of North Ossetia – Alania | 1.7/ 0.29 | 2.7/ 0.38 | 4.3/ 0.65 | 4.5/ 0.495 | 1.5/ 0.17 | 3/ 0.4 | 4/ 0.8 | 21.7/ 3.13 |
| 3 | Kazan and Tatarstan | 3.7/ 0.63 | 3.2/ 0.45 | 4/ 0.6 | 3/ 0.33 | 3/ 0.33 | 4/ 0.55 | 4.3/ 0.86 | 25.2/ 3.68 |
| 4 | Moscow and Moscow region | 5/ 0.85 | 4.9/ 0.69 | 3.5/ 0.53 | 3.5/ 0.385 | 4.8/ 0.53 | 5/ 0.6 | 4.8/ 0.96 | 31.5/ 4.53 |
| 5 | Saint Petersburg and Leningrad region | 3.9/ 0.66 | 4.0/ 0.66 | 3.8/ 0.57 | 4.2/ 0.462 | 5/ 0.55 | 5/0.6 | 5/ 1 | 31.6/ 4.5 |
| 6 | Sverdlovsk region | 0.9/ 0.15 | 3.1/ 0.43 | 4.2/ 0.63 | 3.5/ 0.385 | 4/ 0.44 | 2.1/ 0.3 | 4.7/ 0.94 | 22.5/ 3.23 |
| 7 | Novosibirsk region | 2.1/ 0.36 | 3.8/ 0.53 | 4.8/ 0.72 | 4/ 0.44 | 4/ 0.44 | 3.8/ 0.5 | 4.8/ 0.96 | 27.3/ 3.91 |
| 8 | Primorski krai | 3.6/ 0.61 | 1.9/ 0.27 | 3.5/ 0.53 | 4.1/ 0.451 | 2/ 0.22 | 3/ 0.4 | 3.8/ 0.76 | 21.9/ 3.19 |

Source: Russian regions. Social economic indicators. Rosstat. Moscow, (2018); author's elaboration.

1.3 The forecasting model for regional tourist business development

For purpose to create a forecasting model for regional tourist business development, we employ economic and mathematical methods and use expert evaluation of tourist regions ratings. To begin it is necessary to suggest a hypothesis for the value of benefit that tourists receive from their trip. For that we can suggest the traditional method of “price/quality” numeric evaluation.

For mathematical realization of this approach the following calculations should be done sequentially:

1. Determine total tourist costs of one person from a region in Russia in each region r according to the formula:

$$S_{kr} = K \cdot \sum_{i=1}^N z_{ir} + \sum_{j=1}^M z_{jr} \quad (1)$$

S_{kr} – total tourist costs per one tourist; K – average number of days spent by a tourist in recreation; N and M – number of expenses types, dependable and non-dependable on the number of days spent travelling; z_{ir} and z_{jr} – sum of i -expenses, dependable on the number of vacation days (food, lodging), and j -expenses, non-dependable on the number of vacation days (tours, entertainment and health activities, costs of transportation from their place of residence to vacation spots and back).

2. Calculate region r recreation expenses vs. tourist's (residing in region k) annual income ratio, after deducting annual expenses of minimum living wage from their income:

$$D_{kr} = \frac{S_{kr}}{LR_k - Z_k} \quad (2)$$

where LR_k – average annual income per person in region k;

Z_k – summer-time minimum living wage in region k.

This indicator will characterize availability of a tourist trip to region r for a region k citizen.

The higher the indicator, the less inclined people will be to travel to region r and vice versa.

3. Define ratings of regional tourist areas by expertise R_r .

4. Calculate dimensionless values of the above-mentioned indicators according to the formula:

$$F_{kr} = \frac{f_{kr} - f_{\min}}{f_{\max} - f_{\min}} \quad (3)$$

where f_{kr} – current value of the indicator, typical for a tourist trip from region k to region r; f_{\min} and f_{\max} – accordingly minimum and maximum value of the indicator observed at the market.

The procedure is necessary for developing a consolidated indicator, that describes quality and price ratio in view of paying capacity of tourist services consumers. We will introduce the following notations for dimensionless values: $S_{kr}/$ for S_{kr} , $D_{kr}/$ for D_{kr} , $R_r/$ for R_r , then the formula for calculation of this ratio will look the following way (developed by the author):

$$v_{kr} = D_{kr} \frac{S_{kr}}{R_r} \quad (4)$$

Calculated values for each region represent interpretation of “price/quality” ratio, adjusted with view of paying capacity of population in the region.

It characterizes a differential payment for a service quality unit, received from trips of tourists from region k to region r. Due to this, it is now possible based on mathematical tools of linear programming to find an optimum domestic interregional travelling plan for Russian tourists on the criteria of maximum benefit for minimum expenses.

For purposes of the objective we suggest developing Table 2 including necessary input data; target function that reduces expenses of regional consumers for tourist trips (formula 5) and constraint system (formula 6).

Tab. 2: Model for evaluating domestic interregional tourist flows in Russian Federation (RF)

| Regions is Russia | Regions is Russia - recreation areas | | | | Number of tourists |
|---------------------------------|--------------------------------------|--------------------------|-----|----------------------------|--------------------|
| | 1 | 2 | ... | 85 | |
| 1 | $v_{1,1}$ $x_{1,1}$ | $v_{1,2}$ $x_{1,2}$ | ... | $v_{1,85}$ $x_{1,85}$ | T_1 |
| 2 | $v_{2,1}$ $x_{2,1}$ | $v_{2,2}$ $x_{2,2}$ | ... | $v_{2,85}$ $x_{2,85}$ | T_2 |
| ... | ... | ... | ... | ... | ... |
| 85 | $v_{85,1}$ $x_{85,1}$ | $v_{85,2}$ $x_{85,2}$ | ... | $v_{85,85}$ $x_{85,85}$ | T_{85} |
| Number of vacation destinations | M_1 | M_2 | ... | M_{85} | |

The table 2 was developed with application of formulas (5) and (6)

Note:

v_{kr} – level of benefit from a trip to region r received by vacationers from region k;

x_{kr} - number of tourists that are ready to travel from region k to region r;

M_r – number of vacation destinations, that region r can offer;

T_k – number of tourists living in region k;

n – number of regions in the Russian Federation.

$$Z = \sum_{k=1}^n \sum_{r=1}^n v_{kr} \cdot x_{kr} \rightarrow \min \quad (5)$$

$$\left\{ \begin{array}{l} \sum_{k=1}^n x_{k,r} \leq M_r, \quad r = \overline{1, n}; \\ \sum_{r=1}^n x_{k,r} = T_k, \quad k = \overline{1, n}; \\ x_{k,r} \geq 0. \end{array} \right. \quad (6)$$

First group of inequalities in the system (formula 6) contains limits on the number of hotel vacation destinations with frequency of new tourists checking in. Second group of limits contains equalities determining conditions of complete distribution of regional tourists along the country. Third group of limits shows positive value of interregional tourists.

Solution of this problem is possible through the simplex method or the lowest price method, when spots with lowest v_{kr} value are filled in first. This is the optimum plan which constitutes forecast of tourist flow redistribution within the country, influenced by change of consumer excess in regions, and price and quality of regional tourist services.

To exclude from calculation inaccuracy due to inherent flow of tourists within their region of residence, it is advised to use instead of variable v_{kr} with $k = r$ a rather large number that could exclude its possibility, e.g. 1 000.

2 Data and Empirical Results

Practical application of this model can be demonstrated using several regions in Russia as an example (we took eight regions). Table 3 shows calculated results of total expenses for a five-day vacation in each of these regions.

Tab. 3: Expenses for a five-day tourist trip from region k to region r on the territory of Russian Federation including “all inclusive” option and transport as of 2018, in Russian roubles.

| Regions in Russia | <i>RegionR₁</i> | <i>RegionR₂</i> | <i>RegionR₃</i> | <i>RegionR₄</i> | <i>RegionR₅</i> | <i>RegionR₆</i> | <i>RegionR₇</i> | <i>RegionR₈</i> |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <i>RegionR₁</i> | - | 35 766 | 42 772 | 30 390 | 39 576 | 41 288 | 61 390 | 74 448 |
| <i>RegionR₂</i> | 45 266 | - | 44 346 | 41 428 | 51 164 | 53 692 | 66 516 | 86 258 |
| <i>RegionR₃</i> | 44 272 | 36 346 | - | 35 322 | 40 358 | 39 196 | 62 780 | 78 726 |
| <i>RegionR₄</i> | 66 716 | 66 228 | 68 200 | - | 64 092 | 64 630 | 81 142 | 87 514 |
| <i>RegionR₅</i> | 70 876 | 72 964 | 70 158 | 58 892 | - | 69 500 | 85 430 | 103 992 |
| <i>RegionR₆</i> | 50 288 | 53 192 | 46 696 | 37 130 | 47 200 | - | 41 410 | 84 334 |
| <i>RegionR₇</i> | 63 090 | 58 716 | 62 980 | 46 342 | 55 830 | 34 110 | - | 77 074 |
| <i>RegionR₈</i> | 77 048 | 79 358 | 79 826 | 53 614 | 75 292 | 77 934 | 77 974 | - |

Source: Russian regions. Social economic indicators. Rosstat. Moscow, (2018); author’s elaboration

For calculating availability of tourist trips for citizens of each region, there was used up-to-date statistical data from the State statistical committee related to regional income and minimum living wage for 2016-2018, which are listed in Table 4.

Tab. 4: Average annual income per person and annual minimum living wage in regions of Russia in 2016-2018, in Russian roubles *

| Regions in Russia | <i>RegionR₁</i> | <i>RegionR₂</i> | <i>RegionR₃</i> | <i>RegionR₄</i> | <i>RegionR₅</i> | <i>RegionR₆</i> | <i>RegionR₇</i> | <i>RegionR₈</i> |
|---|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <i>Average annual income per person</i> | 371 124 | 345 456 | 357 960 | 419 376 | 251 184 | 385 884 | 277 320 | 340 080 |
| <i>Annual minimum living wage</i> | 87 408 | 96 324 | 83 856 | 109 800 | 83 808 | 96 300 | 107 340 | 128 196 |

Source: Russian regions. Social economic indicators. Rosstat. Moscow, (2018); author’s elaboration

Based on this data it is possible to calculate D_{kr} indicator. Its calculation can be demonstrated using Krasnodar kray (RegionR₁) as an example:

$$D_{kr} = \frac{S_{kr}}{LR_k - Z_k} = \frac{35766}{371124 - 87408} = 0,126 . \quad (7)$$

Other calculations for all regions are stated in table 5.

Tab. 5: Proportion of tourist trip costs in the annual income after deducting from it summer minimum living wage in regions of Russia

| Regions is Russia | <i>RegionR₁</i> | <i>RegionR₂</i> | <i>RegionR₃</i> | <i>RegionR₄</i> | <i>RegionR₅</i> | <i>RegionR₆</i> | <i>RegionR₇</i> | <i>RegionR₈</i> |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <i>RegionR₁</i> | 0.067 | 0.126 | 0.151 | 0.107 | 0.139 | 0.146 | 0,216 | 0.262 |
| <i>RegionR₂</i> | 0.182 | 0.114 | 0.178 | 0.166 | 0.205 | 0.216 | 0.267 | 0.346 |
| <i>RegionR₃</i> | 0.162 | 0.133 | 0.075 | 0.129 | 0.147 | 0.143 | 0.229 | 0.287 |
| <i>RegionR₄</i> | 0.216 | 0.214 | 0.220 | 0.179 | 0.207 | 0.209 | 0.262 | 0.283 |
| <i>RegionR₅</i> | 0.423 | 0.436 | 0.419 | 0.352 | 0.301 | 0.415 | 0.510 | 0.621 |
| <i>RegionR₆</i> | 0.174 | 0.184 | 0.161 | 0.128 | 0.163 | 0.097 | 0.143 | 0.291 |
| <i>RegionR₇</i> | 0.371 | 0.345 | 0.371 | 0.273 | 0.328 | 0.201 | 0.122 | 0.453 |
| <i>RegionR₈</i> | 0.364 | 0.375 | 0.377 | 0.253 | 0.355 | 0.368 | 0.368 | 0.102 |

Developed based on calculations from Table 3 and Table 4.

In the next stage, use of formula (3) makes it possible to determine dimensionless values of characteristics for consumer power of population that is planning tourist trips.

The calculation is made using Krasnodar kray as an example:

$$F_{kr} = \frac{f_{kr} - f_{\min}}{f_{\max} - f_{\min}} = \frac{0,126 - 0}{0,621 - 0} = 0,203 . \quad (8)$$

Calculations of dimensionless values for other regions, that characterize ratings of regions in Russia based on tourist services quality level R_r , and also tourist recreational expenses in the regions under research S_{kr} , are made by analogy. After all the necessary data according to formula (4) is prepared, v_{kr} values can be calculated. We can also use Krasnodar kray for sample calculations:

$$v_{kr} = D_{kr} \cdot \frac{S_{kr}}{R_r} = 0,203 \cdot \frac{0,344}{0,500} = 0,14 . \quad (9)$$

Calculation of other v_{kr} values is shown in Table 6. It includes the following data under research: number of tourists of region k, capacity of hotels in regions r that can accommodate them.

Tab. 6: Calculated values for variable vkr *

| Regions in Russia | <i>RegionR₁</i> | <i>RegionR₂</i> | <i>RegionR₃</i> | <i>RegionR₄</i> | <i>RegionR₅</i> | <i>RegionR₆</i> | <i>RegionR₇</i> | <i>RegionR₈</i> | Number of tourists, people |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|-----------------------------------|
| <i>RegionR₁</i> | 1 000 | 0.14 | 0.80 | 0.06 | 0.11 | 0.15 | 0.55 | 0.30 | 1500 |
| <i>RegionR₂</i> | 0.51 | 1 000 | 0.98 | 0.12 | 0.22 | 0.29 | 0.73 | 0.46 | 162 100 |
| <i>RegionR₃</i> | 0.44 | 0.15 | 1 000 | 0.08 | 0.12 | 0.14 | 0.59 | 0.35 | 95 400 |
| <i>RegionR₄</i> | 0.89 | 0.44 | 1.86 | 1 000 | 0.27 | 0.33 | 0.88 | 0.38 | 90 900 |
| <i>RegionR₅</i> | 1.86 | 0.98 | 3.64 | 0.37 | 1 000 | 0.71 | 1.80 | 1.00 | 119 000 |
| <i>RegionR₆</i> | 0.54 | 0.30 | 0.93 | 0.08 | 0.16 | 1 000 | 0.24 | 0.38 | 69 000 |
| <i>RegionR₇</i> | 1.45 | 0.63 | 2.89 | 0.22 | 0.38 | 0.17 | 1 000 | 0.54 | 31 800 |
| <i>RegionR₈</i> | 1.73 | 0.92 | 3.72 | 0.24 | 0.55 | 0.71 | 1.18 | 1 000 | 10 000 |
| <i>Tourist capacity</i> | 65 000 | 4 419 000 | 1 641 000 | 8 327 000 | 3 656 000 | 1 275 000 | 677 000 | 752 000 | |

Conclusion

Forecasting regional tourist activities in Russia based on economic mathematical modelling of interregional tourist flows makes possible to start a discussion on where to invest and how to develop tourism clusters in Russia. There is no doubt, it is necessary to develop tourism and recreation areas/regions in Russia to attract more tourists and visitors to impact to social economic conditions for people and business activities and due to 2018 FIFA World cup championship hold in Russia, there are lots of improvements have been done to make Russian cities more "visitors friendly". As tourism policy makers understood a tourism destination should offer a set of desirable and satisfying products and services.

To plan to develop desirable products and services we can apply mathematical modelling to predict the tourists' flows and profits, to understand point down areas and to be able to correct the situation within clusters. This paper sheds light on the key trends, challenges, and opportunities of cluster development in the Russian tourism market. It will help Russian practitioners to understand better which factors are crucial for gaining competitiveness in the service economy and to find new ways of business improvement. There are clear incentives for cluster members to collaborate in different ways including joint marketing research, co-branding, exchanging experiences, taking part in exhibitions, developing and marketing complementary products, etc. Forecasting and improving domestic interregional travelling plans in Russia by author's opinion coincidentally act as anchor to optimise a level of the national economic competitiveness.

As a result of research, a definition of “tourist region” was specified, tourism development trends have been studied and competitiveness rating of regions in Russia in 2016-2018 calculated based on market mix elements. Expert evaluation results are used in economic mathematical modelling. Suggested economic mathematical approach allowed to evaluate interregional changes of tourist flows influenced by growth of population income, tourist services quality and their prices. Application of the suggested model expands forecasting options for regional and federal authorities, allows to estimate consequences of regulating tax rates for corporate entities and individuals, and impact to significance of social and economic interregional differentiation of development for actualization of effective tourism policy.

The paper also provides an understanding of the ways in which Russian cultural, historical heritage and natural resources can be deployed effectively for a positive impact on inbound and domestic tourism and hospitality and on the prosperity of Russian regions and local communities.

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ORGANIZATIONAL CULTURE – A FACTOR OF INNOVATIVENESS IN HOMESTAY ACCOMMODATION SERVICES: THE CASE OF A CROATIAN ISLAND

Nadia Pavia – Marta Cerović

Abstract

Purpose: Homestay accommodation is an important form of tourism accommodation offer and tourist trends indicate that the demand for it is constantly growing. In comparison to the other forms of accommodation, it is less formal, treating the guests in specific manner. The purpose of this study is to research the impact of organizational culture of homestay accommodation providers, in combination with destination offer as supporting system, on the creation of innovative homestay accommodation services.

Design/methodology/approach: The research was conducted using the questionnaires sent to the homestay accommodation providers in island of Krk in Croatia in 2018, May. Insight gained from the study should help family business owners to enhance the competitiveness and improve innovation of the homestay accommodation. 98 valid questionnaires were collected and used for empirical analysis.

Findings: The research results indicate that all families possess their own, inherent organizational culture. Observing the family as a business system, it comes to the understanding that the organizational culture in homestay accommodation is matched with family culture and supported by appropriate set of destination offer which plays important role in innovating of homestay accommodation services.

Research/practical implications: The study has confirmed that family culture is a foundation of the organizational culture of homestay accommodation and is interconnected with destination offer.

Originality/value: The value of the paper is seen in findings indicating that innovative service of homestay accommodation stems from the organizational culture of the owner and his engagement in offering destination services to the guest and making connections with service providers in order to create quality tourism product. The paper is enriching the scarce literature in the field of homestay accommodation services.

Keywords: Homestay Accommodation, Organizational Culture, Innovative Offer, Hospitality, Destination

JEL Codes: L83, M20, Z32

Introduction

Innovation and quality represent a foundation in the creation of a tourism product. The development of technology that allows greater speed and quality in all areas of life enhances this demand additionally. Although the quality is most frequently referred to a material component of a product or service, the intangible component, i.e. the human factor in tourism (which is a very "soft" system) is often more important, and even more a decisive factor in making decisions about consumption of services.

The aim of the paper is to explore to which extent the main components of the organizational culture of the family affect the homestay accommodation services. In addition, it is explored to which extent the components of destination offer, as complementary to accommodation offer, play important role in creating innovative tourism product. This paper presents the result which proves the interdependence between organizational culture of the homestay accommodation providers and destination offer as a tool in designing innovative and quality accommodation services of homestay accommodation. The value of the paper is also seen in enriching scarce scientific literature in the field of the homestay accommodation services.

1 Theoretical background

According to Croatian law, homestay accommodation implies rental of accommodation services and other catering services (mostly food and beverage) in the following types of accommodation facilities: rooms, apartments, studio apartments, holiday homes, camps and camping sites. The provider of homestay accommodation services can be a person who is a citizen of the Republic of Croatia, a citizen of some of the members of the European Union or of the Swiss Confederation and for the purpose of the paper the term renter and host will be used as a synonym.

Although the mentioned type of accommodation is well represented in all European countries, its significance is particularly emphasized in Croatia, as evidenced by the fact that 51% of all overnights in the total annual tourist turnover are realized in this type of accommodation. The specificity in relation to other countries is manifested in their organization, since in most cases it is the accommodation in the part of the family home of the renter, arranged and adapted for commercial use. The nature of hospitality, its cultural significance, and the connection with the host experience point to the fact that homestay accommodation offers multiple opportunities for commercialization of houses and the level of

ownership that the owner includes as a host (Lee-Ross & Lashley, 2009), which makes the attractive potentials of hospitality and the premise of creating business opportunities such as homestay accommodation.

Homestay accommodation services are an important element of the tourism accommodation offer, although according to Mrnjavac et al. (2014), accommodation itself is not the reason why the tourists have come to the destination. Homestay accommodation has a specific way in which they treat their guests (homely approach), personalized approach to providing services, specific architectural, horticultural and designer features of their accommodation, as well as a high level of informality. Homestay accommodation is a type of service in which family culture takes a significant role since guests are daily in direct contact with their renters due to the fact that they enter their space for living and thus become part of their everyday life. When staying in homestay accommodation facilities or close to the household where a renter lives, it is almost impossible for the guest not to be influenced by habits and rules of the renter. This fact should not have an a priori negative connotation, in fact, it can even more be observed as a basis of a new innovative tourism product that exudes traditional, indigenous and family values that allow guests to have a complete experience of the destination and its everyday life. The characteristics of homestay accommodation are determined through heritage, traffic infrastructure, tourist culture and the structure of the local residents of a specific destination. According to Getz (2004) family business, in many areas is the foundation of destination competitiveness. Peters & Kallmuenzer (2018) see the family business as a business managed with the intention to shape and pursue the vision of the business held by a dominant coalition controlled by members of the same family or a small number of families in a manner that is potentially sustainable across generations of the family or families. Agyapong and Boamah (2013) report that family businesses' efficiency measures focus on creating competitive advantage by developing unique features and products. According to Peter & Buhalis (2004) homestay accommodations are peculiar, and their embeddedness in the destinations and regions outlines their entrepreneurial behaviour against Schumpeter's definition of growth-oriented entrepreneurship. Homestay accommodation is a family business when it is an enterprise growing out of the family's needs, built on the family's abilities, worked by its hands and minds, and guided by its moral and spiritual values; when it is sustained by the family's commitment.

Organizational culture is a significant factor in the innovation of the tourist offer as it represents the set of beliefs, values, habits, behaviours, symbols, languages and norms etc. shared by people who live in a particular society or territory which cannot be felt but sensed

(Owoyemi & Ekwoaba, 2014; Anderson, 2015). Obiekwe (2018) defined organizational family culture as the values, norms, mindset, shared beliefs, and attitude involving a group of people in an organization seeing and relating to one another as a family. The size and age of the homestay accommodation also affect its organizational culture. According to Merino et al. (2015) family owned and managed firms are usually younger organizations and are often smaller in size, which favour and reinforce the presence of internal values of group unity against external influences.

Innovation of homestay accommodation depends on the characteristics of entrepreneur who face a tourist demand. Schumpeter (1934) distinguishes five areas where entrepreneurs have the opportunity to apply innovativeness: creating new product or services, new production processes, new markets, new suppliers, and changing organization or management systems. According to Gremyr (2014) innovations in the hospitality industry follow a trajectory of service innovation models, differing from a product innovation. Organizational culture of homestay accommodation is in fact the family culture of the renters who play the role of tourist workers, promoting their lifestyle and affecting the level of guest satisfaction

Organizational culture in the tourist offer occurs when a tourist organization or a homestay accommodation provider starts to live his/her own chosen life. According to Žugaj et al. (2004), there are three important elements of organizational culture of the homestay accommodation has the following elements:

1. family values - defined by culture, religious beliefs, local, national and ethnic identity, social status, employment, financial background, as well as culture of lifestyle, attitudes and family beliefs.
2. family's organizational climate - the way the family is organized (interconnection of family members), the level of education (formal and informal), the level of communication skills, command of foreign languages, etc.
3. family lifestyle that is defined by the structure of the family (members' age, family relationships, altruism, the provision of services based on a "value for effort" principle, that is, the quality of the service provided depends on the family 's engagement and their connection with the stakeholders in the area – tourist board, cooperation with sports, cultural associations, etc.

Cultures spring from three sources, (1) the beliefs, values, and assumptions on founders of organization; (2) the learning experiences of group members as their organization evolves; and (3) new beliefs, values, and assumptions brought in by new members and leaders (Meško Štok et al, 2010). Organizational culture of the homestay accommodation relies on: beliefs,

values and presuppositions that are transferred generationally in a family, they are based on traditional values, learning and gaining maturity of all family members and on the presuppositions of the new family members (husbands, wives, children etc.) who join a family. Organizational culture of a family is developed simultaneously with the operation of a family run business. We need to take into account that the family is a dynamic institution - it evolves and changes over time - members come and go. Membership within a business family influences one's choice of embarking on entrepreneurial career through a start-up, as well as one's ability to grow and renew existing business (Nordqvist & Melin, 2010, p. 222).

In recent years, tourism trends show a continuous growth of the demand for homestay accommodation, which points to its importance and the need for continuous innovation enhancement.

2 Materials and methods

Research was carried out in two phases. Previous studies were used to support the purpose of the study. The second phase included, survey that is focused on the organizational culture and destination services as means of innovating services in the homestay accommodation. The survey involved a questionnaire for the homestay accommodation owners in the area of the island of Krk (municipality of Krk, Baška and Njivice) in May 2018.

The questionnaire was divided into 2 main parts. The first part was related to evaluation of the key features of the organizational culture of the family, while the second part included evaluation of the elements of the tourist destination's offer.

The claims were formulated as premises that each element of organizational culture and destination offer influences the innovativeness in shaping homestay accommodation offer. The examinees evaluated the intensity of agreement with the stated claims. The validity of the claims stems from the fact that homestay accommodation is a specific tourism product whose design is the most influenced by the organizational culture of the host and the destination offer as it doesn't offer additional services in the facility (entertainment, transportation etc.)

The questions were evaluated according to the Likert scale from "1" to "5" (from "I don't agree at all", "I don't agree", "I partly agree", "I agree", to "I completely agree"). Of the total of 120 sent questionnaires, 103 were sent back, which of 98 were valid. The survey was anonymous in order to protect the credibility of the information provided.

3 Results and discussion

Since homestay accommodation implies a greater interact between guest and host compared to other forms of accommodation, organizational culture strongly influences the guest experience in the facility. Within the tourism system, homestay accommodation is a micro business system and additional facilities are almost entirely dependent on the destination offer, which is important to gain the overall impression and experience during the stay. For this purpose, those two parts of homestay accommodation offer are discussed.

There are seven key characteristics that feature the essence of organizational culture (Robbins & Judge, 2009): risk-taking; focus on details; orientation to results; orientation on people; team orientation; aggressiveness; stability.

If the above listed characteristics are implemented when the model of small, medium-sized and also family run firms is considered, it can be concluded that the providers of homestay accommodation are characterized by the following features:

1. Families as providers of homestay accommodation / entrepreneurs in family run firms assume full risk for their business, but are reluctant to introduce changes in their business in spite of the fact that they have full control in decision making. Barriers are most often due to lack of financial power, legislative regulations that are detrimental to small and medium-sized entrepreneurs,
2. Families as providers of homestay accommodation are focused on accuracy, analysis and details because only through continuous listening to the guests' needs they can provide quality service and retain a certain level of competitiveness in the market.
3. Although families as providers of homestay accommodation are oriented towards results and financial success, it is not their primary goal, their priority are namely the needs and satisfaction of the family. It is important to point out that the provision of accommodation is in many cases a source of additional revenue and that providers have become entrepreneurs more by coincidence than by intention.
4. Satisfaction and well-being of families is in the first place. In critical situations or if there arise potential problems with guests, solution to the problem will be the one that favours the interests of the family in contrast to hotel guests where the case is reversed. Resolving conflicts with guests will benefit the guest and not the hotel staff, i.e. the hotel.
5. Depending on their knowledge and skills, all family members are involved in providing quality services in the accommodation facilities in the household.

6. In the homestay accommodation aggressiveness is getting more frequent in relation to competition of other types of accommodation. Providers of homestay accommodation tend to be more aggressive and less tolerant in order to sell their product, which commonly occurs as a result of uncontrolled and not thoughtfully designed distribution and sale of products.
7. Typical features of homestay accommodation are self-satisfaction, lack of criticism especially on the aspect of the quality of accommodation provided (outdated furniture, untidy courtyard, etc.), arising from the emotional charge to things, people and events.

This study included homestay accommodation on the Island of Krk and the impact of organisational culture on innovative services. Table 1 demonstrates Evaluation of certain characteristics of the organizational culture of homestay accommodation in the area of the island of Krk is presented. Seven key characteristics were evaluated by respondents, providers of home stay accommodation, from 1 (I don't agree at all) to 5 (I completely agree).

Tab. 1: Evaluation of characteristic of the organizational culture

| | 1 | 2 | 3 | 4 | 5 | Average grade |
|------------------------|----------|----------|----------|----------|----------|----------------------|
| Stability | 0 | 0 | 3 | 5 | 90 | 4.9 |
| Aggressiveness | 1 | 5 | 25 | 43 | 24 | 3.9 |
| Team orientation | 9 | 31 | 39 | 15 | 4 | 2.7 |
| Orientation to people | 0 | 0 | 5 | 13 | 80 | 4.8 |
| Orientation to results | 79 | 15 | 4 | 0 | 0 | 1.2 |
| Focus on details | 2 | 3 | 19 | 38 | 36 | 4.1 |
| Risk taking | 21 | 30 | 35 | 5 | 7 | 2.5 |

Source: Author's contribution, May, 2018.

Based on the opinions obtained from the homestay accommodation providers the highest grade 4.9 refers to "stability" which could be described as self-satisfaction or apathy is the most common and largest weight for most homestay accommodation providers. The absence of self-criticism hinders the development of better and more competitive services and leads to poor utilization of capacities, bad image of a renter and a destination itself. The whole family is involved in shaping homestay accommodation offer. Following the wishes and needs of their guests they all work hard for the success of the business. Aggressiveness is strongly expressed by the score of 3.9, and it is a consequence of a not planned sales strategy of capacities and a tight and very often unfair competition on in the immediate environment. "Team orientation" is rated as the lowest (2.7). Team spirit of the homestay accommodation providers is evident in the creation of the new innovative product whereby each family member contributes in his/her own way, depending on the knowledge and skills they dispose with, and

they are not exclusively focused on achieving results in a quick way, but to creating a better and complete product. “Risk-taking” is relatively poorly rated (2.5) while the “orientation to result” is at the very bottom (1.2) i.e. they don’t find it important for their relation to the guests. This can partly be explained by the fact that the vast majority of the renters take it as additional job, so they are not highly motivated as it is seen in common family firms. Providers of homestay accommodation are reluctant to take risks in their business because of a poor financial situation, insufficient education and lack of orientation to results as opposed to large business facilities, i.e. hotels.

The homestay accommodation offers apart from the accommodation services, food and beverages, in broader since refers to destinations offer which is a significant factor in the innovation and attractiveness of this specific tourism product. The destination offer can be observed as wide as number of its definitions, so for the purpose of the research authors chose those elements that are considered as the most influencing on the overall guest experience on the island of Krk. Table 2 demonstrates the attitudes of homestay accommodation providers about the intensity of the influence of certain elements of tourist destination offer.

Tab. 2: Evaluation of the elements of the tourist destination’s offer

| | 1 | 2 | 3 | 4 | 5 | Average grade |
|---|----|----|----|----|----|---------------|
| Vicinity and quality of a commercial network of groceries | 0 | 0 | 9 | 9 | 80 | 4.7 |
| Quality of providers' websites, datedness and truthfulness in providing information | 5 | 10 | 49 | 27 | 7 | 3.2 |
| Vicinity and accessibility of public transport | 2 | 52 | 26 | 14 | 4 | 2.7 |
| Quality, equipment and vicinity of the beach | 0 | 2 | 3 | 12 | 81 | 4.8 |
| Knowledge and information about tourist attractions | 6 | 68 | 17 | 7 | 0 | 2.3 |
| Knowledge and information about programmes organized by tourist board | 4 | 25 | 47 | 16 | 6 | 2.9 |
| Family's engagement in work for benefit of local community | 15 | 44 | 24 | 11 | 4 | 2.4 |
| Awareness of waste disposal in an ecologically appropriate way | 4 | 6 | 26 | 46 | 16 | 3.7 |

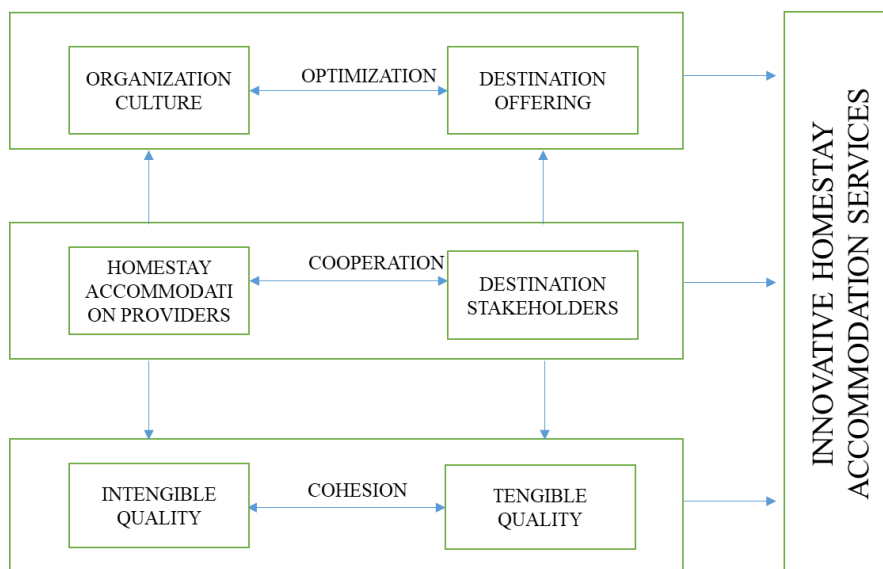
Source: Author’s contribution, May, 2018.

Organizational culture of a family is largely determined by the environment where it is located. It is influenced by legislation and regulations of local government, the activities of tourist community, communal infrastructure, and offer of catering facilities, gastronomic offer etc. By connecting the attitudes, values and beliefs of families with a system defined in such a way organizational culture of the family is created. The respondents in the survey evaluated quality, equipment and vicinity of the beach (4.8) and of grocery shops (4.7) as the most

important elements by the highest grades. The second group of elements such as the quality of websites and their datedness and truthfulness in communication with guests follows, i.e. maintenance of fair relationships before, during and after a guest’s visit and accessibility, quality and local feature in offer of food and drinks. The awareness of the importance of waste disposal in an ecologically appropriate way is also evaluated on the mentioned level. Vicinity and accessibility of public transport, providers’ knowledge and information about tourist attractions in the region and knowledge and information about programmes organized by tourist board offices were evaluated by an average grade. The lowest grade in the evaluation was given to family’s engagement in work for benefit of local community.

Organization culture of homestay accommodation providers and the offering of the destination consist of many elements that need to be integrated into a cohesive whole in order to achieve innovative homestay accommodation offer. In accordance with the results of the research, a model of innovative homestay accommodation service can be defined as shown in Fig. 1.

Fig. 1 Model of innovative homestay accommodation service



Source: Author’s contribution, May, 2018.

The model consists of three main composites: the first composite is made up of organizational culture of the renter and destination offering which represent the main inputs in designing innovative homestay accommodation services. The renter, through his knowledge, engagement and behaviour, increases the attractiveness of the destination services while

the destination services affect the attractiveness of the accommodation in it and consequently the renter.

The second composite consists of the renters and stakeholders of the tourist destinations that have a moderating effect in shaping innovative homestay accommodation services. Renters and tourist destination stakeholders (tourist boards, providers of catering services, entertainment, transportation, etc.) interact with each other, shaping the destination offer and adapting it to the demand conditions.

The third composite represents the outputs that derive from the previous two composites: renters through their family culture provide intangible elements of the quality of the tourism product (hospitality, knowledge, personalized service, local life experience, etc.), while the tangible elements of the tourism product of the homestay accommodation are mostly realized in the tourist destination (beach quality, transportation, catering facilities, entertainment, etc.), so for the overall guest experience, cohesion of these two elements is essential.

Coordination of all mentioned elements enables the creation of an innovative homestay accommodation services. Innovation in this case means the possibility of timely and adequate adaptation to the requirements of demand, and all of the elements mentioned behave as a connected system. The absence of the function of any element disturbs the operation of the system and reduces the degree of innovation of the particular tourism product.

Conclusion

Based on the research made for the purpose of this paper and previous researches it can be concluded that organizational culture of homestay accommodation is an important element of innovative homestay accommodation offer. Homestay accommodation providers (using their organization culture) and tourist destination stakeholders (using the destination offering) create a unique system which affects the innovativeness of the homestay accommodation offer.

The optimal combination of elements of organizational culture with emphasis on the innovativeness, can increase the quality and competitiveness of the service provided. The innovation of homestay accommodation is largely manifested through organizational culture, (i.e. family culture), knowledge, skills and competences of the renter. Since innovativeness of service in the physical sense (technology development, trends in decoration and equipment, demand changeability etc.) is a highly variable category and the resources of the renter are limited, competitiveness can be increased by innovating the service through non-material

indicators (learning foreign languages, increasing general and special knowledge, introducing new cultures etc.), which increases the level of the general and organizational culture of the renter, but also the satisfaction of the guests.

The renters' knowledge about the destination amenities and services and their collaboration with the providers of services in the destination create a positive destination image by providing added to the destination value and satisfaction to the guest.

Considering a high proportion of homestay accommodation in the total number of accommodation capacities and the fact that 1/3 of total tourism revenues at the global level is achieved by micro entities – firms run by families, conclusion can be made that family culture creates an important determinant when a guest makes a selection of a destination. Destinations characterized by family culture whose core values are in accordance with the values of the guest's culture are considered to be more comfortable for the guest's stay and it can be assumed that such destinations will also have a priority in the selection. Organizational culture of homestay accommodation providers determines the quality and innovations of services depending on the extent to which they satisfy guest's wishes, needs and expectations, so it affects the guests' impression of the facility and the destination at the same time.

Since the organizational culture of the renters and destination offer make inseparable parts of the same system it can be concluded that best results can be expected only by the optimization of resources (inputs), collaboration between the destination stakeholders (including renters) and cohesion of the quality obtained in the accommodation facility and in the destination.

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PREFERRED E-PROMOTION STRATEGIES OF INTERNATIONAL HOTEL CHAINS – INSIGHTS AND EVALUATION

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Abstract

Purpose: The main objective of this paper is to identify, the most successful element of the online promotional mix for hotel chains in the EU. Its purpose refers to understand promotional strategies by learning from the top hotel chains.

Design/methodology/approach: This paper focuses on online promotion of hotel chains in the EU, its techniques and tools for communicating with the tourism market especially their investments in SEO and AdWords, two of the most prominent online promotional techniques. The research is based on observation and analytical evaluation of web sites of hotel chains. This was realised by using special digital tools with which promotional mix elements were evaluated. The research was conducted in July and August 2018 and the sample covered the ten largest European hotel chains, evaluated through 37 indicators arranged into 6 main groups.

Findings: The research findings show that the most notable tools and techniques of online promotion for hotel chains in the EU are SEO, AdWords and Direct Marketing. Respectively, success of a particular online promotional tool is proportional to the investment made in it including monthly costs for a specific online promotional tool.

Research/practical implications: The Internet is becoming one of the most important channels for marketing communication, making the constant development of online promotional strategy one of key elements of success. Future research should investigate how innovative promotional strategies impact SME in hospitality and the challenges of their application.

Originality/value: The answer to the question “Which tools and techniques should be used and what promotional activities should be conducted?” supports the purpose and present main contribution of the paper.

Key words: Online Promotion, Hotel Chains, European Union, Internet Marketing in Tourism, Marketing Communication

JEL Codes: L1, M16, Z3

Introduction

The advantages of Internet in relation to traditional media are numerous. For guests, it facilitates simple and fast searching for required information and products, as well as the choice of the most suitable product for purchase, i.e. booking. In today's conditions of saturation of the Internet with information, hotel companies face the challenge of promoting their offer. For that purpose, many financial funds are set aside for online promotion.

The following research questions are asked: a) In what way do hotel chains in the European Union communicate with the market using Internet on their websites and other platforms (SEO and Adwords)? b) Which *online* promotional mix element do hotel chains in the EU invest the most?

Internet has become one of the most important media through which hotel chains communicate with the market; this is why a lot of financial funds are invested in the promotion of their own offer using Internet. The importance of online promotion of hotel chains on the European tourism market is set as the purpose of this paper.

The research goal is set, which is finding the most successful element of online promotional mix of hotel chains in the EU.

1 Theoretical review – On line promotion of hotel chains

A hotel chain is a form of horizontal integration a company manages numerous hotels which are situated in different areas, conducting their business under the same name. All hotels within a hotel chain carry out their business in line with defined high standards, a recognisable trade mark and guaranteed quality (Walker 2014) in consideration of the problem area of hospitality organisation. Hotel chains can be full, but also partial hotel owners and run their own management, marketing and promotion. Regarding management conditions, hotel chains provide the same terms as the franchise contract (trade name, booking system, etc.). However, there is also an additional agency agreement, which enables the company to manage the hotel and make all the important decisions on behalf of the hotel owner. Many authors view the problem area from different aspects. Borković and Kobašić (1994) resume hospitality company business and hotel chain context, Thompson et al. (2008) discuss valorisation of competitive advantages of organised hospitality under the umbrella of strategic management, while Kapferer (2001) stresses the importance of differentiation of certain specific qualities of hotel products as brands, which makes them recognisable and which affects the clients' decision to purchase. Strategic hotel management under an international brand is studied also by

Enz (2010). Vranešević (2007) discusses aspects of hotel brand management, Swystun (2007) looks at its quality, while Kemp et al. (2012) explore organisation and branding of destinations in which branded hotels, compatible with the destination identity, are being opened. The platform for knowledge about the research problem area, i.e. online promotion of hotel brands, is made up of considerations made by Piccoli (2010), who summarises marketing postulates of branded hospitality and emphasises the importance of sustainable IT technologies, followed by Breindel et al. (2015), who discuss the potentials of creation of long-term values through online technology promotion and branding using the same technologies, as well as by O'Guinn et al. (2018), who consider and discuss a whole range of marketing postulates, from the environment to various aspects of creativity, advertising and integrated brand promotion.

1.1 Online promotion - innovative approach and context

Online promotion, as a part of Internet marketing, encompasses different methods of communication with the market using Internet (Koezler, Cox, 2005). As the key segment of digital marketing, electronic, e-marketing, uses different tools by means of which it reaches new consumers, from web sites, mobile applications and social networks, including the segments which are open to new approaches and media (Greenhalgh, 2014, Casalo et al. 2015). The set online promotion goals, elements of online promotional mix are used, which do not differ much from the elements of the classical promotional mix, namely (Shimp, 2007; Previšić, Ozretić and Došen, 2007): online advertising, public relations, sales promotion, individual sales and direct marketing. SEO (Search Engine Optimisation) represents an additional element which is included in the online promotional mix. SEO is a part of SEM (Search Engine Marketing) and it is a strategy which includes all activities and measures which are undertaken in order to achieve as best as possible placement of web sites on the Internet search engines, depending on the searched key words (Civak & Emeksiz, 2016; Moran & Hunt, 2015). There are two main SEO elements: keywords and backlinks from other websites (Slivar, 2012).

1.2 Techniques of online promotional mix

Online advertising, one element of promotion, is an impersonal, paid form of communication by which, using Internet, the market is informed about specific products and services. At the beginning, online advertising requires a high level of investment; however, due to its extended reach, the cost per reached visitor becomes very low. Smith (2014) explores how technology is

revolutionising advertising and ways companies reach consumers especially using SEM and auctions.

Advertising in search engines includes paid posting of textual advertisements in search engines, which appear when users search for specific terms (for example, Google Adwords, Yahoo Search Marketing, etc).

Many hotel invest a larger part of their budget in online advertising in SEM itself, i.e. as much as 75% of the budget intended for online advertising goes on Google AdWords. (<https://kg-media.eu>, 2018). "Google AdWords is an advertising system in which advertisers bid for specific key words in order for their advertisements to appear in the Google search results." (www.wordstream.com, 2018). The position of an advertisement in the search engines is determined by the advertisement rank. The highest rank gets the top position in the search engine. The rank is determined on the basis of two factors, namely: quality score and bid. In this way, AdWords punishes advertisers who bid with low quality score (www.wordstream.com, accessed on 21.07.2018). Tonkin et al (2010) study this topic area, where they analyse web site revenues and performance indicators.

The power of this advertising tool lies in its ability to target an ad to a wider public or to a specific, narrow market segment (Marchal & Todd, 2018), directing them to the advertiser website.

Personal selling is identified as the second e-promotional mix element. Given that there is no interaction in the real time between online sellers and buyers, the suitability of the term of "personal selling" is rather questionable in the Internet environment. In the classical form, personal selling does not have its application on Internet; however, its only match could be online booking systems (Ružić et al., 2009).

Sales promotion includes marketing activities which stimulate sales, i.e. which represent added value to the product or service and imply things which are offered on top of the usual offer or service, due to which consumers will change their purchasing habits. Among several online techniques, Nothnagel (2006) emphasises freebies, gifts, e-coupons, discounts and special offers, loyalty programmes, promotional competitions and games.

Public relations are an element of the online promotional mix which is intended for different groups of the widest public. They can be found in every organisation, regardless of whether that particular company or institution wants it (Nothnagel, 2009). Public relations are used to gain the favour of different groups of public. They can be divided into corporate public relationships and production public relationships, with the key role of social networks, discussed by Erkan et al. (2019). Websites are also considered to be a good public relationship

tool (Nothnagel, 2009). On websites, the key techniques include "frequently asked questions" (FAQ), electronic bulletins, online media releases, photo galleries, etc.

Finally, considering the promotional mix key elements, direct marketing is also identified, aimed at generating answers or encouraging transactions (Belch & Belch, 2017). Direct marketing includes different activities, from database management, direct sales and telemarketing, to advertising, asking for a direct response by post, Internet, television, radio and other media. Barr & Weiss (2012) study and analyse Web presence and discuss the importance of innovative web marketing through evoking of emotions which stimulate identification and linking with a brand. Floričić (2018) researches digital tourism promotion and e-mail marketing and considers the importance of the "customer relationship management" CRM system in hospitality and tourism. Companies collect data about customers, and based on that data, improve the product or service with the aim to, in the best possible way, meet the customers' needs (Belch & Belch, 2017). Buttle and Maklan (2015) analyse this problem area, pointing to the differences between strategic, aimed at customers, operational, related to marketing concepts and analytical, related to CRM databases, with consideration of usefulness for companies' performance in the market. Raab et al. (2016) examine this topic area from the global aspect, where they put consumers in the focus of interest, who perceive the product quality and express their satisfaction, i.e. intention of a repeated purchase in accordance with internal values. Direct marketing on Internet appears on companies' web sites in different forms aimed at buyers, such as: contact information, email/contact form, brochures, navigation, virtual visits/panoramic photographs, event calendar, weather forecast, maps, travel planner and multilingual possibilities (Slivar, 2012).

2 Research methodology

The research is based on the method of observation and analytical evaluation of web sites of hotel chains. The aim of the research is to determine which online promotional tools and techniques are used by hotel chains in their online communication with potential customers. For this reason, hotel chains' web sites will be analysed according to the tools and techniques of the listed in the theoretical review.

The leading hotel chains according to their accommodation capacities in 2016, which operate in the European Union, were chosen as samples in this research, namely (from the largest to the smallest): Accor & FRHI (Fairmont Raffles Hotels International), IHG (InterContinental Hotels Group), Best Western, Marriott – Starwood, Louvre Hotels,

Whitbread, Hilton, Melià Hotels, Carlson Rezidor and NH Hotel Group (www.statista.com, accessed on 12.07.2018). Considering that each listed group develops several trademarks, the research is narrowed to a smaller sample and only one trademark from each of the groups is analysed and that in accordance with the evaluation of representativeness and authors' choice.

2.1 Data collection and processing

The authors conducted the research during July and August 2018. A predefined Excel table was used. The research is, therefore, based on the most frequent techniques and tools of online promotion, listed in the theoretical review. The tools and techniques which were present on the hotel chain web sites are marked in the table with "1", while the tools and techniques of online promotion which were not found in the web sites, are marked with "0".

The data of the *online* tool SpyFu (www.spyfu.com, accessed on 31.07.2018), which collects data by searching for and analysing data from the most famous search engine – Google for the needs of this research. Also, for the needs of the research on paid key words and determination of an estimated monthly SEO cost and paid clicks, SpyFu uses Google Ad tool for planning of the key words. SpyFu shows data in the way that a web site is entered in its internal search engine, following which SpyFu presents the desired data related to the searched web site, the methodology of analysis and selection the authors used to conduct the research.

For the needs of the research on RSS page possibilities, the online tool "W3C Feed Validation Service" was used (www.validator.w3.org), which searches for the said RSS possibilities following the entry of the desired site in the tool search engine.

The online tool called "Majestic" (www.majestic.com) was used to analyse backlinks from other sites.

One of the more important elements of online advertising which is encompassed by this research is the number of paid key words (only those paid through Adwords were researched). When searching for one of the paid key words, the search engine (Google) shows a paid advertisement in one of its 22 most popular paid results. Based on the number of paid key words, we can estimate roughly the number of clicks which the stated domain gets from all its paid key words and it is calculated from an average position of advertisements for each key word for the current month. Based on the obtained data, a hotel chain's approximate budget is calculated for Google AdWords specific domains.

The research on investment of hotel chains in SEO is made in the way that, using the online programme Spyfu, the total number of key words is found for the entered domain, which means that, when one of these key words is searched for on Google, it shows the entered domain

link in one of its 50 best search results. Depending on where a certain domain is ranked in the search results during search for a specific key word, the Spyfu programme allocates "SEO values", just like each paid word has its cost per click. Based on "SEO values" and the total number of key words, found for a particular domain, the hotel chain's monthly budget is calculated for SEO specific domains (Spyfu, accessed on 31.07.2018).

Based on the data about hotel chain investment in SEO and AdWords and the number of organic/paid key words, the cost per (SEO) click is calculated, which points to the efficiency of investment in a specific tool or technique. For the purposes of an analysis of a certain marketing channel's performance, used by hotel chains for realisation of traffic on their Internet sites, the online programme "SimilarWeb PRO" is used (www.pro.similarweb.com). Based on the obtained data on hotel chain Internet sites, a table is created, which illustrates the traffic share of hotel chain Internet sites, realised by a certain marketing channel.

3 Results and discussion

The results reveal the presence of the following tools and techniques on all hotel chain web sites: e-coupons, discounts and special offers, loyalty programmes, own online booking system, contact information, customer data collection and multilingual possibilities. Table 1 presents 37 indicators grouped in 6 categories evaluated per each international hotel chain.

Table 1. Analysis of use of certain tools and techniques of online promotional mix of the largest hotel chains in the EU

| | | HOTEL CHAIN AND GROUP | | | | | | | | | |
|--------------------------------------|--|--|--|--|--|---|---|--|--|---|---|
| Instrument of online promotional mix | Tools and techniques of a specific element | Ibis (Accor & FRHI - https://www.ibis.com) | Holiday Inn (IHG - https://www.holidayinn.com) | Best Western (https://www.bestwestern.com) | Marriott International (https://www.marriott.com) | Campanile (Groupe du Louvre - https://www.campanile.com) | Premier Inn (Whitbread Hotels - https://www.premierinn.com) | Hilton (https://www.hilton.com) | Melià Hotels Group (https://www.melia.com) | Radisson (Carlson Rezidor - https://www.radisson.com) | NH Hotels (https://www.nh-hotels.com) |
| Online advertising (AdWords) | Number of paid key words (AdWords) | 236 | 5,482 | 2,447 | 39,259 | 247 | 3,612 | 42,971 | 3,769 | 1,345 | 5,065 |
| | Estimated monthly PPC in \$ | 1,760 | 70,300 | 55,600 | 345,000 | 722 | 8,580 | 516,000 | 28,000 | 12,600 | 13,700 |
| | Estimated monthly AdWords budget in \$ | 1,720 | 118,000 | 29,300 | 511,000 | 876 | 16,500 | 683,000 | 46,700 | 12,800 | 27,900 |
| | Cost per click in \$ | 0.98 | 1.68 | 0.53 | 1.48 | 1.21 | 1.92 | 1.32 | 1.67 | 1.02 | 2.04 |
| SEO – as a separate category | Total number of backlinks | 418 | 15,591 | 25,681 | 6,626 | 165,080 | 1,441,154 | 4,593,236 | 8,231,586 | 2,556,099 | 543,044 |
| | Number of organic key words | 26,719 | 449 | 122,803 | 319,139 | 2,823 | 26,971 | 280,686 | 17,548 | 26,272 | 15,340 |
| | Estimated monthly number of SEO clicks in \$ | 833,000 | 4,800 | 1,370,000 | 8,220,000 | 24,500 | 1,180,000 | 7,550,000 | 358,000 | 556,000 | 501,000 |
| | Estimated monthly cost of SEO clicks in \$ | 746,000 | 5,100 | 2,130,000 | 11,100,000 | 39,600 | 1,240,000 | 10,700,000 | 597,000 | 897,000 | 697,000 |
| | Cost per SEO clicks in \$ | 0.9 | 1.06 | 1.55 | 1.35 | 1.62 | 1.05 | 1.42 | 1.67 | 1.61 | 1.39 |

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| | | | | | | | | | | | |
|-------------------------|---|--------------------------|--|-------------------------------------|-------------------------------------|------------|--|---|-------------------------------------|---|---|
| Public relations | Frequently asked questions (FAQ) | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| | Press centre | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| | Photo gallery | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | E-bulletin | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 1 |
| | Forum, chat/ online support | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| | RSS | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | News | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 |
| | Blog | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| | e-magazine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Link send to a friend | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Link to social networks | 1 (Facebook, YouTube, Google Plus) | 1 (Facebook, Twitter) | 1 (Facebook, Youtube, Google Plus, Instagram, Twitter, Pinterest, LinkedIn) | 1 (Facebook, Instagram, Twitter) | 1 (Facebook, Twitter, Instagram) | 0 | 1 (Facebook, YouTube, Google Plus, Instagram, Twitter, Pinterest, LinkedIn) | 1 (Twitter, Facebook, Google Plus, Instagram, YouTube) | 1 (Facebook, Twitter, Pinterest) | 1 (Facebook, YouTube, Google Plus, Instagram, Twitter, LinkedIn) | |
| Sales improvement | E-coupons, discounts and special offers | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Free offer of products, services or gifts | 1 (free Wi-Fi) | 1 (app) | 1 (gift card) | 1 (free Wi-Fi, app) | 1 (app) | 1 (free children's meals) | 1 (free Wi-Fi) | 0 | 0 | 0 |
| | Loyalty programmes | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| | Promotional competitions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Games | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Per-sonal sel-ling | Online booking system | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

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| | | | | | | | | | | | |
|-------------------------|----------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---|
| Direct marketing | Contact information | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | E-mail – contact form | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |
| | Brochures | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Map pages/internal search | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 |
| | Virtual visits/ panoramic photos | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| | Event calendar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Weather forecast | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Map | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Travel planner | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Customer data collection | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Multilingual | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Total | 15 | 14 | 15 | 15 | 15 | 12 | 14 | 13 | 12 | 15 | |

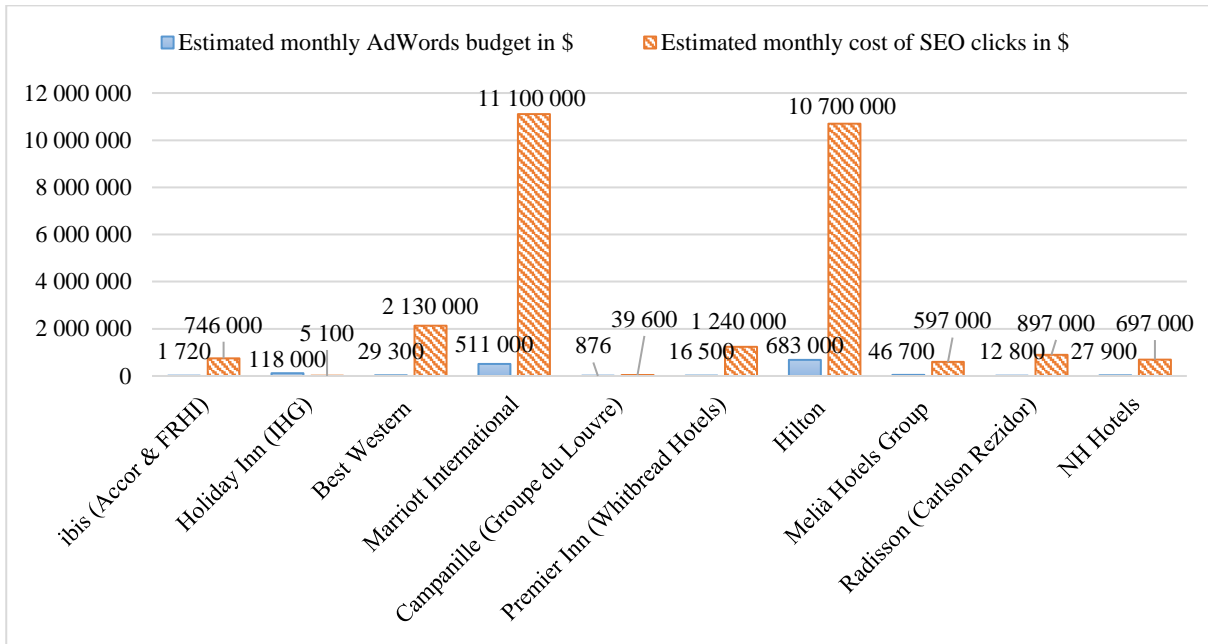
Source: Authors' research

One half of hotel chains use 15 online promotional mix tools and techniques on their web sites, while the other half of them use somewhat less. It is noted that all hotel chains partly invest in SEO and AdWords, i.e. in online advertising and, if we look at the share of use of the online promotional mix elements, the shares of use are as follows: (1) Public relations: 43.64%, (2) Sales improvement: 52%, (3) Personal sales: 100%, and (4) Direct marketing: 50%. Given that personal sales do not have a real application in online promotion apart from their own booking system, which all hotel chains have anyway on their web sites, its small segment is entirely fulfilled, i.e. its utilisation is one hundred percent. Out of the three remaining elements, most represented is sales improvement with 52%, followed by direct marketing with 50% and public relations with 43.64%.

The tools and techniques which are not used at all on the websites of the researched hotel chains are: e-magazine, link send to a friend, promotional competitions, games, brochures, event calendar, weather forecast and travel planner. Some tools and techniques, such as loyalty programmes, and links to social network sites, are used by all hotel chain Internet sites except one, more precisely, the loyalty programme and links to social networks are not used by Premier Inn, while Holiday Inn does not use maps.

Hotel chain investment in the remaining major online promotional mix elements including online advertising and SEO, will be analysed separately. Based on the comparison between paid key words through AdWords and the number of organic key words for specific hotel chain domains, It is evident that, in general, the number of organic key words for hotel chain Internet sites is much larger than the number of paid key words. The Holiday Inn hotel chain is the only one to have a larger number of paid key words than organic key words and third by the number of paid key words. Hilton and Marriott take a lead in the number of paid and organic key words among hotel chains. Based on this data, an estimate of the cost of hotel company investment in AdWords and SEO is also given below.

Fig. 2: Estimated monthly cost of investment in AdWords and SEO



Source: Prepared by the authors according to: *Spyfu*, available at: <https://www.spyfu.com/hq>

From figure 2, the connection between the number of paid and organic key words with the cost of hotel chain investment in AdWords and SEO can be seen. So, the higher the investment, the higher the result, i.e. the larger the number of paid and organic key words. Out of the total budget, only Holiday Inn invests more in Google AdWords than in SEO. All other hotel chains invest large amounts in SEO, i.e. in organic key words.

Based on the researched data on estimated total monthly cost per click (PPC and SEO), as well as on estimated hotel chain monthly budgets, the value is obtained of cost per click of a particular hotel chain. Cost per click is used to perceive the achieved efficiency of hotel chain investment in AdWords and SEO. The hotel chain which achieves the lowest cost per click unit is deemed to have the most efficient investment.

The cost per click through AdWords is obtained by division of estimated monthly cost per click and estimated monthly AdWords budget of a particular hotel chain. Judging by the conducted research, the hotel chain Best Western has the most efficient investment in AdWords with achieved cost per click of 0.53 dollars. Besides Best Western, the only other hotel chain which has cost per click below one dollar is Ibis, with 0.98 dollars. The hotel chain NH Hotels achieves the lowest efficiency of investment, with cost per click of 2.04 dollars.

The cost per SEO click was also obtained in a similar way. Namely, it was obtained by division of the estimated monthly number of SEO clicks and estimated monthly cost of SEO clicks, i.e. the budget set aside for obtaining of that number of monthly SEO clicks. The obtained results show that

the hotel chain Ibis achieves the most efficient investment in SEO, with cost per click of 0.90 dollars, thus being the only researched hotel chain whose cost per click does not go over one dollar. Melià Hotels Group has the least efficient investment in SEO, with cost per click of 1.67 dollars.

The share of hotel chain web page traffic, realised by a specific marketing channel is given in Table 2.

Table 2. Share of hotel chain web page traffic realised from a specific marketing channel

| Marketing channel | Hotel chain | | | | | | | | | |
|--------------------|-------------|-------------|--------------|------------------------|-----------|-------------|--------|--------------------|----------|-----------|
| | Ibis | Holiday Inn | Best Western | Marriott international | Campanile | Premier Inn | Hilton | Melià Hotels Group | Radisson | NH Hotels |
| Direct marketing | 21.30% | 15.64% | 36.21% | 44.02% | 15.53% | 24.00% | 44.52% | 37.63% | 29.00% | 30.37% |
| E-mail marketing | 2.29% | 0.36% | 5.08% | 6.59% | 2.50% | 4.83% | 3.98% | 4.86% | 0.83% | 4.42% |
| Referral marketing | 1.77% | 8.56% | 12.87% | 8.76% | 3.27% | 4.29% | 4.88% | 4.96% | 6.75% | 11.47% |
| Social networks | 0.74% | 0.23% | 1.02% | 1.80% | 0.81% | 0.82% | 1.00% | 2.61% | 0.74% | 0.85% |
| SEO | 63.07% | 61.02% | 37.77% | 35.45% | 53.58% | 45.75% | 38.16% | 31.24% | 56.13% | 31.91% |
| AdWords | 10.22% | 12.94% | 6.11% | 1.88% | 22.09% | 20.19% | 4.79% | 13.11% | 5.76% | 16.16% |
| Display banners | 0.60% | 1.23% | 0.93% | 1.49% | 2.22% | 0.12% | 2.67% | 5.59% | 0.79% | 4.81% |

Source: Prepared by the authors according to: *SimilarWeb PRO*, available at: www.pro.similarweb.com

According to the data from table 3, it is evident that the majority of hotel chains realise the largest traffic through SEO; however, Marriott, Hilton and Melià realise their largest traffic on their Internet sites through direct marketing. Ibis (63.07%), followed by Holiday Inn (61.02%) and Radisson (56.13%) realise the largest share in the traffic from SEO. Direct marketing represents the second most significant hotel chain marketing channel. The largest share in the traffic from direct marketing is realised by Hilton, followed by Marriott and Melià. The largest share in the traffic from AdWords on their Internet sites is realised by the hotel chain Campanile, followed by Premier Inn and NH Hotels. Other marketing channels realise a one-figure share in the traffic of hotel chain Internet sites, apart from referral marketing at Best Western (12.87%) and NH Hotels (11.47%).

Based on these researches, it can be concluded that the SEO online promotional mix is the element in which the investment is the highest and which realises the best results in regard to the realised traffic on the hotel chain web sites. The second most important element of hotel chain online promotion is direct marketing, while AdWords is the third most important element, as an online advertising tool. The Holiday Inn hotel chain invests a significantly larger amount in AdWords than in SEO; however, it realises a very high cost per click of 1.68 dollars, which points to investment

inefficiency. Also, the share of the source of traffic on Holiday Inn's web sites, realised through SEO, is multi-fold higher than the traffic realised from AdWords.

Conclusion

The aim of this paper was to research and analyse online promotion of hotel chains in the European Union and to find the best performing element of the online promotional mix. The hotel chains in the EU invest the most significant means in SEO; however, the Holiday Inn hotel chain bases its strategy on larger investment in AdWords than in SEO, being the only one with such a promotional strategy among the ten largest hotel chains in the EU.

The results of the analysis of shares of sources of traffic on hotel chain web sites, show that the majority of hotel chains in the EU realise the largest share of their source of traffic on their web sites through SEO. The only exceptions to this rule are the hotel chains Marriott, Hilton and Melià, which receive the largest traffic on their websites through direct marketing. The most efficient investment in AdWords is recorded by the hotel chain Best Western, while the hotel chain Ibis has the most efficient investment in SEO.

In empirical observation of web sites, in the hotel chains Hilton Worldwide and Marriott – Starwood there are problems and limitations, as these groups have many trademarks of which the names consist of the key words "Hilton" or "Marriott". This represents an obstacle in the analysis of the paid key words (AdWords) and organic key words (SEO) of individual trademarks, since a large number of trademarks within a group consists of the same key word.

From the obtained research results, it is possible to conclude that the hotel chains in the EU realise the importance of online promotion in communication with the tourism market, based on estimated monthly costs for a specific online promotion tool. The amount of budget and the performance of achieved traffic on web sites point to the importance which hotel chains in the EU attach to online promotion. The presented quantification parameters and their analytics and implications emanating from evident hotel chain strategies in the system of their online promotion point to a continuous development of the trends of digitalisation, innovativeness, communication in a dynamic environment and to market openness, to which international hospitality should adhere, whether it concerns SME hotels, smaller chains, consortia or global brands.

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SENIOR, YOUTH AND WOMEN ENTREPRENEURSHIP IN THE EUROPEAN REGIONS

Anna Pilková – Juraj Mikuš – Ján Káčer

Abstract

Purpose: The study aims to empirically investigate characteristics of regional distribution of inclusive entrepreneurship in Europe through the selected less represented segments (seniors, women, youth) and to identify how the selected factors influence the extent to which the underrepresented groups are engaged in entrepreneurship.

Design/methodology/approach: The study is based on Global entrepreneurship monitor (GEM) data (both APS – adult population survey and NES - national expert survey data) and the GDP per capita in PPS. A pooled sample of individual-level APS GEM data of 30 European countries for the period of 2011 to 2016 was used. The sample is weighted to be representative. K-Means clustering using Hartigan and Wong algorithm was applied to divide countries into clusters based on constructed inclusivity indices of seniors, women and youth.

Findings: We have identified four clusters among the studied European countries. Based on their analysis in the context of economic and entrepreneurial environment, and individual entrepreneurial characteristics, we found that opportunity perception increases with a higher level of the studied environment. A better environment in combination with individual entrepreneurial characteristics, encourage especially seniors to start their businesses, while youth under these circumstances, prefer to use employment opportunities. However, youth are more involved in entrepreneurship under weak economic and entrepreneurial conditions. Women do not seem to be significantly influenced neither by economic and entrepreneurial environment nor individual entrepreneurial characteristics.

Research/practical implications: Our findings provide information for policy makers. Presented results may help to improve the environment, and formulate strategies on inclusive entrepreneurship and employment policy, which depend on the regional development stage and the level of entrepreneurial involvement of the selected underrepresented groups. Future research should address inclusive entrepreneurship further in the context of socioeconomic and cultural variables.

Originality/value: The paper offers a value by providing a unique insight on inclusivity of entrepreneurial activities in Europe, by breaking down the GEM-based analysis of female, youth and senior entrepreneurship to regional levels.

Keywords: Inclusive Entrepreneurship, Regional Development, Inclusive Growth, Entrepreneurial Activity

JEL Codes: L26, R12, J01

Introduction

Aging population, migrant's crisis, Brexit, macroeconomic growth, innovation activities are issues that are on top of the European agenda nowadays. One of these issues, macroeconomic growth, has been extensively studied from the perspective of inclusive growth. This direction is the focus of institutions as OECD, European Union and many national governments. There are a few reasons behind it, the main one is that the economic growth hasn't been distributed fairly across societies and doesn't create opportunities for all (OECD, 2018). Particularly, a high level of inequality and the lack of relevant conditions to explore opportunities by all groups of the population, can cause lower economic growth in the future, with negative impacts around the world. But even more important to inclusive growth, is to involve all underrepresented groups of population which have the entrepreneurial capacity to take part in the entrepreneurial process through inclusive entrepreneurship.

Inclusive entrepreneurship represents an involvement of under-represented or disadvantaged groups in entrepreneurial activities, by unleashing their creative potential towards economic self-sufficiency, that is beneficial for themselves and for society (Pilková, et al., 2016). These groups include mainly youth, women, seniors, immigrants and disabled people. Their participation in entrepreneurial activities is lower than the average population. According to our studies based on GEM data, the average total early-stage activity of women in Europe for the years 2011 – 2016 was 5.3% while that of men was 10.3%. For the youth, the average total early-stage activity was 9.5% while that of seniors was of 4.1%. All these segments are significantly lower involved in comparison to USA, where entrepreneurial activity of women is 10.3%, youth 13.5% and seniors 8.6%. Canadians involvement is even higher: women – 11.6%, youth – 16.4% and seniors – 8.7% These figures suggest that Europe is well behind benchmarks. As these groups of population are important factors for inclusive growth through inclusive entrepreneurship, they deserve special consideration to positively change their position. However, to achieve this, it requires a comprehensive analysis of factors that influence their entrepreneurial activities. Some of the factors are related to entrepreneurship as such and others are specific for each segment. In addition to that, regional aspects also play a significant role. In general, it is known that the interactions between the environment and individuals are important. The motivation of individuals to be engaged in entrepreneurship includes how the individuals interact with different environments and what individual characteristics are important to exploit entrepreneurial opportunities (Shook et al., 2003). The regional context of entrepreneurship has been studied since 1990 and its effects on regional development has been firstly and thoroughly presented by Sternberg, R. (2010). Since that time many regional studies have been published

(see latest review Muller, S., 2016) but none of them have focused on inclusive entrepreneurship and/or regional development. Our research therefore aims to (1) empirically investigate characteristics of regional distribution of inclusive entrepreneurship in Europe through the selected less represented segments (seniors, women, youth) and to (2) identify how entrepreneurial environment factors, macroeconomic indicators and individual entrepreneurial characteristics influence the extent to which the underrepresented groups engage in entrepreneurship.

1 Literature review

Inclusive entrepreneurship, as it was stated above, is one option for managing inclusive growth. In the literature, it is studied from perspectives of attitudes, competencies, skills and experience of individuals, but also the environment that enables these groups of people, if they are interested, to take part in entrepreneurship (Pilková et al., 2017). It is about more than just starting new businesses (Henriques & Maciel, 2012). Inclusive entrepreneurship is a way to identify, explore and exploit in detail the potential of these groups, and particularly those individuals who have the desire, interest and ability to do business. Inclusive entrepreneurship is one of the major approaches to constantly increase social cohesion (OECD, 2017). The concept of inclusive entrepreneurship is not extensively studied on its own, but mostly in relation to social business or social economy. It gains its importance as a concept and practice motivated by equal opportunities that can be enjoyed by anyone in society (Amaro da Luz, 2014). However, as it was mentioned above, inclusive entrepreneurship is a set of approaches, competencies, and skills that are about more than just starting new businesses. But according to theory (Gartner, 1988) it is not enough to consider only personal characteristics. Nevertheless, there are several research studies aimed at seniors, women and youth, who examine these individual attitudes, competencies and skills and their importance for the growth of entrepreneurial activities (Geldhof et al., 2014; Sharma & Madan, 2013; Ajzen, 1991; Davey et al., 2011; Carter et al., 2007; Kautonen et al., 2008). However, as Henriques and Maciel (2012) emphasized in their work, inclusive entrepreneurship is highly dependent on culture and historically given national traditions. From this, it can be concluded that individual entrepreneurial characteristics play an important role in promoting inclusive entrepreneurship, whether on country or regional levels. However, according to the literature review (Tominc et al., 2015) focused on the studies of the entrepreneurial cultural dimensions, the interest in entrepreneurship in a particular culture is linked to the level of entrepreneurial activity expressed, for example, by the number of start-ups whose frequency of occurrence is influenced by cultures that are aimed at their support and further lead to a higher percentage of new start-ups and entrepreneurial activity as such.

As far as regional aspects go, they significantly influence the individual's decision to engage in entrepreneurship (Sternberg, 2010). But entrepreneurial activity is unevenly distributed over regions and thus, regional environment is an important context variable that must not be ignored when exploring the determinants of entrepreneurial activity (Audretsch and Fritsch, 2002). Three main types of studies have been identified in the literature regarding regional development and entrepreneurial activity (Müller, 2016): 1. economic explanations of entrepreneurial activity; 2. sociological perspective on regional entrepreneurship such as local culture, embeddedness, social context and networks; 3. economic geography and thus contextualized policy recommendations. However, based on literature review, the studies on entrepreneurial inclusivity from a regional perspective based on robust data, are missing.

The entrepreneurial environment represents a significant role in influencing entrepreneurial activity of the whole population and furthermore in underrepresented groups. There are identified barriers in the entrepreneurial environment that these groups have to overcome if they want to enter entrepreneurship. Relevant policies should modify or eliminate these barriers from the environment. Generally, the impact of entrepreneurial environment lies not only in the formation of the quantity of entrepreneurial activity, but also in the direction of its qualitative allocation (Baumol, 1990). Entrepreneurial environment conditions affect, among others, the perception of entrepreneurship as such, the perception of difficulty to set up and operate an entrepreneurial activity, the perception of the availability of funding, professional assistance, support services, the necessary infrastructure, etc. (Šúbertová, 2015). Within the GEM conceptual model, attention was paid to identifying the conditions and their sub-dimensions, which are significant considering the impact on entrepreneurship. Based on this, twelve so-called Entrepreneurial Framework Conditions (EFCs) were set. EFCs represent the most important factors of an entrepreneurship ecosystem and constitute “the necessary oxygen of resources, incentives, markets and supporting institutions for the growth of new firms” (cf. Bosma et al., 2008, p. 40). But individual entrepreneurial characteristics are an important factor of national entrepreneurial capacity too (Bosma et al., 2008).

Due to that, our study focuses on inclusive entrepreneurship of selected underrepresented groups (seniors, women and youth) and its determinants in a regional context, with the aim to fill the identified gap.

2 Methodology and Data

Our analysis is based on the Global entrepreneurship monitor (GEM) data, through the two main primary data collection instruments – Adult Population Survey (APS) and National Expert Survey (NES). We have created a pooled sample from 30 European countries APS individual-level data (adult population 18 – 64 years) from years 2011 to 2016 comprising of 516,586 adult population individuals (185,827 youth, 94,607 seniors and 258,049 women). For each year, the sample is weighted to be representative for gender, age and regional distribution.

In the first stage, we have identified individuals involved in total early-stage entrepreneurial activity (TEA) in this sample, who are either actively involved in start-up effort, they are owners of a business, but received no wages yet, or manage and own a business that is up to 42 months old. We have analysed a level of inclusive entrepreneurship of youth (age 18-34), women (age 18 -64) and seniors (age 55-64) at each of the 30 GEM European countries, applying their own developed TEA inclusivity index. The calculation of which is the following: $TEAI_{jk}$ is the summary inclusivity index of individual category j of population (youth, women, seniors) for the country k , $TEAI_{jki}$ is the inclusivity index in the year i , region k and n is the number of years:

$$TEAI_{jk} = \left(\sum_{i=1}^n TEAI_{jki} \right) / n$$

$TEAI_{jki}$ - the TEA inclusivity index in the year i , for a particular category of population j in a country k is calculated as follows:

$$TEAI_{jki} = (TEA_{jki} / TEA_{ki})$$

Where TEA_{ki} – percentage of population 18 - 64 who are involved in total early-stage entrepreneurial activity; TEA_{jki} is the percentage of population of a category j (women, youth, seniors) in a country k and year i .

In the second stage using the $TEAI_{jk}$ as a main variable, we implement K-Means clustering using Hartigan and Wong (1979) algorithm to divide the 30 countries into 4 clusters based on inclusivity indices of women, seniors and youth. The data were scaled before clustering by $1/\sigma$. K-Means aims to partition n observations into k clusters, in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster.

In the third stage, the constructed clusters are further analysed according to entrepreneurial environment factors (Financial environment; Government concrete policies, priority and support; Government policies bureaucracy and taxes; Government programs; Entrepreneurial level of education at Primary and Secondary; Entrepreneurial level of education at Vocational, Professional, College and University; R&D level of transference; Professional and commercial infrastructure

access; Internal market dynamics; Internal market burdens; Physical infrastructures and services access; Cultural, social norms and society support), macroeconomic indicator (Gross domestic product per capita in Purchasing Power Standards) and selected individual entrepreneurial characteristics. (Entrepreneurial self-confidence; Fear of failure; Ability to identify opportunities; Entrepreneurship as a good career choice; Status of entrepreneurs in society; Media attention to entrepreneurship, Knowing other entrepreneurs).

3 Results and Discussion

The values of inclusivity indices for the analysed disadvantaged groups – seniors, women and youth, in European countries during the period of years 2011 to 2016 are displayed in Tab. 1.

Tab. 1: Inclusivity indices (seniors, women and youth) for European countries, 2011-2016

| Country | Seniors | Youth | Women | Country | Seniors | Youth | Women |
|----------------|---------|-------|-------|------------------------|---------|-------|-------|
| Russia | 0.35 | 1.28 | 0.86 | Poland | 0.53 | 1.36 | 0.66 |
| Greece | 0.67 | 1.02 | 0.74 | Germany | 0.50 | 1.21 | 0.73 |
| Netherlands | 0.56 | 1.18 | 0.69 | Turkey | 0.41 | 1.16 | 0.61 |
| Belgium | 0.58 | 1.10 | 0.67 | Portugal | 0.52 | 1.20 | 0.74 |
| France | 0.45 | 1.19 | 0.67 | Luxembourg | 0.63 | 1.12 | 0.74 |
| Spain | 0.48 | 1.09 | 0.81 | Ireland | 0.70 | 1.03 | 0.64 |
| Hungary | 0.53 | 1.09 | 0.66 | Finland | 0.64 | 1.07 | 0.74 |
| Italy | 0.57 | 1.24 | 0.67 | Lithuania | 0.32 | 1.43 | 0.62 |
| Romania | 0.44 | 1.30 | 0.68 | Latvia | 0.34 | 1.42 | 0.69 |
| Switzerland | 0.78 | 0.78 | 0.88 | Estonia | 0.34 | 1.44 | 0.74 |
| Austria | 0.46 | 1.21 | 0.83 | Croatia | 0.44 | 1.36 | 0.64 |
| United Kingdom | 0.71 | 1.01 | 0.71 | Slovenia | 0.46 | 1.33 | 0.61 |
| Denmark | 0.52 | 1.11 | 0.63 | Bosnia and Herzegovina | 0.40 | 1.31 | 0.64 |
| Sweden | 0.90 | 0.94 | 0.72 | Macedonia | 0.34 | 1.18 | 0.59 |
| Norway | 0.84 | 0.86 | 0.62 | Slovakia | 0.45 | 1.16 | 0.69 |

Source: GEM 2011-2016, own elaboration by authors

The varying level of inclusive entrepreneurship is observed in the analysed countries. The highest inclusivity index of senior's entrepreneurship is in Sweden (0.90), while the lowest is observed in Lithuania (0.32). Women's engagement in entrepreneurship is, likewise, lower than the overall population in all countries. Switzerland exhibits the highest inclusivity index among them (0.88) whereas Macedonia the lowest (0.59). Finally, youth population engagement in entrepreneurship is the highest among the studied groups, and it is even higher than the overall population except for three countries (Sweden – 0.94; Norway – 0.86; Switzerland – 0.78). The country where youth inclusive entrepreneurship peaks is Estonia (1.44).

Four clusters were formed using Agglomerative Hierarchical Clustering (Tab. 2) based on the inclusivity indices of seniors, women and youth.

Tab. 2: European countries grouped into clusters according to inclusivity indices

| Cluster | Cluster members |
|-----------|--|
| Cluster 1 | Belgium, Denmark, France, Hungary, Italy, Macedonia, Netherlands, Slovakia, Turkey |
| Cluster 2 | Bosnia and Herzegovina, Croatia, Estonia, Latvia, Lithuania, Poland, Romania, Slovenia |
| Cluster 3 | Finland, Greece, Ireland, Luxembourg, Norway, Sweden, Switzerland, United Kingdom |
| Cluster 4 | Austria, Germany, Portugal, Russia, Spain |

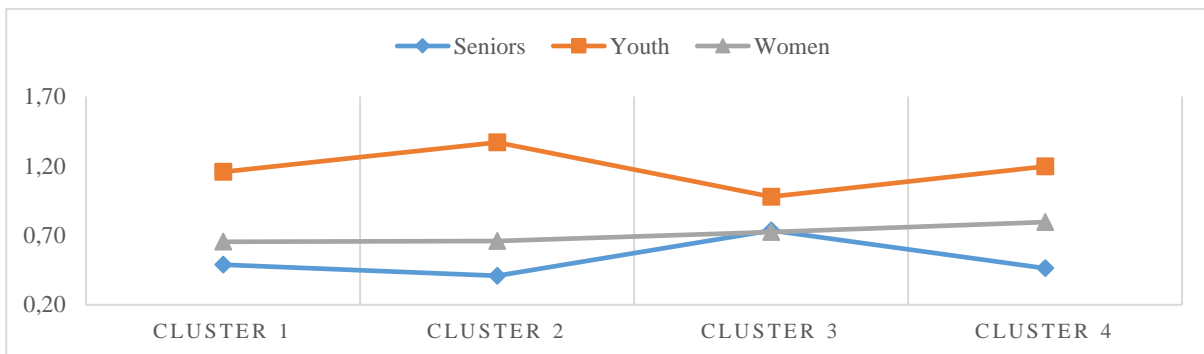
Source: own elaboration by authors

Resulting inclusivity indices according to constructed clusters are shown in Tab. 3 and Fig. 1, which clearly illustrates patterns of inclusivity of seniors, women and youth for constructed clusters.

Tab. 3: Inclusivity indices for seniors, women and youth

| Inclusivity indices | Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4 |
|---------------------|-----------|-----------|-----------|-----------|
| Seniors | 0.49 | 0.41 | 0.74 | 0.46 |
| Youth | 1.16 | 1.37 | 0.98 | 1.20 |
| Women | 0.65 | 0.66 | 0.72 | 0.80 |

Source: Own elaboration by authors

Fig. 1: Inclusivity indices for seniors, women and youth


Source: Own elaboration by authors

The key similarities and differences between the identified clusters are further discussed and explained in the context of economic and entrepreneurial environment (Tab. 4).

Cluster 1 is characterized by the lowest entrepreneurial engagement of women (0.65) and relatively low engagement of seniors (0.49) and youth (1.16). It appears that the average level of economic and entrepreneurial environment in cluster 1 doesn't encourage any of the studied segments to increase their entrepreneurial activity. Good entrepreneurial education and high internal market dynamics are some of the outstanding indicators of this cluster. Regionally, this cluster is composed of developed western countries (Belgium, Denmark, France, Netherlands, Italy), former Central and Eastern European socialist countries (Hungary, Slovakia, Macedonia) and Turkey.

Cluster 2 exhibits a high inclusivity index of youth population (1.37) while the inclusivity index for seniors is the lowest among the studied clusters (0.41). Women inclusivity is just slightly higher than the lowest among the constructed clusters (0.66 compared to 0.65). It looks like the lowest level of economic and majority indicators of entrepreneurial environment significantly encourage youth to engage in entrepreneurship and discourage seniors and women. Regionally, this cluster is created by former Central and Eastern European socialist countries.

Cluster 3 displays a peaking senior inclusivity, at 0.74 accompanied by a high inclusive entrepreneurship of women (0.72). Cluster 3 is the only cluster showing youth inclusivity which is below 1, which means that youth entrepreneurial engagement (0.98) is lower compared to overall population in this cluster. The lavish economic and entrepreneurial environment, with a majority of the highest indicators within the observed clusters, is in favour of senior and women entrepreneurial activities. Regionally, cluster 3 consists of only western European countries.

Cluster 4 demonstrates the highest women activity (0.80), a high engagement of youth (1.20) and a relatively low activity of seniors (0.46) which is result of moderate economic and entrepreneurial environment. It appears that such indicators of entrepreneurial environment as entrepreneurial education at primary and secondary level, internal market dynamics, cultural, social norms and society support towards entrepreneurship, have the lowest level and encourage youth and women to entrepreneurship, even though GDP per capita is rather high. Regionally, this cluster is composed of western countries (Austria, Germany, Portugal, Spain) and Russia.

Tab. 4: Entrepreneurial environment factors and macroeconomic indicators of inclusivity-based clusters

| | Cluster 1 | Cluster 2 | Cluster 3 | Cluster 4 |
|--|-----------|-----------|-----------|-----------|
| Financial environment related to entrepreneurship | 3.09 | 2.73 | 3.19 | 2.92 |
| Government concrete policies, priority and support | 3.04 | 2.56 | 3.31 | 2.89 |
| Government policies bureaucracy, taxes | 2.81 | 2.38 | 3.32 | 2.70 |
| Government programs | 3.11 | 2.78 | 3.49 | 3.52 |
| Entrepreneurial level of education at Primary and Secondary | 2.46 | 2.25 | 2.67 | 2.21 |
| Entrepreneurial level of education at Vocational, Professional, College and University | 3.44 | 2.91 | 3.42 | 3.20 |
| R&D level of transference | 2.95 | 2.49 | 3.30 | 2.93 |
| Professional and commercial infrastructure access | 3.75 | 3.32 | 3.94 | 3.71 |
| Internal market dynamics | 3.53 | 3.56 | 3.46 | 3.27 |
| Internal market burdens | 3.15 | 2.76 | 3.38 | 3.17 |
| Physical infrastructures and services access | 4.62 | 4.17 | 4.89 | 4.39 |
| Cultural, social norms and society support | 3.00 | 2.78 | 3.41 | 2.89 |
| Macroeconomic indicator | | | | |
| GDP per Capita in PPS | 91.6 | 62.9 | 145.2 | 105.3* |

Source: GEM NES, Eurostat 2011 - 2016, own elaboration by authors; *data for Russia not available

Inclusivity of seniors is the highest in cluster 3. Further analysis of individual characteristics (see table 4) of seniors shows that they are encouraged by a higher perception of opportunities, self-confidence (both from their knowledge and skills and a lower level of fear of failure) and individual entrepreneurial characteristics (media attention to entrepreneurship and knowing other entrepreneurs). On the other hand, the lowest inclusivity of seniors is in cluster 2. As this cluster is characterized by the lowest level of almost all environmental indicators, it suggests that these factors influence older people's decision to start their own business. Even though, in cluster 2 seniors do not have positive entrepreneurial characteristics, except for one indicator (entrepreneurship as a good career choice) and they feel rather confident in their skills, it does not outweigh the negative influence of the highest fear of failure, the lowest opportunity perception and other indicators of social attitudes towards entrepreneurship (poor status of entrepreneurs, media attention and knowing other entrepreneurs).

Youth inclusivity is the opposite to seniors. Their inclusivity is the highest in cluster 2 where a weak entrepreneurial environment is characteristic, and surprisingly the lowest in cluster 3, which is outstanding for all observed factors of economic and entrepreneurial environment. Even though in cluster 3 youth perceive the highest level of opportunities recognition (see table 4) and entrepreneurs enjoy high social attitudes towards entrepreneurship (status in society and media attention to entrepreneurship), young potential entrepreneurs do not feel confident and do not consider entrepreneurship as a good career choice. It is apparent that cluster 2 exhibits a moderate opportunity perception and negative status of entrepreneurs. On the contrary, entrepreneurship is perceived as a good career choice, there is a high media attention to entrepreneurship as well as knowing other entrepreneurs, young people feel confident in their skills and knowledge to start a new business. In this context, we assume that youth in cluster 3 prefer to exploit good employment opportunities, while necessity driven efforts prevail in cluster 2.

Tab. 5: The selected individual entrepreneurial characteristics in European countries by segments and clusters

| | POPULATION | | | | SENIORS | | | | YOUTH | | | | WOMEN | | | |
|-------------------------|------------|------|------|------|---------|------|------|------|-------|------|------|------|-------|------|------|------|
| | C 1 | C 2 | C 3 | C 4 | C 1 | C 2 | C 3 | C 4 | C 1 | C 2 | C 3 | C 4 | C 1 | C 2 | C 3 | C 4 |
| Self-confidence | 41.1 | 46.4 | 40.8 | 41.9 | 35.5 | 40.5 | 41.7 | 37.3 | 39.8 | 46.7 | 33.6 | 38.8 | 31.7 | 37.9 | 32.2 | 35.8 |
| Fear of failure | 45.4 | 47.9 | 45.5 | 48.7 | 40.5 | 46.8 | 40.2 | 45.6 | 45.9 | 45.1 | 46.6 | 49.6 | 49.4 | 53.7 | 49.5 | 53.9 |
| Perceived opportunities | 33.7 | 29.1 | 44.9 | 29.0 | 29.3 | 22.6 | 43.3 | 25.4 | 37.2 | 37.3 | 44.2 | 32.4 | 30.5 | 27.6 | 42.0 | 26.3 |
| Good career choice | 62.3 | 64.4 | 49.5 | 56.8 | 62.4 | 65.7 | 48.8 | 57.1 | 65.5 | 66.2 | 53.2 | 59.5 | 62.8 | 64.8 | 48.3 | 56.9 |
| High status in society | 66.7 | 61.6 | 74.4 | 67.4 | 66.6 | 61.1 | 72.6 | 66.4 | 68.3 | 64.7 | 76.9 | 70.1 | 67.4 | 63.0 | 75.7 | 67.7 |
| Media attention | 51.2 | 50.6 | 55.2 | 54.1 | 54.3 | 49.2 | 59.7 | 55.9 | 49.6 | 52.8 | 52.3 | 52.8 | 51.5 | 51.9 | 54.5 | 53.8 |
| Knowing an entrepreneur | 30.9 | 33.7 | 34.4 | 31.7 | 23.4 | 22.7 | 25.9 | 22.0 | 35.1 | 41.9 | 38.1 | 36.7 | 26.6 | 29.8 | 30.4 | 28.7 |

Source: GEM 2011-2016, own elaboration by authors

The inclusivity of women does not vary as significantly as the inclusivity of seniors and youth across the studied clusters. The highest inclusivity of women is found in cluster 4, while the lowest is found in cluster 1 and 2. It seems that economic and entrepreneurial environment is not a significant factor influencing women's decision to engage in entrepreneurial activities, even though they are perhaps more likely to become entrepreneurs in the clusters with better economic and entrepreneurial environment. This indicates that they prefer opportunity-based actions. None of the individual entrepreneurial characteristics (see table 4) seem to significantly influence their inclusivity level in the studied clusters.

Conclusion

In this study, our aim is to contribute to understanding why in some countries certain types of inclusive entrepreneurship prevail compared to others. We observed that in the European population, opportunity perception increases with a better economic and entrepreneurial environment. Higher opportunity perception and good economic and entrepreneurial environment works the best for seniors. Their higher involvement in entrepreneurship is accompanied by individual characteristics: both higher self-confidence in their knowledge, skills and experiences to be an entrepreneur and positive social attitudes towards entrepreneurship. Similar behaviouristic patterns have been found for women. According to our findings, they prefer favourable entrepreneurial conditions and we assume their activities are not driven by necessity. On the contrary, youth prefer to rely on good employment opportunities in the countries with a good economic and entrepreneurial environment. In this context, they are discouraged from entrepreneurship by their individual entrepreneurial characteristics, such as low self-confidence, high fear of failure and a negative social attitude towards entrepreneurship (entrepreneurship as a good career choice). We assume that both groups of

characteristics negatively influence their opportunity perception. Based on that, we also assume that in economically weaker countries, where the level of youth entrepreneurial activity is the highest, they are pushed into entrepreneurship, and necessity-based motives prevail. Under these conditions, self-confidence, low fear of failure and mixed social attitudes towards entrepreneurship (high level of entrepreneurship as a good career choice and low status of entrepreneurs in society) are their typical entrepreneurial characteristics. Our findings contribute firstly to fill the gap in knowledge on inclusive entrepreneurship in Europe, and secondly, serve as an information resource for policy makers on national or regional level to improve the entrepreneurial activity level of the less represented groups.

Our research has its own limitations. They come from the first level of description situation in inclusive entrepreneurship in Europe, based mostly on GEM data we studied in this paper. Further studies should go in depth to analyse at least the significance of the already analysed factors at each cluster, and also analyse the other dimensions of entrepreneurial activities of less represented groups in the European population.

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REINVESTMENT POSSIBILITIES AND EVALUATION: A LITERATURE REVIEW

Pavla Pokorná – Jarmila Šebestová

Abstract

Purpose: The topic of the research was selected in view of the prosperity and growth of firms and the lack of information in the policy of reinvestment companies in general. The question arises if this situation also affects the company's profit-sharing policy in some way.

Design/methodology/approach: The first step is to map possible ways how reinvestment is defined and calculated in the current literature. A bibliometric analysis on existed studies was made to find out a logical pathway to describe determinants, closely connected with reinvestments. A sum of 3,635 records in total was obtained from Web of Science database, to be compared. Secondly, articles with financial ratios had been reviewed and compared to choose appropriate set of indicators.

Findings: Six key ratios were identified within first phase to be able to frame a further research activity by Modified IRR, Average IRR, Economic value added, Discounted economic value-added, Modified NPV and Annualised Net Present Value. A bibliometric analysis had shown three key problems such as (a) no ties between different financial indicators (internal ratios and ratios based on stock market); (b) lack of financial planning and the connection with equity financing; (c) no tie between financing and equity financing for innovation, no other areas of reinvestment possibilities are discussed in review articles.

Research/practical implications: A reinvestment as a term relates to financial controlling in European countries and it relates to profitability and liquidity ratios. Further primary research must focus on dynamic investment ratios evaluation, connected with determinants which were identified. These results can be a source for financial strategy directions for company development.

Originality/value: A wide bibliometric analysis (3,635 sources), which confirm non-unified approach for reinvestment definition and ratios for reinvestment evaluation. This topic can serve as start point to uncover the current trend of money flows and possible strategy in enterprises with proper indicators.

Keywords: Business Policy, Company, Equity Financing, Reinvestment, Company Segmentation

JEL Codes: L26, D25, G31

Introduction

The economic theory proclaims that the primary goal of the business is to maximize profits, as Baumol along with Blinder assumes in *Principles of Economic Policy* (2016) or Kaczmarek (2014). To support this principle, several definitions are used, especially in the Czech business environment, like the purpose of entrepreneurship activity as activity carried out on one's own account and the responsibility of a gainful activity in a trade or similar manner with the intent to do so consistently, is considered to be the entrepreneur's activity (New Civil Code 89/2012, § 420). Opposite to that, Veber and Srpová (2012) mentioned another dimension of success - linked to the entrepreneur's ability (creativity, initiative or activity). However, what can be done with such a profit if the company is so successful that it reports it in its financial statements? An entrepreneur who does not think long-term, buys something for his own profit for his own consumption, immediately after gaining a firm's profit, which is more natural.

Obviously, there is a certain trend in the direction of the reinvestment, and therefore these directions and the company's strategy would change. The present time is characterized by interconnection and information sharing, which makes the word of mouth (WOM) effect very good. Globalization and openness of the market is conducive to the development and expansion of companies, and hence the potential for growth of its competitors. According to that, the main goal of this paper is to introduce a different approach to profit reinvestments across the research world, when a research gap can be seen in different definitions and wide possibilities to measure optimal reinvestment revenues. The paper is divided into three main parts, the first part summarizes a theoretical background to profit reinvestment and possible financial ratios for the decision-making process, the second part introduces methods and data sources used in the paper – as bibliometric analysis and a data sample. This part is followed by key findings from bibliometric analysis and finished by financial ratios analysis and with the draft of logical steps for reinvestments.

1 Profit and reinvestments - basic principles

Sustainable business development is one of the basic principles of business that is reflected in all business considerations that model a functional enterprise. The distribution of revenues, the acquisition of financial resources, investment, reinvestment, the ability to create value and thus to make successful business in the long time period (Režňáková, 2012). But for a long-term business, the money that the entrepreneur has earned from the business is needed to reuse them and not just let them “go “. This approach to entrepreneurship is supported by the Czech statistic data, when up to

70 % of companies will close their activity in the first year, and up to 90 % of entrepreneurs will finish their activity within five years (Srповá et al., 2010).

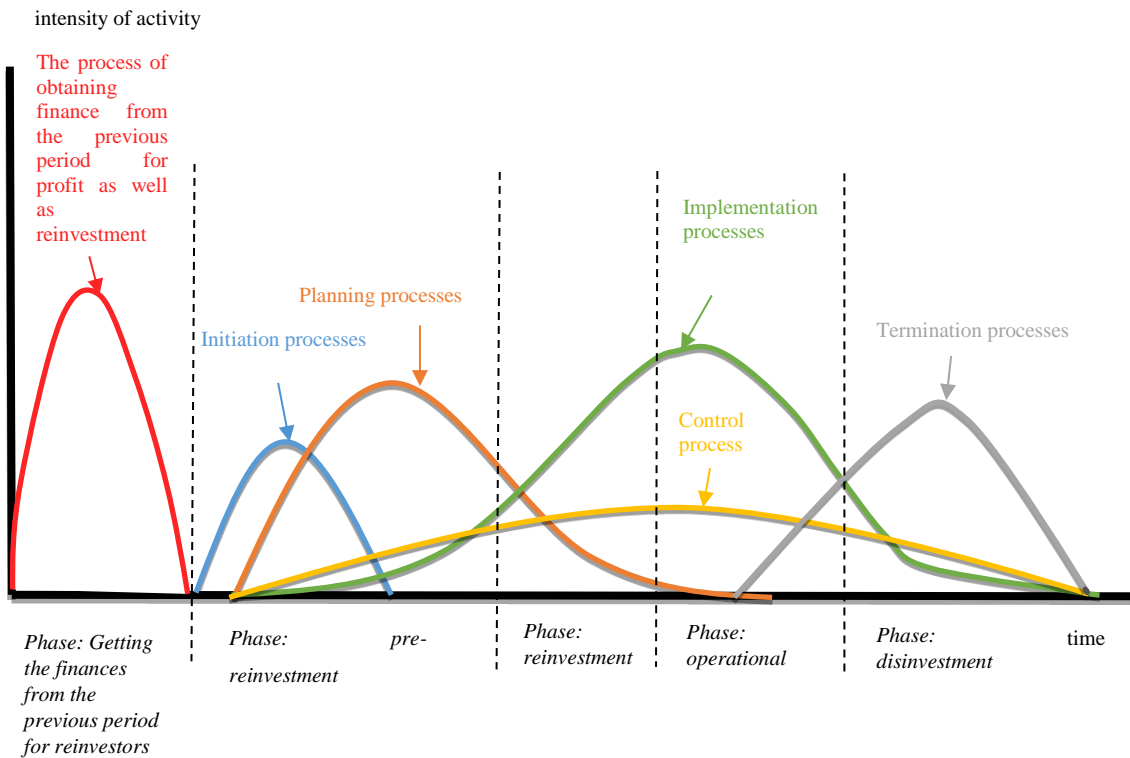
The concept of investment and reinvestment is linked to the issue of return of profits to business. Investments are sometimes characterized as deferred consumption. Reinvestment is therefore a re-investment of part of the company's profits into the same company with the expectation of higher profits in the longer term, Synek (2007), dividing it into three areas (financial, tangible and intangible investments). In many ways, this investment (reinvestment) has its own risks, so it is a good risk to diversify, reinvest into various business areas. The company can invest into various activities. This is determined by the type of company, especially with innovative potential. Reinvestments are mostly realized in the area of science and research and human resources, that means to attract new employees hired to develop innovation, which companies make more profit (Hasuch and Pyka, 2007, Chakravarty and Xiang, 2011).

Business profit is usually limited in two ways. Once, entrepreneurs don't have so many stable customers which will generate sustainable profit, secondly, limitation of enterprise capacity, which limits amount of orders that they cannot accept more ones. There could be one solution to both problems in form of reinvestment to employees, machines, other products and appropriate promotion. The fact that businesses could allow reinvestment to accept reinforcement to help us handle orders can be a key element that moves business into a different dimension. When the company reinvests profits to themselves, the money is used for research and development, debt repayment, or possibly has a net cash flow from investment activities. On the contrary to that a joint stock company which pays out to shareholders, usually increases dividends and buys back its shares. Main motivation to plan this process would be (1) profit maximization; (2) maximizing the current value of future net cash inflows with cost minimization or (3) maximization of profits in the long run and the prestige of the enterprise according to the owner or owners (Kędzierski, 2017, Kaczmarek, 2014).

1.1 Internal reinvestment process

The internal reinvestment supports an organic growth and it had greater and more stable positive impact on corporate shares than the distribution of profits to shareholders. By contrast, companies driven by profit distribution to shareholders are often at the peak of their market potential and cannot grow longer through organic growth (Hall, Hutchinson and Michaelas, 2004). When they distribute profits to shareholders, they can lose supporters among investors. Reinvestment process could be illustrated in figure 1.

Fig. 1: Reinvestment process



Source: Author's illustration based on Scholleová, 2009

The process above is only indicative, but it is necessary to mention that individual steps in the company are not made separately, but it is a continuous decision-making process. It can be divided into five basic phases, finalized by a control, so the whole process has six parts on (Scholleová, 2009):

1. *Reinvestment* – decision that profit from previous business activities will be returned to the company in the form of reinvestment.
2. *The pre-reinvestment phase* - this phase has three parts:
 - a. Identification of projects - the aim of this phase is to find potentially feasible projects by identifying the basic parameters for success (achieving the objectives of reinvestment).
 - b. Selection of projects - the aim of this phase is to select projects according to reality and to evaluate projects with proper methodology.
 - c. Evaluation and possible decision - The aim of this phase is to select from the already short-lived project selection to those that will be applicable in real terms, including the calculation of the return on individual projects.
3. *The investment phase* - the company or the implementation team will ensure the conditions for a successful start of reinvestment at this stage.

4. *Operational* - This phase ensures reinvestments and eventual response to new conditions and barriers to reinvestment.
5. *Disinvestment phase* - the termination phase at a given stage of reinvestment.
6. *Post-Reinvestment Audit* - This audit is not firmly linked to the entire reinvestment process, this phase is important for the decision-making and management of other similar reinvestments in the enterprise, it is a retrospective evaluation of reinvestment, not only in the field of economic returns but also the level of achievement of the goals under the given conditions.

This process is closely connected with possibility of equity financing and barriers to get external financing.

1.2 Financial ratios used in reinvestment process

According previous findings, several methods can be selected to evaluate investments and profit reinvestments. In general, these methods can be divided into two groups as static and dynamic methods (Altshuler and Magni, 2012; Kislíngerová et al., 2011).

Static methods are typically used for less significant projects or for projects where factor factors do not play a significant role, that's mean for example short-term projects. There are various methods, mainly used is Return on investment (ROI), Net Investment Income.

Dynamic methods, these methods calculate with time factor depreciation. It could be mentioned ratios like profitability index, Net Present Value (NPV), Internal Return Rate (IRR), Modified IRR, Discounted economic value-added (DEVA).

Moreover, Michalski (2009) and Kędzierski (2017) suggested modified dynamic methods based on NPV, which are calculating with reinvestments, such as ANPV (Annualised Net Present Value) and MNPV (Modified Net Present Value) when information on discounted cost of equity capital and an additional reinvestment rate is added.

The research question is, how this process relates to other determinants e.g. financial planning, ratios in current literature? Which methods or ratios could be measured the process of reinvestments?

2 Methodology and data

A review process has two main steps according a structure of analysis. *Firstly*, a literature review started by bibliometric analysis performance. The importance of the subject and its development can support bibliometric analysis of resources about reinvestments and equity financing. A bibliometric analysis was used to search for the relevant keywords and ties where term is frequently used

(Pacheco, 2015; Weerakoon et al., 2016). The main goal was to define an evolution of that topic on research field by defining a key word. *Secondly*, a practical analysis was made to get relevant ratios for reinvestment measurement from secondary data sources. Each ratio was evaluated on preselected criteria: (a) preference; (b) how easy is to calculate; (c) ratio type and (d) Originality/added value for future research.

2.1 A Bibliometric analysis

As a source of primary data was selected database Web of Science (WoS), because many literature sources are doubled from Scopus (e.g. in form of Emerging citation index³⁴). The bibliometric analysis was considered a source of inspiration in the processing of its own investigation or find answers to the research questions.

The selection was made in two steps, based on keyword “equity financing” and 3,635 records³⁵ in total (criterion: TS = equity financing) was obtained from WoS, when most of them were articles in journals. Next, special filter was used to get a set of references for reinvestments only (criterion: TS= (reinvestment* AND profit). An amount of records was 75. In accordance with the focus of subject area, business economy prevails, which may be related to the corporate financing concept (Table 1).

Tab. 1: Main subject are of literature sources

| Keyword “Equity” (N= 3,635) | | Keyword “Reinvestment” (N=75) | |
|-----------------------------|------------------|-------------------------------|------------------|
| Area | Percentage share | Area | Percentage share |
| Economics | 24% | Business economic | 53.3% |
| Management | 11% | Public administration | 9.3% |
| Business Finance | 13.3% | Engineering | 8% |
| Business | 12% | Operational research | 5.3% |

Source: Author’s calculation based on WoS results

3 Profit, reinvestments and equity financing - A bibliometric analysis

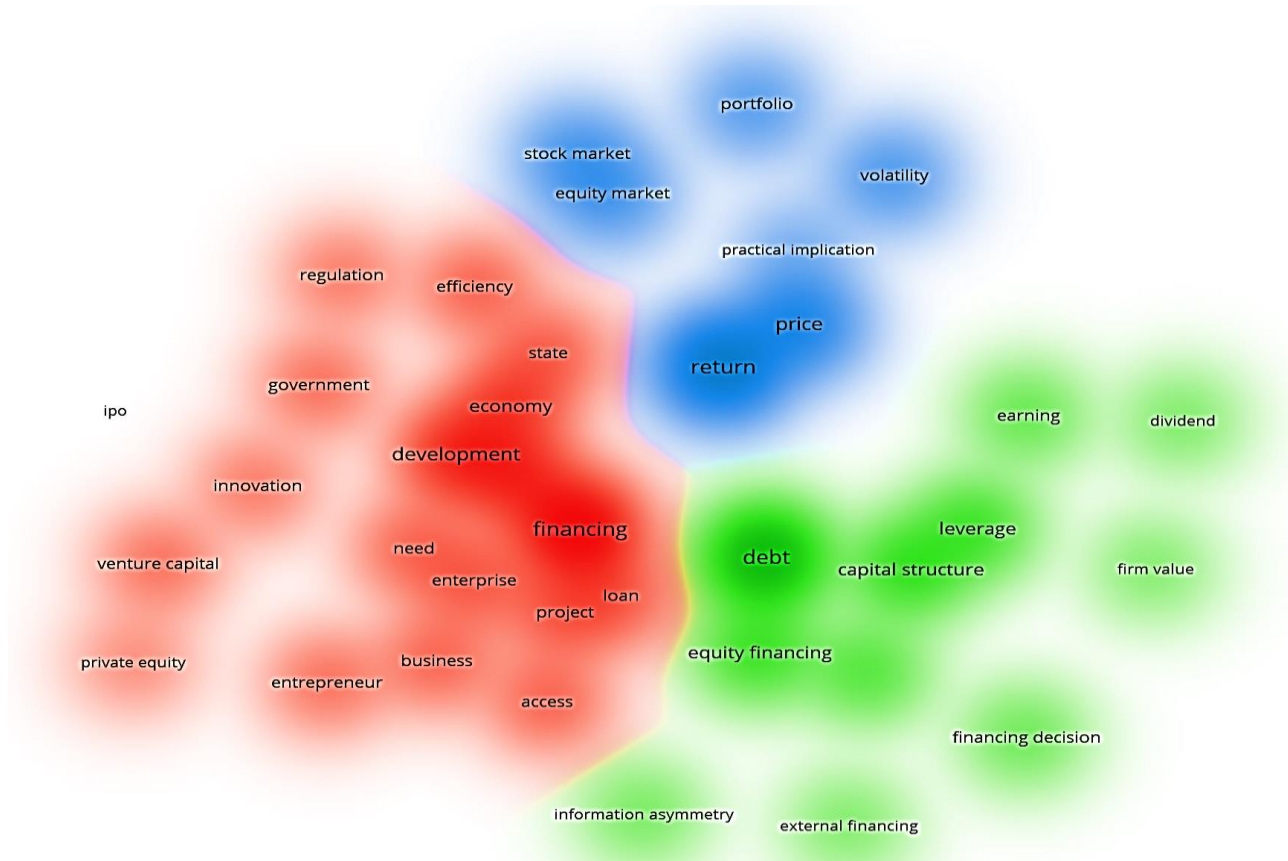
To get logical ties a VOSviewer ver. 1.6.9 was applied following methodology made by Van Eck and Waltman (2010). Maps were created on information from full record of an article (title, abstract,

³⁴ Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI, CCR-EXPANDED, IC Timespan=All years

³⁵http://wcs.webofknowledge.com/RA/analyze.do?product=WOS&SID=D5GCKTxv74r5yoqoUp5&field=TASCA_JCRCategories_JCRCategories_en&yearSort=false

keywords plus, references). First evaluation showed three clusters of significant keywords to be explained (Fig. 2).

Fig. 2: Keywords density



Source: VOSviewer calculation and visualization based on WoS data

This analysis confirmed three dimensions of the research problem:

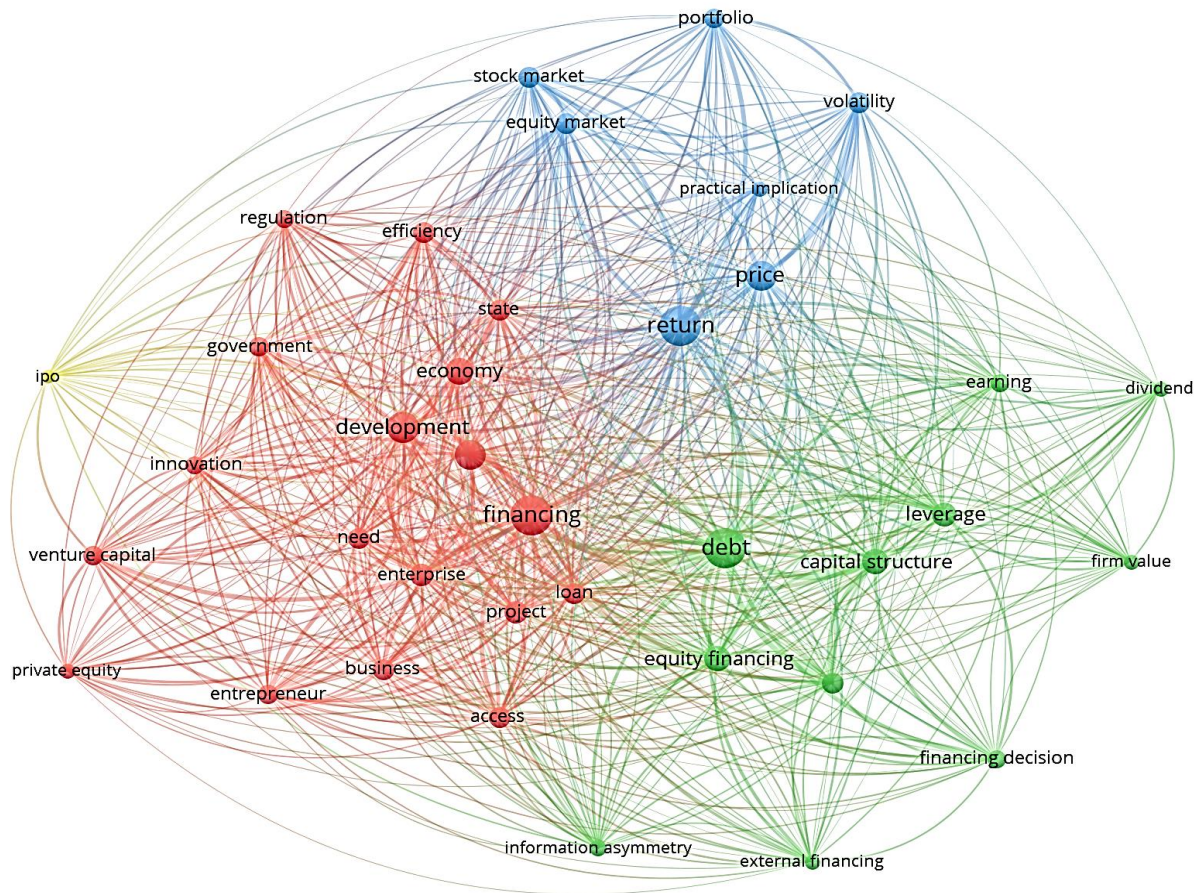
Red cluster presented by keyword “financing” and it shows external determinants which cause that entrepreneurs use equity financing *as regulation, loan barriers, access to alternative resources*. Dark red cluster present current policy of development, state support and economy. *Significant finding in that cluster is, that, there is a gap (no connection in studies) between venture or equity financing for innovation with other parts of cluster like project financing and economy development.*

Green cluster presents an “internal environment” for decision making process surrounded by capital structure asymmetry of information, leverage effect, firm value and dividends. *There is no tie between financing decisions and capital structure or equity financing.* It supports the information, that there aren’t discussed reinvestments as a part of financial strategy, previously.

Blue cluster signalize “methods”, how to solve the problem (practical implication) on market. It could be seen that in the centre are practical implications surrounded by isolated group like portfolio analysis, return rates or others. *There isn’t a special group of financial indicators.* According to that

cluster interconnections a density map was made to show a possible critical logical path for further research (Fig. 3).

Fig. 3: A critical logical path



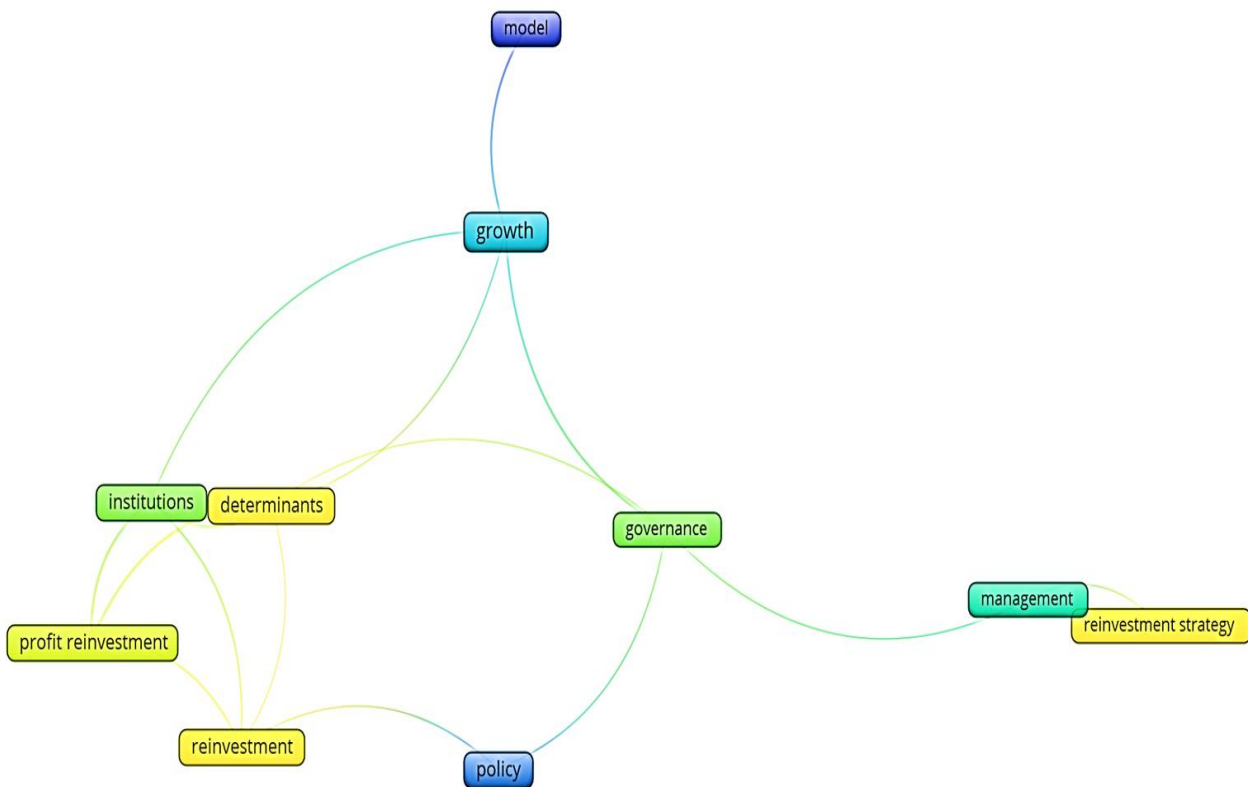
Source: VOSviewer calculation and visualization based on WoS data

An equity financing was identified as part of financial decision (root word, green bubble) in line with capital structure and debts (green bubbles), so reinvestments must be a part of it to form the value of the enterprise. The map confirmed that profit reinvestments is determined by institutions, type of corporate governance and internally by management and its reinvestment strategy.

When we want to succeed in reinvestment problem research, we must decide about the layer (one of the three possible) we want to analyse and how to develop the model of successful reinvestment portfolio.

To simplify that output, a visualization based on 75 special items (articles, root word “reinvestment”) showed logical mind map for a research gap finding (Fig. 4).

Fig. 4: A mind map of profit reinvestment

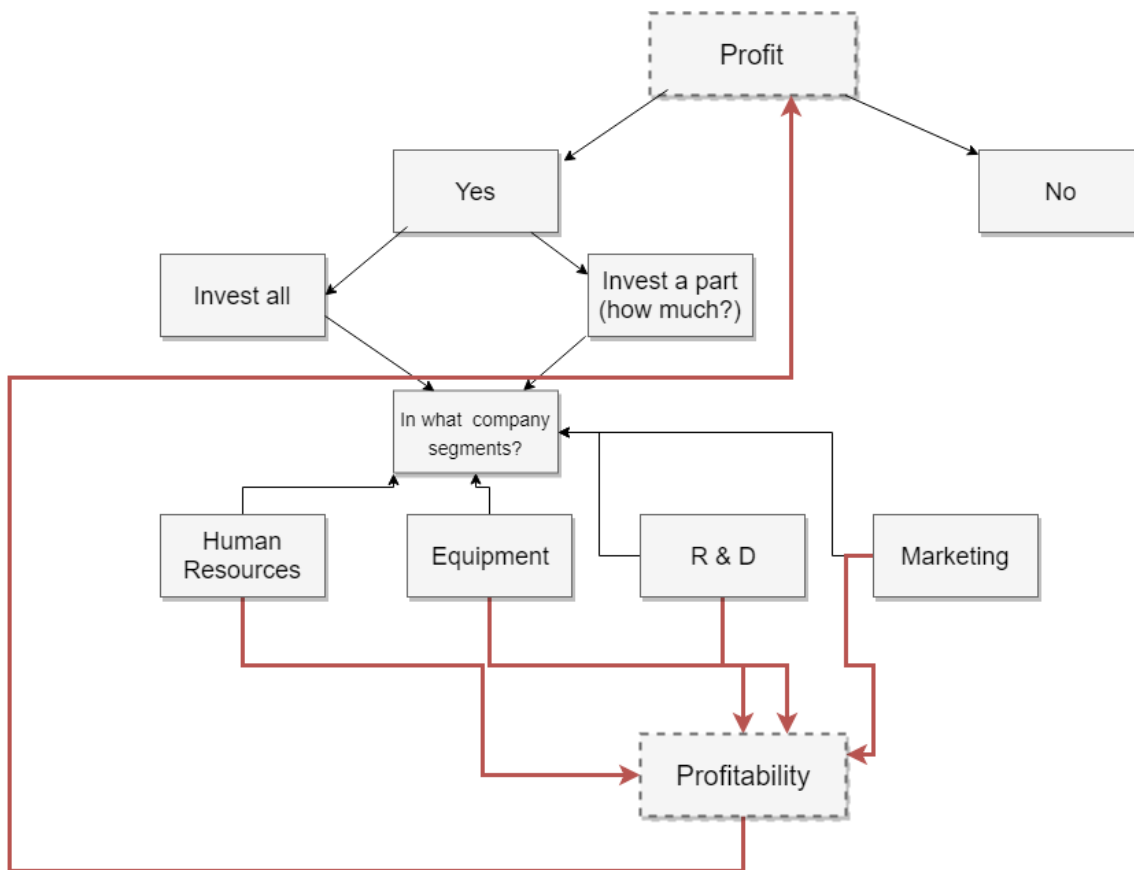


Source: VOSviewer calculation and visualization based on WoS data

The WoS Social Science database gains a significant source of references, these results have helped us to reveal several interesting parameters, namely:

- Sources of information for literary research are unbalanced; a one-sided view of the US economy prevails, which does not have the same business policy system as European countries, they mostly use term “equity financing”.
- Authors from Europe or analysing European firms often use term “reinvestments” and reinvestments strategy” instead of “equity financing”.
- A bibliometric analysis showed the fragmentation of the problem, the inconsistency of approaches, which is also hampered by the development of the theoretical basis for further research.

When the analysis showed that reinvestments are only connected with the innovations, it is also necessary to think more deeply about reinvestment types to be able to meet “portfolio” keyword founded in blue cluster. A need of the planning process and goal setting is illustrated below (Fig. 5).

Fig. 5: Logical steps to decide about internal reinvestments


Source: Own illustration

The illustration covers main areas of reinvestments to be decided and they are not covered in bibliometric analysis such as Human Resources (supporting new benefits, training, growth in company structure, teambuilding events, better personnel policy in recruitment, training, promoting job vacancies), Equipment – supporting new (more modern, other extension of production, new logistic systems etc., Research and development to support innovations and to create competitive advantage and finally to support marketing innovations and activities (the only one area widely discussed in articles).

3.1 Evaluation of reinvestment process – further research directions

As being mentioned, several literature sources were used of context analysis to propose a set of ratios, which could help to evaluate reinvestment process (Altshuler and Magni, 2012; Dluhošová, 2004; Durrah et al., 2016; Neumaier and Neumaierová, 2014; Kędzierski, 2017; Kaczmarek, 2014; Michalski, 2009).

Kislingerová et al. (2011) also mentioned preference of each method in the Czech business environment, so final qualitative comparison have been made to find out optimal way for evaluation

(table 2) according preference (High-average-low), easy way to use (yes-no), ratio type (static-dynamic) and originality in previous research works (yes-no) as was evaluated by authors.

Tab. 2: Importance of profit investment method

| Ratio | Preference | Easy to calculate Yes/no | Ratio Type | Originality/added value for future |
|---|------------|-----------------------------|---------------|--|
| Return on investment (ROI) | high | yes | Static | no |
| Net Investment Income | high | yes | static | no |
| Net Present Value (NPV) | average | average | dynamic | no |
| Internal Return Rate (IRR) | average | average | dynamic | no |
| Modified IRR | low | average | dynamic | partly yes |
| Average IRR (AIRR) | low | average | dynamic | yes |
| Economic value added (EVA) | average | no | dynamic | partly yes in case of logarithmic and functional methods |
| Discounted economic value-added (DEVA) | low | no | dynamic | Yes |
| Modified NPV (MNPV) | low | no | dynamic | Yes |
| ANPV (Annualised Net Present Value) | low | no | dynamic | Yes |

Source: Author's evaluation

As being presented last three ratios would bring originality to the work, but they are no so easy to calculate for real entrepreneur. In a line with originality of methods for reinvestment evaluation, we must respect other ties between financial ratios in the company as mentioned by Durrah et al. (2016) and Neumaier and Neumaierová (2014) such as liquidity and profitability ratios.

Conclusion

A bibliometric analysis illustrated wide range of literature sources in examined area. Unfortunately, definitions are not unified in European and non-European context, which can cause problems. The same situation came with appropriate ratios, which are connected with investments. Classical methods are easy to use, but their impact to decision-making in financial management is really speculative. Six ratios were identified as original to provide a further research activity by Modified IRR, Average IRR (AIRR), Economic value added (EVA), Discounted economic value-added (DEVA), Modified NPV (MNPV) and ANPV (Annualised Net Present Value) on selected sample of business entities, but they have to be tested on Czech data sources to be sure, that they will really support financial decisions about the segment of reinvestment and the reason, why the entrepreneur want to reinvest the profit.

Acknowledgment

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PATH DEPENDENCE AND REGIONAL PATHS OF PROCESS CHANGES IN THE RUSSIAN INDUSTRY

Svetlana Rastvortseva

Abstract

Purpose: The regional economy depends on the structure of industrial production which has been established earlier. This study makes it possible to determine the hi-tech spheres in which the entrepreneurship is going to develop more successfully. The purpose of the investigation is to determine the technological proximity of the industrial production branches with the high-tech economy sector for further defining the egress from the previous development path.

Design/methodology/approach: In order to determine possible egress of the region from the previous development trajectory there has been proposed a method of proximity evaluation between the high-tech sector and the existing structure of industrial production in the region. The characteristics of high technologies relatedness to other industry branches in the Russian regions have been defined.

Findings: For the Russian regions it was determined that less than 30% of sub-branches can be considered as connected with the high technology sector - 25%. The regions having the comparative advantages in the high-tech types of industry and sectors related thereto have been revealed. We have demonstrated that individual regions can progress through investment into interregional connections and entrepreneurship domestic innovations.

Research/practical implications: Considered as the investigatory contribution of the paper can be the alternative proposed to the comparative advantage index in the form of a localization coefficient to be used at evaluation of the technological proximity of industrial branches. The results of this study can be of benefit to representatives of the regional managerial bodies in the course of the economic policy development in the sphere of entrepreneurship.

Originality/value: Proposed in the article is a method for evaluation of technological proximity of industry branches which differs from the traditional use of the localization coefficient. The calculated proximity indexes make it possible to determine such high-tech industries to the development of which there are the necessary prerequisites in the region, i.e. the technologically similar industrial production is under development.

Keywords: Evolutionary Economic Theory, Path Dependence and Breaking, Technological Relatedness, Proximity Index, The Regions of Russia

JEL Codes: O18, O33, R11

Introduction

The regional economy depends on the structure of industrial production which has been established earlier. Transition from the previous development trajectory through innovations cannot take place without the necessary prerequisites and shall be formed on the basis of the industrial structures, labour market and institutes already established in the region (Neffke et al., 2011). If conditions for high-tech industries development already exist in the region, the transition from the traditional path to the innovative one will be harmonic.

The purpose of the investigation is to determine the technological proximity of the industrial production branches with the high-tech economy sector for further defining the egress from the previous development trajectory.

The paper is organized as follows. Section 1 gives us a short overview of the theoretical literature on the subject. After description of the methodology in the second part of the paper and disclosure of data in the third part, the obtained results are described (section 4), the prerequisites for move-away from the previous development trajectory for the Russian regions (section 5) and summarizing and drawing conclusions are determined.

1 Theoretical background and bibliography

Over the last years a number of investigations increases which show that the economy in the countries and regions is not only developing the most rational way, but depends largely on factors which have importance far back in the past. For example, (Acemoglu et al., 2001) have considered the institutional factors of economic growth; at that, many of them have appeared or even taken place hundreds of years ago. Such authors as (Engerman & Sokoloff, 2002), (La Porta et al., 1997) have focused their investigations on establishment of institutes depending on the country colonization character.

The *path dependence* concept development was started more than thirty years ago by Paul David (works since 1985) and Brian Arthur (works since 1988). The previous development theory was used to explain why non-efficient standards and technologies prevail when predominance of market efficiency is forecast theoretically (Liebowitz & Margolis, 1995). At the present time, in the total scope of works concerning *path dependence* it is possible to define a tendency which draws special attention to some unforeseen events considered as insignificant at the moment of their appearance. They influence the process of social-economic development mainly through the institutional structures or chains of events (Mahoney, 2000). Such events pose a challenge to political scientific theories ascribing major impacts to significant reasons. Noted particularly is the importance

of critical stages in formation of dependence paths that create stable institutes and minimize possible alternatives for further development.

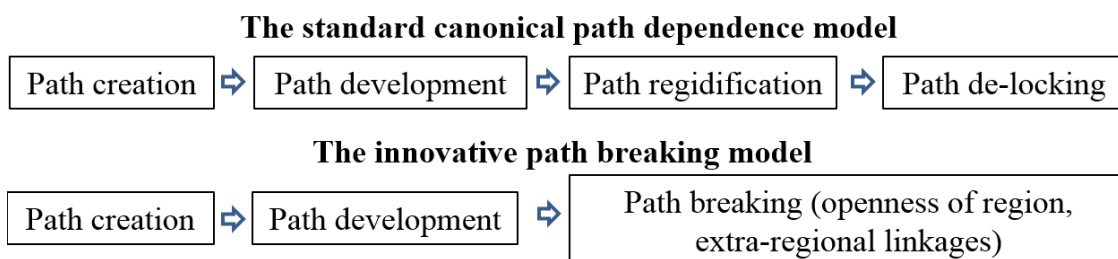
Held in the Russian economical literature were discussions in the field of the innovative management as a possibility to shift away from the existing development path. It was shown that such transition depends not only on the institutional reforms but also on social and cultural characteristics of the country or individual region (Yasin, 2007; Auzan et al., 2011). "New industrialization components" can be promotive of a change in the development path at a regional level (Silin et al., 2017). The regions developing new industries shoot ahead of those which "close" with better established industries in regard to the economic growth rates. Old industrial regions which are distinguished by high salaries, functioning trade unions, density of population and transport loads become victims of past success (Uskova & Lukin, 2016).

1.1 Economic evolution of regions

The example of regional movement along the development trajectories from creation of one industry to the other, interesting to our opinion, was proposed by (Zhu et al., 2017). They have illustrated the regional specialization on the example of tropical forest where the trees represent individual industries, and the forest represents the world production environment. The regions are monkeys that jump from a tree to the other tree looking for the best fruits (specialization area). The range of their jump is limited by physical preparedness and acquired skills (historical development). Just as in the given comparison, the strong regions have more possibilities to diversify the industrial production. So, rightful seems a question on whether the regions with a low level of economic development can catch up the regions with a high level thereof using the benefits created thanks to the interregional specialization, and what mechanisms are necessary for this process.

Let us consider possible paths of regional development - traditional and innovative (Fig. 1).

Fig. 1: Possible paths of regional development



Source: Prepared by the author by (Zhu et al., 2017)

We see that moving along the *traditional development path* provides for passing four stages. The first stage – *path creation*: creation of technological, industry-specific and institutional structure of a region. The second stage – *path development*: development consisting in the growth of revenues of industrial enterprises in a region. The third stage – *path rigidification*: loss of flexibility characterized by obsolescence of knowledge and relations due to absence of new technological solutions. Weak interaction between regions in this case is accompanied by the absence of knowledge and technologies exchange mechanism. The period of the region stay in this stage depends on economic policy, since waiting for independent transition to a whole new level, in this case, is self-defeating. The fourth stage allows for transformation only (*path de-locking*), i.e. regional restructuring as a result of exogenous shocks (Martin & Sunley, 2006). The initiative for transformation can come from the main stakeholders of the region - companies, state and private sectors.

The innovative theory of development is based upon the "creative destruction" concept (Schumpeter, 1947) – creation of new industries as a result of supplementation and alteration of the existing technologies with innovative solutions, which makes it possible for the regions to carry out expansion to the new production spheres. So, the region comes through the first stages by the same path as the traditional version, but thanks to initial set of more successful industries such region demonstrates flexibility of production, ability to come to terms with the external innovative processes. This is provided by openness of the structure for external technological solutions (Boschma & Iammarino, 2009), implementation of modern technologies and exchange of knowledge.

Transition from the traditional path to the innovative one is complicated. If the region initially specializes in peripheral industries, it loses the opportunity for growth by the accelerated innovative direction. Move-away of the regional economy from the previous development path and creation of "new path" does not originate from ground zero, but appear from the already created industrial structures, institutes and standards, labor resources and capital in the region, which determine what new prospective directions in the region can appear (Neffke et al., 2011). If there are many opportunities for creation of new industries in the region, then its move to a new development path will be quicker and easier.

2 Methodology

In order to assess a possibility of the region transition to a new development path it is necessary to determine an index reflecting the technological proximity between new and existing industries. The so called "indicators of relatedness" or "proximity" have been represented in some other papers (Yeats, 1985).

The indicator of technological proximity between the industries is based on the indicator reflecting a level of their development in the region. To this end, some papers offer using a comparative advantage index based on the export of industrial commodity groups (*RCA*) (Yeats, 1985; Ivanova et al., 2017). To our opinion, such approach has some disadvantages. This is due to imperfection of records of the international trade indicators, firstly. So, at *RCA* calculation the equality of the alternative suppliers of similar commodities would be desirable, which is impossible upon the availability of trade barriers. The *RCA* value is significantly distorted in recent decades under the influence of institutional factors which start playing the leading role in the international trade. *RCA* does not reflect different measures on stimulation of export, subsidy assistance of individual industries.

Secondly, the use of *RCA* index is complicated during the analysis of industries within one and the same country. For example, if index values for a specific industry compared to other countries are highly concentrated in the range slightly exceeding or below a figure of one, the country with the most comparative advantage in the industry can have relatively low value of *RCA* index.

Thirdly, statistical errors are possible, which are connected with accounting of enterprises and their export by physical or legal registration address. For example, for the Russian regions the data of the Federal Customs Service are accumulated by the company legal address.

Let us consider the grounds on which export cannot always reflect the comparative advantages of regions, using the example of Russia. Mineral fuel, oil and their distillation products have taken 59% of export in 2017. Food products, agricultural, mineral raw materials and fuel - 66% of export. If commodity groups are selected which can be attributed to a high-tech category, then their share in the Russian export is 2.4%. Previous studies have shown that the development of innovations and their impact on economic growth in the Russian regions has its own specifics (Rastvortseva, 2015).

The comparative advantage index based on the export indicator is inadvisable to be used if the commodity composition in the country has homogeneous character, as well in the countries with a receptive internal market.

A small-scale contribution of high-tech sector products to export is not yet an evidence of that it is not represented in the country regions. We believe that in order to determine the geographic concentration of this segment, and to assess the industries proximity degree in the future, it is advisable to use the localization coefficient (*LQ*) – an indicator proposed by (Porter, 2003):

$$LQ = \frac{\frac{Emp_{ig}}{Emp_g}}{\frac{Emp_i}{Emp}} = \frac{\frac{Emp_{ig}}{Emp_i}}{\frac{Emp_g}{Emp}}, \quad (1)$$

where Emp_{ig} – a number of the employed in the economy sector i in the region g ; Emp_g – total number of the employed in the region g ; Emp_i – a number of the employed in the economy sector i ; Emp – total number of the employed in the country.

The co-occurrence analysis method is used by us to determine the interconnection through assessment of that in how many regions these two industries occur together. Following the paper (Hidalgo et al., 2007), we will consider such coincidences only when the regions possess the comparative advantage (have a localization coefficient more than 1) in the industry being analyzed.

The index of proximity between two industrial sectors ($\phi_{i,j}$) is calculated as follows:

$$\phi_{i,j} = \min \left\{ P(LQ_{c,i} > 1 | LQ_{c,j} > 1), P(LQ_{c,j} > 1 | LQ_{c,i} > 1) \right\}, \quad (2)$$

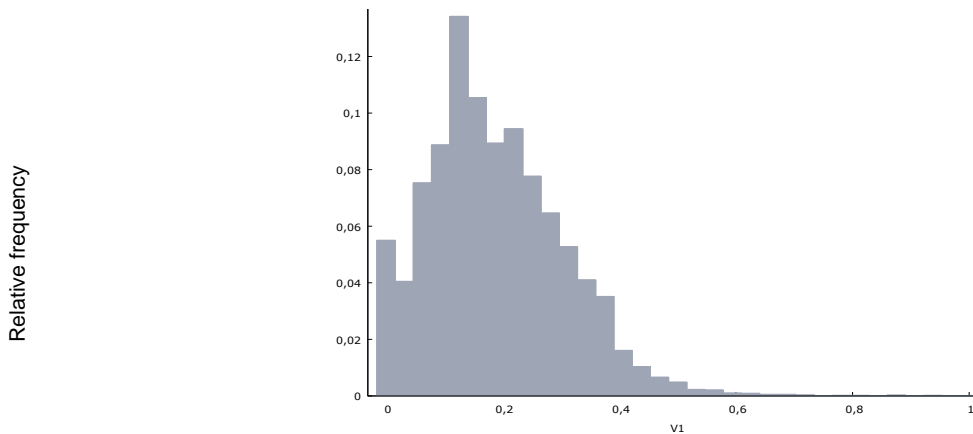
The index of proximity between the industrial sectors i and j is calculated as a minimum between the conditional probability of the comparative advantage availability in sector i , taking into account that the region c has the comparative advantage in sector j (i.e. $P(LQ_{c,i} > 1 | LQ_{c,j} > 1)$) and the conditional probability of the comparative advantage availability in sector j , taking into account the revealed comparative advantage in sector i (i.e. $P(LQ_{c,j} > 1 | LQ_{c,i} > 1)$). The substantiation of this proximity indicator consists in that if two economy sectors are closely related to each other, they, probably, require creation of similar institutes, infrastructure, factors, and technologies. The potential of that they will occur jointly and develop successfully in the same region is high. The indicator used by us, unlike the others, for example, classification methods or cluster analysis, makes it possible to take into account all combinations of industries, even overlapping ones, which significantly enriches the obtained results.

3 Data

We have calculated the indicator of proximity between the industry branches by a number of the employed in 2016 according to the data of the Federal State Statistics Service. Samples in this paper have counted to 198 industrial sub-branches (section D) for 85 regions of the Russian Federation. The proximity index in this investigation was calculated on the basis of single country data. We can reason this by that Russia is a country of large territory with a high regional inequality. This means that calculation on the basis of data in such great economy must be sufficient. The calculation of indicators of the regional employment by industries, but not by export data, can make it possible for us to better take into account the unique national economic conditions of Russia.

We have created a matrix of indicators in the industrial branches 198 x 198, which makes it possible to determine the spatial connections in the branch. Figure 2 gives a bar chart of proximity indicators. We can see that the technological proximity index is characterized by a truncated normal distribution.

Fig. 2: Bar chart of proximity index



Source: Calculated by author

A slight deviation from the norm is detected in a number of pairs of industries not having the connection (proximity index is equal to zero). There are 1072 or 5.5% of such pairs in the total sample. The most number of industry pairs have proximity indexes in the range of 0.11-0.14 – these are 2616 pairs or 13.41% of a sample. It is traditionally considered that two economy sectors can be characterized as connected if the proximity index is equal to or exceeds 0.25. In the obtained sample, such condition is met by 5690 industry pairs or 29.2% of all combinations.

4 Results

According to OECD standard, the high-tech industrial branches include five sub-branches, namely: production of pharmaceutical products, airplanes and space crafts, electronic and telecommunication equipment, computers and office appliances, medical equipment and measurement devices.

We have determined that when attributing the industrial branches to high-tech ones, 14 branches from the obtained matrix of proximity indexes (198x198) can be attributed to high technologies. With regard to the current territorial distribution of high technologies in Russia, the most number of regions are distinguished by the comparative advantage in production of electric machines and electric equipment (32 regions); ships, airplanes and space crafts and other transport means (28 regions); electronic components, equipment for radio, television and communication (28 regions), and devices and equipment for measurements, monitoring, tests, navigation, control and

other purposes (28 regions). The least number of regions have the comparative advantage in production of optical devices, photo and cine equipment (9 regions), and clocks and other time instruments (10 regions).

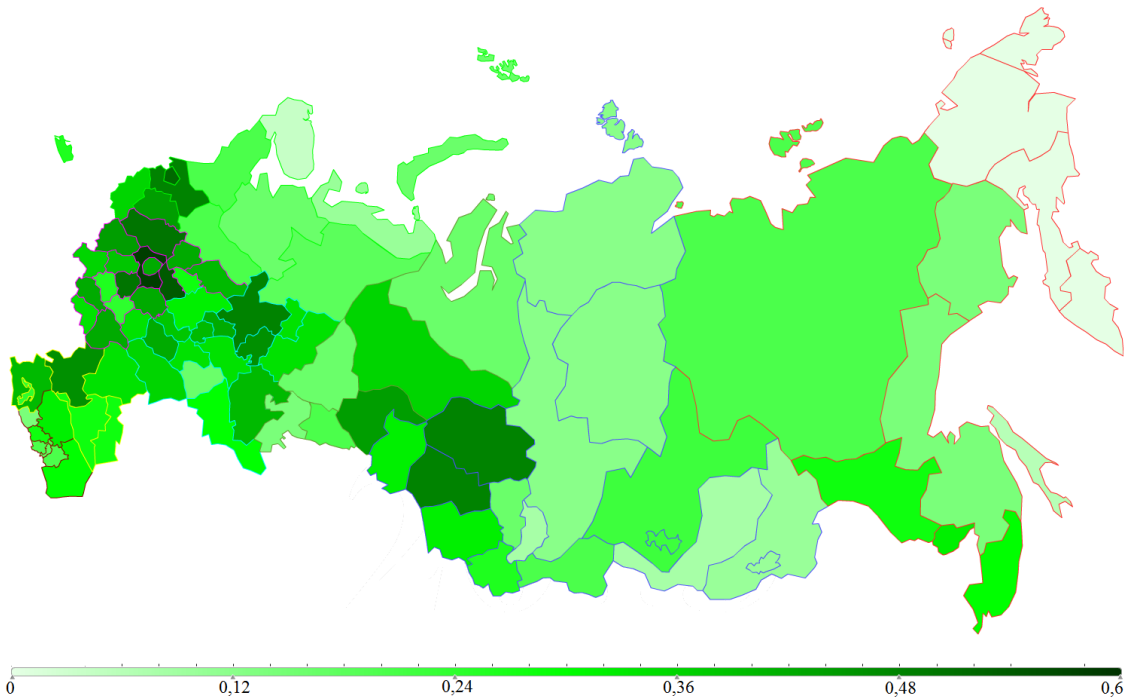
It is considered that two branches are connected if their proximity is equal to or exceeds 0.25. However, having analyzed the obtained proximity indexes we have come to a conclusion that only 25 sectors of 198 have no connection with high technologies (the index is less than 0.25). That is why we made the condition more rigorous and consider a case as connection of branches if the proximity index is more than 0.40. As regards to the high-technological production branches there are 51 of them.

Having calculated the proximity indexes by branches and having determined those most related to high-technological sectors of industry, we can make some conclusions. Firstly, the high-tech branches are connected between each other. Secondly, arrangement of high-tech production in the regions is often accompanied by the logically connected branches not related to high-tech category. For example, the pharmaceutical industry is accompanied by chemical production, Office equipment and computing machines have the comparative advantage in the same regions where electronic lamps and lighting equipment have the comparative advantage. Thirdly, we can distinguish some branches which are difficult to be logically connected to new technologies, but they have high index of proximity with some of them. So, one of the branches most closely connected to high-tech industry sectors is production of suit-cases, bags and similar articles of leather and other materials, production of saddlery and other articles of leather; production of leather, leather articles and shoes.

5 Determination of prerequisites for move-away from the previous development path for the Russian regions

Figure 3 shows a degree of regions participation in industrial sectors connected with high technologies. We see that some other picture is observed here. For example, concentration of "proximal" branches takes place to a greater extent not in Moscow, but in the Moscow region. On the whole, more than 40% of "proximal" branches in 25 regions differ in the comparative advantage. And in two regions only (the Kamchatka Region and the Chukotka Autonomous District) no connected branches are observed at all.

Fig. 3: Degree of the Russian regions participation in the industrial production sectors connected with high technologies



Source: Russian Federal State Statistics Service and own elaboration

The high participation degree in the high-tech sectors and those close to them is observed in Moscow, St.Petersburg, Novosibirsk region, Vladimir region, Penza region, Yaroslavl region and Omsk region, the Republic of Tatarstan, Udmurtia. The high participation degree in the allied industries is observed in Tver region, Tula region, Leningrad region, Kirov region, Tomsk region and Rostov region. We can suppose that these regions have prerequisites for development of the high-tech industrial sectors, and therefore for move-away from the previous development path.

Conclusion

Thus, we see that understanding of connections in the current industrial structure of regions with certain high-tech sectors must be integrated into the economic strategy of the region development. The scientifically grounded approach to determination of a new development path and specialization of the region economy makes it possible to avoid implementation of standard policy for labor resources preparation or investment in the popular scientific-technological fields. Instead, the regional governments will facilitate creation of the human capital for new demands in knowledge of traditional industries which will adapt and use these new skills and knowledge. The supportive infrastructure in the regions should be more focused on the strong cooperation among

the research centers, universities, science parks, business incubators and governmental institutions (Dvouletý, 2017).

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ARE THERE ANY ECONOMIC IMPACTS OF BUSINESS R&D SUPPORT? THE CASE OF THE CZECH REPUBLIC

Tomáš Rátinger – Vladislav Čadil – Sylvester Amaoko Agyemang

Abstract

Purpose: In recent years, evaluation of economic effects of R&D policies has become a key issue in policy debates. This paper contributes to these debates and aims to evaluate impacts of Czech programme TIP supporting R&D in private companies on the economic performance of supported enterprises. The programme running in the period of 2009-2016 targeted on knowledge based competitiveness strengthening through R&D activities.

Design/methodology/approach: The analysis is based on the counter-factual econometric approach. Because an appropriate control group could not be found among the unsupported companies, a so-called generalized propensity score matching (GPSM) was used. Two data sources were used: monitoring data of the TIP programme and economic data from the database Bisnode-MagnusWeb. The impact of R&D support on the firms' performance was measured by output indicators: gross value added, profit and productivity. The analysis covered economic performance of 335 (i.e. 53% of supported firms) in the period of 2009-2015 using 2008 as a base year and 2013-2015 as an end period.

Findings: Treatment effects are diverse depending on firm sizes. Generally, the R&D support effects are positive and more substantial in small and medium firms while there are no such effects confirmed for large firms. The support could only impact positively on the output (profit, productivity and gross value added) of small firms only after reaching a certain minimum threshold of the support whereas output diminishes for medium firms after a point of saturation.

Research/practical implications: This paper results could be useful for policymakers and R&D funding providers because it provides evidences about microeconomic impacts of programmes, namely it shows the differentiated effects of public interventions in relation to the size categories of beneficiaries.

Originality/value: The paper aspires to contribute to the ongoing debate on appropriate quantitative methods for impact evaluation. The analysis confirms that GPSM approach provides logical outcomes and if the investigation is situated to the right time period after the programme is accomplished it has potential to bring insight in the effects than the standard dichotomous model.

Keywords: R&D Support, Economic Impacts, Econometric Approaches, Generalized Propensity Score Matching

JEL Codes: C01, C31

Introduction

Evaluation of economic impact of government support for business R&D is a key theme in research and innovation policies evaluations and policy debates (Cunningham et al. 2013, Zúñiga-Vicente et al. 2014). Especially in these debates and evaluations, the issue of efficiency and effectiveness of the public support has been gaining increasing importance in recent years in the context of limited public resources on the one hand and the need to increase competitiveness on the other hand.

Several quantitative and qualitative methods can be used for evaluation of economic impact (see for example Cunningham et al. 2013). Among these methods, the counter-factual econometric analysis is becoming increasingly popular. Bondonio et al. (2016) used Conditional Difference in Difference (CDD) model implemented within a multiple regression framework to investigate impact of innovation, investment and R&D policies on the performance (employment, sales, GVA and labour productivity) of businesses in seven EU countries. They however found no statistically significant impacts for subsidies which support firms R&D activities exclusively (in contrast to the investment support). Sidorkin and Srholec (2017) indicated using propensity score matching (PSM) that R&D and innovation programmes launched in the Czech Republic during last 8 years stimulated additional R&D output in terms of applications for formal intellectual property (IP) protection, such as patents of invention and utility models.

The use of methods based on comparison between strictly separated treated and control groups face some obstacles in terms of data-availability and quality, interpretation and presentation of results to a non-specialist audience (Cunningham et al. 2017). A particular challenge is finding the right control group (Khandker et al. 2010), particularly if country or investigated region is small and support measures plentiful (Bia and Mattei 2007).

This is also the case of evaluation of economic impact of R&D programmes in the Czech Republic, where the number of firms carrying out in-house R&D is almost identical with the number of private companies receiving direct R&D support. In simple terms, it can be said that each firm with own R&D activities has recently received direct R&D subsidies. Moreover, many companies (particularly those which have a central position within their industries) have received support for a long time. From these reasons it is almost impossible to find a suitable control group consisting of unsupported firms, and to use common matchmaking techniques like PSM or Direct Covariate Matching (DCM).

If an appropriate control group cannot be found among the unsupported companies, a so-called generalized propensity score matching (GPSM) can be used, provided that firms receive a different

level of treatment (support). The control group is created from the closest similar firms, which received a different level of support (Bia and Mattei 2007).

The objective of this paper is to assess the economic effects of the Czech programme TIP supporting R&D in private companies in the recent decade. Beside the evaluation of that particular programme, the paper aspires to contribute to the debate on quantitative methods for assessing outputs additionality of the public funds poured in the sectors (Athey and Imbens 2017) and the suitability and usefulness of GPSM for impact evaluation in general.

The TIP programme was implemented by the Ministry of Industry and Trade in the period of 2009-2016 with the total financial allocation of CZK 12.5 billion (EUR 480 million). It aimed to provide grants supporting applied research and development projects in the fields of new materials, new progressive technologies and new information and control systems. In four calls the programme supported 707 subjects, of which 631 were private companies (approx. 90% of supported subjects) receiving more than CZK 8.7 billion (EUR 335 million). About 60% of supported firms were small and medium enterprises, while 120 firms belonged to large companies.

1 Conceptual Framework (GPSM) and Data

As pointed out above, most firms carrying out R&D activities receive public support. It is also evident that the amount of the support considerably varies among firms and not only due to their size. Thus we have a continuous distribution of the public subsidies rather than dichotomy between supported and unsupported firms. For this reason, we adopted a generalization of the propensity score model of Rosenbaum and Rubin (1983) for continuous treatment as proposed by Hirano and Imbens (2004).

We assume that probability to receive a lower or higher support depends on a set of covariates and that this dependence can be captured by normal linear model.

$$(t|X_i) \approx N(\beta_0 + \beta_1'X_i, \sigma^2), \quad (1)$$

where t refers to a treatment variable and X to a vector of covariates, β are coefficients of the linear model and σ^2 the variance.

The model to determine generalized propensity scores (GPS) is rather straightforward in terms of estimation (similar to the discrete case), however, it is worth to stress that the levels of the treatment need to be checked for balancing property (for more details see Bia and Mattei 2007). In the next step, the conditional expectation of the outcome (programme effect) is calculated as a function of the treatment level and GPS. In the third step, the dose-response function is estimated by averaging the estimated conditional expectation over the GPS at each level of the treatment we are interested. Bia and Mattei (2007) implemented this approach in STATA, thus these steps are directly computed by

the procedure called dose-response. The resulting Dose-Response Function indicates the estimated impact of a given level of the R&D support on the outcome indicator. In this way it answers the counterfactual question, what would have happened to a given firm had it received a different level of treatment. The (Marginal) Treatment Effect Function shows the change of the outcome indicators in response to a change of the treatment level.

In the analysis we use data of two sources: monitoring data of the support programme TIP and economic data from the database Bisnode-MagnusWeb (DBMW). DBMW provides selected indicators of the financial reports of Czech companies (from the balance sheets and profit-loss accounts). The running period of the programme TIP was 2009 to 2016 and thus monitoring data of this period were completed by economic and financial indicators from DBMW. We added the economic data also for the year 2008 as a base year before the investigated programme was launched.

Thus, the analysis covered the period of 2009-2015 using the period of 2013-2015 for the impacts evaluation. Later years were not taken into consideration due to the lack of data for the majority of analysed companies. However, the data unavailability for the all years of the evaluated period reduced the number of analysed firms to 335 (i.e. 53% of supported firms).

We selected four indicators to measure programme effects: revenue, gross value added (GVA), labour productivity (represented by the ratio $GVA/labour_cost$) and return on capital (given by the ratio $net_operational_surplus/capital\ costs$, where capital costs refer to the sum of depreciation, and paid rents and interests). In addition, we investigated if larger public funding also stimulated larger own funds put in the project in relative terms. We also adopted difference in differences (D-I-D) approach which in turn means that instead with levels we worked with changes to the base year.

Following Bia and Mattei (2007) we split the sample by size of beneficiaries assuming a different behaviour of large, medium and small size companies; for the latter we carried out logarithmic transformation of the treatment (funding) variable. Since the DBMW includes only companies which are obliged to publish their financial statements, the firms are pretty big, and therefore, the classification should be interpreted as “very large, large and medium” sizes. In spite of the split in the size groups, size stayed as one of the covariates determining GPS (in total 10 pre-treatment covariates - cash flow, fixed assets, current assets, equity, profit, long term debt/total assets, bank credit/total assets, intermediate consumption, depreciation, interest received by a firm – were used).

2 Results and Discussion

Tab. 6 shows the descriptive statistics of the treatment variable and the selected output variables categorized into groups of small, medium, large and the total sampled firms. The results show clear differences in received treatment (support) in the size categories of the firms. Whereas average support received by small firms falls well below the average support for sampled firms, the average support received by medium firms was close to the sample average; the large firms received on average twice as much than the average support in the sampled. Small firms exhibited very poor results in terms of profit and value added, with negative averages, while medium and large firms were profitable on average. In contrast to absolute figures which suggest that the largest firm perform the best, in relative terms the medium size and small firms show better average results: medium-size firms had the highest (3937.90) average return on capital the small firms showed the best average labour productivity (lab_product = 1.14).

From the descriptive statistics we can well understand the differences between size groups as well as the fact that here called small firms are still pretty large rather fitting with the standard classification of medium size firms, mediums size firms are already rather large firms and the large firms are extremely large companies. The other note which is worth to make is the fact that standard deviations are very big suggesting high heterogeneity of the firms in the size groups. We will comment on it later in the interpretation of the results and in the conclusions.

Tab. 6: Descriptive statistics of the key variables (CZK thousands)

| Variable | Small Firms | Medium Firms | Large Firms | Sampled Firms |
|------------------------|--------------------------|--------------------------|----------------------------|--------------------------|
| | Mean (Std. Dev.) | Mean (Std. Dev.) | Mean (Std. Dev.) | Mean (Std. Dev.) |
| support (treatment) | 1492.84 (2186.81) | 2471.08 (3069.41) | 4002.30 (9135.07) | 2037.15 (4234.54) |
| revenue | 63923.14 (66914.68) | 444992.10 (145525.50) | 4881262.00 (9150282.00) | 16998.81 (4526559.00) |
| profit | -9280.97 (164209.20) | 6427.01 (57640.10) | 167712.20 (670928.40) | 19872.73 (298141.60) |
| gva | -13739.52 (169474.80) | 24515.21 (76207.15) | 452799.40 (1683994.00) | 62561.12 (681517.00) |
| return_capital | 1023.65 (2990.68) | 3937.90 (9019.24) | 21271.02 (28970.78) | 4621.12 (13953.16) |
| lab_product | 1.14 (11.10) | 0.77 (2.78) | 1.00 (2.70) | 1.04 (9.17) |

Note: Number of observations: large firms = 56; medium firms = 65; small firms = 254; total sampled firms = 375

lab_product (labour productivity)

Source: own calculation

The dose-response functions were estimated for each outcome variable for all the size classes of firms. The predicted level of outcomes (Profit, GVA and labour productivity at every level of R&D support, given the pre-treatment variables for the three size classes of firms are shown in Figures 1 to 3. The middle line in the individual charts represents the estimates of the dose-response function or treatment effect function whereas the upper and lower lines represent the bounds of the 95% confidence interval generated by bootstrapping with 100 replications. In the next two paragraphs we analyse the estimate dose-response and treatment effect functions for the selected effect indicators concentrating mainly on their shapes and trends. These carry important information on the effects in relation the level of the support regardless the fact that the confidence intervals are broad including the zero effect line (x axis) as it is evident in Figures 1 to 3. The figures also show that variance vary along the treatment (support) levels, often expanding with increasing support.

2.1 Impact on GVA and Profit

It is obvious that the patterns of the dose-response and treatment effect functions are similar for GVA and Profit (in each size category) (see **Chyba! Nenalezen zdroj odkazů.** and **Chyba! Nenalezen zdroj odkazů.**, resp.). The figures also show that effects of the R&D support differ by size groups for these two indicators. To make the interpretation easier we summarized patterns if effects of R&D support on GVA and profit in Tab. 7. It is vital to remind the reader that the dose-response function captures the total effect of the support while the treatment effect function represents the marginal effect of the support (if the support shifts to higher or lower level). For small firms, the dose-response and treatment effect functions are convex. It means that the effects are low or even negative up to some level of the R&D support received. For the average effects the threshold is about CZK 13 million, for the marginal effect it is CZK 5 million (per investigated support period). Contrary to small companies, GVA and profit exhibit a concave shape of the dose-response function for medium size firms. The total GVA effects are positive for all treatment/support levels while the profit effects turn negative when support exceeds CZK 10 million. More interesting are declining marginal effects of support on GVA and profit (we provide interpretation later). Concerning the large companies, there is no evidence of effects on GVA and profit at all.

Tab. 7: Review of effect of the R&D support on GVA and profit by size classes

| Size group | Function | Shape | Interpretation |
|------------|------------------|-------------------|---|
| Small | Dose-response | Concave | Positive effects when supports bigger than 13 mil. CZK |
| | Treatment effect | Concave | Increasing marginal effects when supports bigger than 5 mil. CZK |
| Medium | Dose-response | Convex | Positive effects, increasing up to 10 million CZK, then declining with the support. |
| | Treatment effect | Down-sloping line | Declining marginal effect of the supports |
| Large | Dose-response | Constant = 0 | No effect |
| | Treatment effect | Constant = 0 | No effect |

Note: The support figures are per the investigated support period.

Source: Own interpretation

Fig. 2: Dose-response Functions of GVA

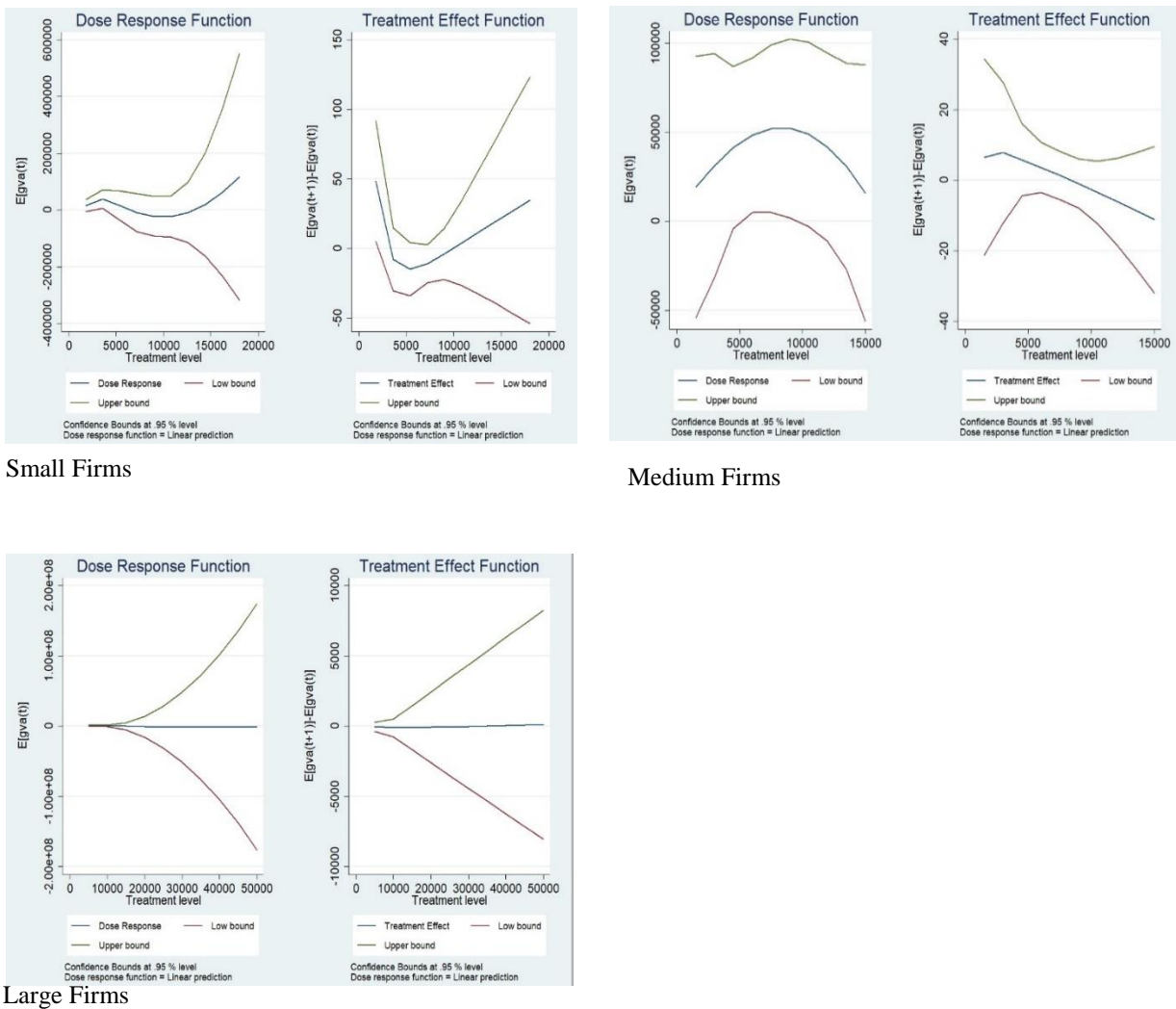
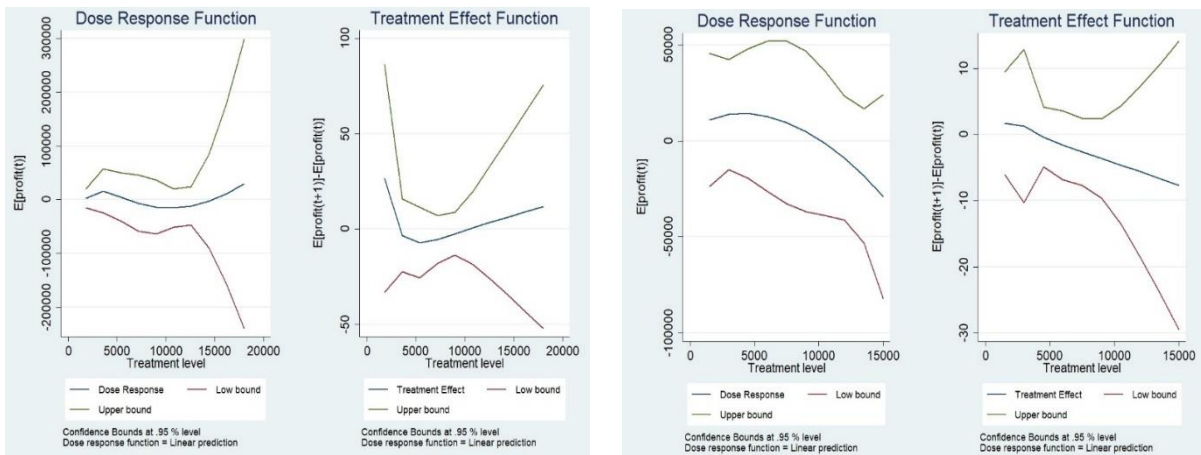
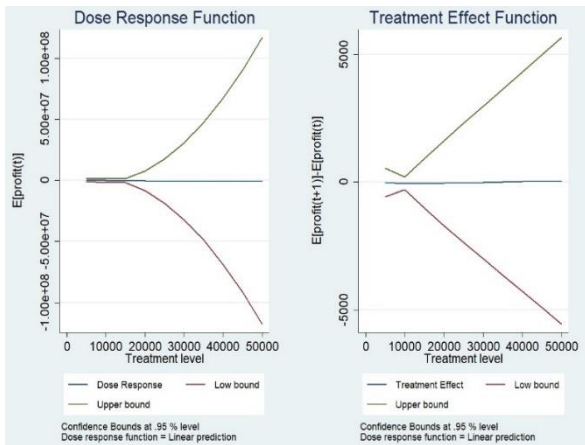


Fig. 3: Dose-response Functions of Profit



Small Firms

Medium Firms

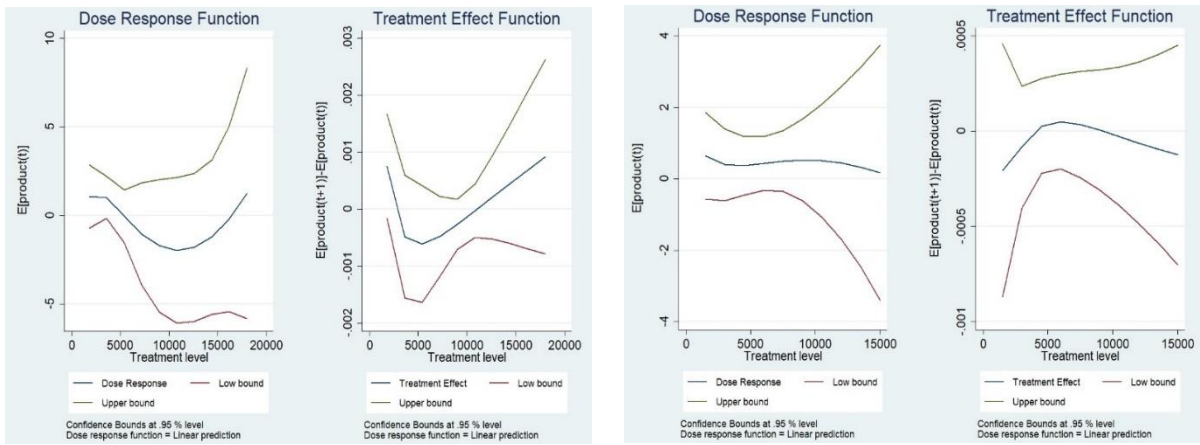


Large Firms

2.2 Impact on Labour Productivity

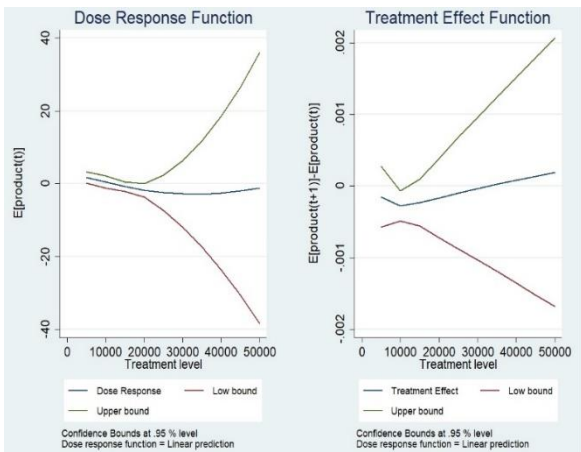
Fig. 4 and Tab. 8 show the differentiated impact of R&D support on firms' labour productivity in various size categories. The dose-response and treatment effect functions have convex curvatures for small and large firms. Also for the both groups it holds that productivity effects are largely negative (except in small firms with the support over CZK 17 million). On the other hand, marginal effects grow with the support over CZK 5 million and CZK 10 million respectively). For the group of medium size firms, the estimated dose-response function is positive. However, the marginal treatment effects increase with the support until it reaches CZK 5 million (a point of saturation), and then decrease thereafter with higher levels of R&D support received by a medium firm.

Fig. 4: Dose-response Functions of Labour Productivity



Small Firms

Medium Firms



Large Firms

Tab. 8: Review of effect of the R&D support on labour productivity

| Size group | Function | Shape | Interpretation |
|------------|------------------|--------------|--|
| Small | Dose-response | Concave | Largely negative, positive effects when supports > 17 mil. CZK |
| | Treatment effect | Concave | Increasing marginal effects when supports bigger than 5 mil. CZK |
| Medium | Dose-response | Flat S-shape | Positive effects |
| | Treatment effect | Concave | Increasing marginal effect up to 5 million CZK, then declining |
| Large | Dose-response | Concave | Small negative effects |
| | Treatment effect | Concave | Increasing marginal effects when the support exceeds CZK 13 million. |

Note: The support figures are per the investigated support period.

Source: Own interpretation

Conclusion

The results confirm the earlier assumption that treatment effects differ depending on firm sizes (categories). It shows that in the relatively short time period, the evaluated programme was generally more beneficial to small and medium enterprises than to large firms. It also shows that the programme impact positively on the output (profit, productivity and GVA) of small firms only if they received more than a certain amount of the support (a support threshold) whereas effects diminish for medium firms beyond a point of saturation. The differences in impacts between the size categories of supported enterprises can be explained by the different economic performance of small firms compared to the medium and large companies and different strategic focus of R&D in each size category. Small companies are more likely to concentrate on activities with faster return on capital. Therefore, R&D conducted by small firms is rather oriented on the direct support of their production activities or on the application of the new knowledge in the short-term horizon, while the strategic focus of R&D in large companies are more focused on long-term strategic research.

In line with Bondonio et al. 2016 we can stress that investigating effects of the subsidies to economic performance depend on the fact that the investment in R&D requires more time to mature and to provide noticeable impacts on general firm-level performance. Besides, a qualitative survey carried out as part of the TIP programme evaluation (Čadil et al. 2018) showed that the transfer of R&D outputs into commercially used real innovation took several years, depending on the technological progress, production capacity of the company and the development of market demand.

Taking into account that GPSM approach is demanding in terms of investigator's skill and investigation time it is rather questionable to pursue the application of the advanced methods if there is little expectation that the effects can occur, especially if these effects occur in several years after the programme completion. On the other hand, we can confirm that GPSM approach provides logical outcomes and if the investigation is situated to the right time period after the programme is accomplished it has potential to bring more insight in the effects than the standard dichotomous model.

High variance and heterogeneity of the effect variables definitely limit the practical usefulness of the results. It is at least partly due to missing information on the other public support provided to the investigated firms and of course due to market differences and fluctuations of sales. Note, that this problem will be similarly severe when using standard propensity score matching (PSM) method. Thus any further research should make attempt to control for these factors. First of all, it will be useful to consider (and to get data) the other programmes/measures of the similar objectives. In addition, one should think about the split of the sample in more homogenous groups than are the size groups.

Specialisation, labour or capital intensity might be such characteristics to be taken into account when setting up the “homogenous” groups.

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MEASURING SCALING-UP AWARENESS AMONG INCUBATOR MENTEES

Vivek Sharma – Sudhir K. Jain – Kusha Sharma

Abstract

Purpose: The technology students in India are upbeat about the innovative environment in their institutions while government wholeheartedly supports their entrepreneurship zeal in hope of support towards the gaping demand-supply mismatch, in job availability. The present work intends to explore the naivety of technical innovators towards entrepreneurial challenges after a successful start.

Design/methodology/approach: The awareness of scaling-up challenges among fresh applicants seeking tenancy at these incubation centres, is an important parameter of knowledge for mentors of incubation centres in academic institutions. This could be a roadblock in a nation's plans to grow private organisations and generate jobs. Data from 40 such applicants to incubation programs at Indian Institute of Technology, Delhi, were collected in 2018, to carry out a pilot study towards exploration of naivety of technical patent holders regarding entrepreneurial careers. The work used a battery of self-generated statements about scaling-up of successful start-ups, addressed to applicants of a technological incubator.

Findings: The pilot study has thrown back three factors which have been named as 'Future Readiness', 'Early Stage recklessness' and 'Zeal for Growth'. The clubbing does point to researched themes like; (1) financial recklessness at initial stage of ideation by offering partnership in exchange of meagre investments. (2) too much of individualism in decision making.

Research/practical implications: The work has been carried out with a clear aim to generate a tool for mentors at business incubators of academic institutions, which can assist the mentors in assessing the need for scaling-up readiness right at start-up stage. The factors, once finalised, can be used for a pre-post analysis of the mentorship programs, with respect to the effectiveness of the scaling-up information disseminated during the mentorship program.

Originality/value: The challenges of scaling-up the initial success of new business are distinctly different from those faced by start-ups. Literature has reported many tools to assess the mentoring needs of start-ups. The present attempt is aimed at facilitating the mentee readiness about the scaling-up needs, likely to come their way.

Keywords: Incubation Applicants, Engineer Entrepreneurs, Scaling-Up Awareness Entrepreneurial Challenges, Early Stage Recklessness

JEL Codes: O32, O30, O33

Introduction

According to draft of National Education Policy, India is gaping at an entry of 104.62 million fresh entrants to the workforce by the year 2022 (dNEP, 2016). It is immensely important for the nation to promote self-employment as well as organised entrepreneurship so that the burden of providing work to these youth can be shared. As such, on one hand, the government is promoting self-employment through its flagship initiatives like “Stand-up India”, “Start-up India”, “Mudra loans” and erstwhile PMRY etc. while on the other hand, government is going all out to promote business incubators with different focuses viz. Technology Business Incubators at seats of higher learning from Department of Science & Technology (DST) or National Science and Technology Entrepreneurship Development Board (NSTEDEV), Livelihood Business Incubators (LBIs) for promotion of industrial clusters from Ministry of MSME (Micro Small Middle Enterprises) and “Atal Innovation Centres” from *Niti Ayog*, to support the entrepreneurship ecosystem at selected institutions. Clearly, the government is going all out for setting-up and operationalising the incubation centres within academic institutions. According to a report from National Association of Software and Service Companies (NASSCOM, 2017) there was a 35 per cent growth in number of incubators in 2017 as compared to 2016. This trend continues unabated at government educational institutions and generally, the existing academicians are being handed the task of setting-up and operationalising these centres. Being in a tenure job, generally devoid of any business background they are likely to be neither aware nor mindful of the likely pitfalls to be faced by the potential entrepreneurs after initial success. This is where the proverbial demons might be lying, in a nation’s fast journey on the entrepreneurship development paths, hitherto uncharted. While the regional literature on entrepreneurship has reported on critical factors affecting incubatee confidence (Sharma et al., 2017), the awareness of scaling-up challenges among fresh applicants seeking tenancy at these incubation centres, has not been adequately explored. This work intends to explore the naivety of technical innovators towards entrepreneurial challenges after a successful start. The themes so explored, can be used for a pre-post analysis of the mentorship programs to be carried out at the university incubation centres.

1 Business Incubators

The idea of business incubation centres is well supported by the Cluster Theory which suggests that successful incubators act as a hub which is accessible to new firms for assistance and support and can expose a firm to acquire and exploit knowledge (Yli-Renko et al., 2011). Therefore there is an urgency to promote entrepreneurship through these business incubators as apparent from the targets to set-up more and more such incubators. The resource based theory of firm behaviour suggests the

accumulation of knowledge to be an unavoidable component in the growth and development of new firms (Spender, 1996; Grant, 1996). But the issues pertaining to scaling-up of successful start-ups is likely to be a blind-spot at this stage. Incubation centres not being able to instil the knowledge regarding scale-up challenges would be an anomaly as literature has amply reported that, it is the next stage of scaling-up that poses a bigger challenge to the entrepreneurial venture. For instance, Wasserman (2008) has chronicled that fewer than 25 per cent of founders are able to lead their company's initial public offerings. According to Bureau of Labour Statistics (2016), irrespective of the brilliance and compelling nature of a business idea, only about a half shall survive for more than five years. Ruhnka et al. (1992) have already chronicled that even with substantial funding, more than 75 per cent of venture-backed firms, fail or go into marginal existence. Other researchers (Boeker and Karichalil, 2002; Stuart and Abetti, 1990) have chronicled that aspiring Chief Executive Officers (CEOs) must be aware of the challenges to founder survival and should be open to learn and develop their leadership capabilities. Zainalaludin (2012) has reported that men generally fare better than women in scaling up the start-ups in case of rural micro enterprises. Picken (2017) opines that in conventional wisdom, successfully transitioning from a founder to a CEO is, at best, a long shot. Quoting Hofer and Charan (1984) he elaborates that after start-up difficulties are over, the most likely cause of business failure is the problem encountered in transition from one-person style of management to a functionally organised, professional management style. It is observed that this transition is difficult because of the psychological make-up and personality of founding entrepreneurs. Such an observation leads to a dichotomy of situation.

1.1 Challenges of new entrepreneurs

A plethora of research has gone into identifying entrepreneur's behavioural attributes and qualifies that it is a unique one. Further, it is increasingly being revealed by literature that the personality required for adopting a professional management style is different from this one. According to Picken (2017), there are eight hurdles in the path of scaling-up a successful start-up viz. (1) Setting a direction and maintaining focus; the entrepreneur has to be clear of his goals and should be able to establish a clear direction in terms of target customer, offering, value proposition, business model and key milestones, (2) Positioning products in the expanded markets, ability to leverage existing customers and distribution channel to achieve growth, (3) Maintaining responsiveness, which takes a hit with establishment of organisation structure, (4) Building of a management team; the new team has to be able to chart the next set of growth challenges, (5) Developing processes and infrastructures, as with growing traction, new systems and infrastructures shall be required to deliver value to customers, (6) Building financial capability, as the financial prudence shall have to be planned and

delivered so as to satisfy investors in terms of efficient utilisation of resources, (7) Developing an appropriate culture that reflects the original set of values, and (8) Managing risks, i.e. making sure that risks like narrow revenue base, inexperienced employees, key employee defections etc. are avoided with effective information and management systems. Gulati and DeSantola (2016) also point out four critical activities that are required for scaling a venture: (1) Hiring of functional experts, (2) Adding of management structures while maintaining informal ties across organization, (3) Building planning and forecasting capabilities, and (4) Formalizing and reinforcing cultural values to sustain the business. They also observe that this is not easy for start-up entrepreneurs who would not want to let go their leadership titles. Further, the formalization efforts can make older employees feel insecure. They would get frustrated and would leave taking away their understanding of organizational mission and connections with them. Hiring of functional experts may require an individual to hire his/her own boss who would then be expected to steer the organizational to a whole set of new values. The original employee is definite to be scared of this scenario and is quite likely to quit. But if accepted, this change heralds a set of whole new learning, which is eventually a win-win situation, for the original as well as the new workers besides the organization. Similarly, the next challenge of adding management structures is likely to make the working esoteric. The rigidity of formal structures is likely to destroy the informal communication structures. The challenge of maintaining informality in a hierarchal management structure is a tough one. The need to set-up a planning and forecasting section is the next challenge if the organization is to continue on the path of growth. Finally, the value-systems that lead to growth of the company have to be formalized so as to embed them into the managing philosophy. The set of values that lead to first surge of growth need to be formalized for next set of growths.

1.2 Challenges of successful start-ups

The challenge of scaling is not limited to commercial enterprises but extends to social ventures as well. The differentiation between social incubators and social accelerators suggests that scaling-up is primarily the job of accelerators. Commenting on the challenge of scaling up social enterprises, Casanovas and Bruno (2013), have differentiated that social incubators focus on ventures in early stage of development where the average age of organisation is less than three years and it has no particular threshold of revenue or number of employees. The efforts of these incubators are limited to design of business model and business plan, grant of seed capital for product/process development and a possibility to network with other social entrepreneurs. On the other hand, social accelerators focus at institutions having at least two full-time employees and a minimum threshold of revenue.

These typically offer management training, strategic mentoring focussed on growth strategies in specific work areas, networking with similar ecosystem and access to financial instruments.

The above discussion broadly posits that the scaling challenges are quite crucial for the long term success of entrepreneurial ventures both in commercial as well as social domains. The study of literature clearly mandates that a potential entrepreneur be made aware about the challenges of scaling up. The theoretical underpinnings for growth of entrepreneurs have been operationalised by Lichtenstein and Lyons (2006) through the concept of a pipeline of entrepreneurs and enterprises. The work lays foundations for investment in entrepreneurship from sides of both individual as well as community. At an individual level it is believed that entrepreneurs are successful to the extent to which they are skilled; that they come to start enterprises at different levels of skill and that these skills can be developed. The authors opine that moving from one skill level to another requires a transformation on the part of the entrepreneur which is more than just acquiring information, receiving services or adopting latest business practices. Giving an example the authors elaborate that a new entrepreneur would think about his market from inside out i.e. what to do in order to get customers. On the contrary the mature entrepreneurs would approach the market from outside in i.e. from the need of customers to own model of business. Authors opine that there is no amount of information transfer or training courses in writing a business plan or short-term transactions that shall help someone change how they process information. The pipeline theory lays that stages of development of a business are independent of the skill level of the entrepreneur, however, higher skill levels are required of entrepreneurs, in order to successfully transition from initial to later stages of business development. It also warns that the stages of development of a business are not identical with age of firm. The strategies that are suggested for incubating various stages of entrepreneurial pipeline are; Skill development, building/adding management to bring higher skill level, changing ownership through sale of business, recruitment of new talent, launch of intrapreneurial ventures, spinning out into new and independent ventures, reinvigourisation of stagnant firms etc.

Indian ecosystem for entrepreneurship promotion is currently focussing at development of business incubators through funding from multifarious government agencies. The students of technical institutions, too are excited about giving entrepreneurial directions to their careers. The collective focus is to grow successful start-ups which are mature enough to ensure maturation from micro level organisations into Small scale and onto higher levels. Therefore, it is a good idea to sensitise the mentors at the university incubators, about next level of challenges to hit their mentees. Both from investors' and business incubator's point of view, it would be sensible that entrepreneurs be aware of the challenges coming ahead in their organisation's growth chart. As such it would be worthwhile for mentors to note whether the start-up owner is also aware of scale-up challenges likely

to hit the organisation in times to come. This gives rise to the need to analyse the scale-up challenge awareness among the incubatees.

2 Research Problem

The technical innovators seeking registration at an incubation centre are likely to be unaware of the scaling-up challenges to be faced by them, few years down the line, in case of tasting success. The pipe-line theory for development of an entrepreneur lays stress on skill building among entrepreneurs. The applicants who holistically appreciate the rigours of an entrepreneurial career path are therefore more likely to withstand the test of time as an entrepreneur. In order to develop scaling-up awareness among entrepreneurs seeking registration at business incubators, the logical first step is a measurement of such awareness, right before mentoring for start-up stage. This can put a lot of things in perspective from the point of view of mentoring needs. A need therefore arises to develop a tool which measures the naivety of technical innovators regarding their entrepreneurial journey in longer run. The present article reports the results of a pilot study carried out towards this end.

2.1 Research Methodology: Questionnaire and Data Collection

Using the findings of various studies in scaling-up literature as discussed earlier, eight new statements were constructed. The questionnaire listed statements to evaluate the candidate awareness of scale-up challenges (Tab. 1). The statements comprised questions pertaining to naivety of potential mentees regarding the challenges involved in an entrepreneurial career path, the recklessness about raising initial funds against stocks/partnerships and awareness of scaling-up challenges at start-up stage. The correlation between responses to the 8 statements is reported in Tab. 3. Data were collected on a five point negative-positive Likert scale with responses varying from Strongly Disagree (1) to Strongly Agree (5). The questionnaire was then presented to technical graduates intending to incubate their patented innovations at Foundation for Innovation and Technology Transfer at Indian Institute of Technology (I.I.T.) Delhi which is a premier technology institution in India. A total of 40 questionnaires were circulated. Out of these, 34 valid filled-in questionnaires were received and used for this preliminary study aimed at exploration of factors.

Tab. 1: Statements used in the Questionnaire

| | |
|-----|--|
| S-1 | Once the start-up is in profits, owner's worries end |
| S-2 | The revenue goals of a start-up depend primarily on owner's ambitions |
| S-3 | If an entrepreneur has a truly innovative product, he is sure to succeed |
| S-4 | It is easy to hire professionals for managing day-to-day working of a start-up |
| S-5 | Lifestyle of a start-up entrepreneur is more relaxed, than that of an employee |
| S-6 | One successful product is all that is needed for a lifetime of business success |
| S-7 | It is a good idea to incorporate partners at start-up so as to avoid initial costs |
| S-8 | At start-up stage, one need not be mindful about scaling of business |

Source: Self-generated

The current study aims to analyse a desirous entrepreneur's awareness regarding the challenges of entrepreneurial career path and scaling-up. The data was collected from technical patent holders applying for structured mentoring. As student patent holders there are two options available to these youngsters. Either they can sell their patents to industry or they can take an entrepreneurial path to go the full cycle.

Tab. 2: Correlation among statements

| | S-1 | S-2 | S-3 | S-4 | S-5 | S-6 | S-7 | S-8 |
|-----|--------|-------|--------|-------|--------|--------|--------|-----|
| S-1 | 1 | | | | | | | |
| S-2 | 0.180 | 1 | | | | | | |
| S-3 | 0.237 | 0.039 | 1 | | | | | |
| S-4 | 0.329 | 0.265 | 0.019 | 1 | | | | |
| S-5 | 0.249 | 0.392 | 0.145 | 0.317 | 1 | | | |
| S-6 | 0.246 | 0.351 | 0.026 | 0.009 | 0.567* | 1 | | |
| S-7 | 0.270 | 0.000 | -0.078 | 0.414 | 0.495 | -0.058 | 1 | |
| S-8 | -0.139 | 0.179 | 0.350 | 0.293 | 0.075 | 0.268 | 0.561* | 1 |

*Statistically significant at 1% level of significance

The idea was to work towards preparation of a tool so as to gather scale-up challenge perception among youngsters desirous of taking up an entrepreneurial career instead of selling off their patents. If the innovators were to stick to their desire for an entrepreneurial career, then they would be required to go through a mentorship program and these responses could be studied again to

conduct a pre-post analysis. With this aim in mind, the statements in Table 1 were put to pre-testing through this attempt. In this preliminary study, the potential items were identified using content validity. An incidental purposive sampling technique was used to select the respondents. The responses were coded as Strongly Disagree (1) to Strongly Agree (5). The responses were duly coded using SPSS 20 and the data analysis was carried out.

2.2 Data Analysis

In order to ensure that the statements are consistent with the theoretical concept being measured, inputs were sought from practicing mentors in order to carry out the preliminary content validity assessment. There was substantial convergent evidence that the entrepreneurs undergoing mentoring in an incubation centre were uniform in their responses to the statements about scaling-up awareness at a later stage in business. The data were then subjected to exploratory factor analysis using internal consistency method. The factorial clustering of the responses of incubatees lent enough support to the theory-based grouping of the items. The principal component analysis resulted in clubbing of the eight statements into three factors.

3 Results and Discussion

Since the data consisted of only 34 sets, so a detailed reliability analysis was not feasible. Tests for adequacy of data for application of factor analysis (Stewart, 1981) found that the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy statistic was 0.519, which (being > 0.5) was found to be statistically significant. Moreover, the correlation matrix revealed enough correlation for application of factor analysis in the cluster. Besides, the Bartlett's test of Sphericity threw up a value of 27.267 ($p < 0.001$) which also is statistically significant. The decision for arriving at the number of factors was made on the basis of Latent Root Criterion i.e. those variables that have Eigen values greater than 1. Factors having loadings greater than or equal to 0.35 (ignoring the signs) were retained.

The results yielded three factors, explaining 83.93 per cent of total variance. The study clubbed the eight statements into three different factors on basis of Varimax rotation with Kaiser Normalisation. The first one of these (F-1) was named 'Zeal for Growth', because of the statements that it clubbed (Tab. 3). The statement S-2 is not in sync with the pipeline theory on growth of entrepreneurs which says that an entrepreneur's goals continue to evolve over the years. The entrepreneur is therefore not the only stakeholder to decide the revenue goals over time. Out of the two statements in the Table, the underlined one returned negative factor loading. The associated Mean (M) and Standard Deviation (SD) values to S-2 clearly suggest naivety regarding other stakeholders

that are likely to come in picture over the years. There is a need to add more questions towards this aspect in next research stage but the pilot survey does point to too much of individualism in taking decisions, which may not always work that way for entrepreneurs at scaling-up sage.

Tab. 3: Zeal for Growth (F-1)

| Statements | Mean | S.D. |
|--|------|------|
| S-1: <u>Once the start-up is in profits, owner’s worries ends</u> | 1.53 | 0.51 |
| S-2: The revenue goals of a start-up depend primarily on owner’s ambitions | 2.83 | 0.76 |

Source.: Statistical Analysis; S.D. : Standard Deviation

The second factor (F-2) generated was named ‘Future Readiness’ based on the statements clubbed therein (Tab. 4). Again, the underlined statement in the table depicted negative loadings or negative correlation with others.

Tab. 4: Future Readiness (F-2)

| Statements | Mean | S.D. |
|--|------|------|
| S-3: If an entrepreneur has a truly innovative product, he is sure to succeed | 1.76 | 0.83 |
| S-5: <u>Lifestyle of a start-up entrepreneur is more relaxed, than that of an employee</u> | 1.38 | 0.51 |
| S-4: It is easy to hire professionals for managing day-to-day working of a start-up | 2.46 | 0.97 |
| S-6: One successful product is all that is needed for a lifetime of business success | 1.61 | 0.51 |

Source.: Statistical Analysis; S.D. : Standard Deviation

The M and SD values also depicted negative response towards relaxation in case of product’s success, among whole of population, which is a good thing as it is likely to propel future businesses. Surprisingly, the entrepreneurs were upbeat about their chances of hiring right kind of people for growth of their enterprises, as depicted by the M and SD values to the statement.

The third factor (F-3) generated in the study comprised of two statements and was named ‘Early Stage Recklessness’ (Tab. 5). The respondents seemed agreeable to the idea of bringing in partners in order to raise the initial capital. The carelessness about scaling-up was also reported by the respondents. The clubbing of these two suggested the reckless nature of initial stage mentees who are focussing towards taking their idea, off the ground. The risk-taking nature of entrepreneurs, has been amply reported by literature and the pilot study corroborates this by factoring statement that represent the attitude to jump the gun.

Tab. 5: Early Stage Recklessness (F-3)

| Statements | Mean | S.D. |
|---|------|------|
| S-7: It is a good idea to incorporate partners at start-up so as to avoid initial costs | 3.0 | 0.71 |
| S-8: At start-up stage, one need not be mindful about scaling of business | 2.46 | 1.05 |

Source.: Statistical Analysis

Conclusions

Powered by various government agencies, the number of business incubators is growing at a fast pace in India. This growth of business accelerators, which primarily address the needs of scaling-up is not that rapid. The reasons can be traced to the need of the nation to promote entrepreneurship, in the first place, The process of handling scale-up challenges is likely to be a blind spot for business incubator mentors, in view of the stated goal of business incubators being the setting up of successful start-ups/. After all these are being created in face of the burgeoning challenge of generating employment opportunities for the coming wave of educated youth. But successful start-up is to be followed by scaling-up and literature has warned the latter process to be very different from the former. This leaves it to initiative of the leaders heading the existing incubation centres, that they inform their incubatees about scaling related challenges, in times to come and also maintain a continuous rapport so as to remain accessible at those times. This was a pilot study aimed at finding directions for future research on above idea. The study has generated three directions for future research. The first one of these (F-1) is a contradictory one and requires further analysis on the dichotomous directions of the clubbed statements as they seem unaware of the organisation being a separate entity and believe too much in themselves being the major decision maker in their organisations at all times in future. Research suggests that technical patent holders, just out of graduation are fairly unaware of the challenges of finding and hiring right kind of employees. Also, they are not very mindful regarding seeking investment in lieu of giving away stakes in company. The pilot study thus lays ground for detailed work in terms of exploring these vulnerable areas among the mentees which can then be catered to by the mentors of the incubation centres. For mentors, another use of the questionnaire can be as a pre-post tool to gather the achievement of mentorship program in terms of improving the scaling-up awareness of mentees.

The pilot study was carried out over a valid responses of 34 participants and the results are only directional. Also, the statements for the questionnaire were self-generated on the basis of interviews with the potential entrepreneurs and their common underlying beliefs. Any further study

shall have to incorporate more statements in generated directions with latest relevant reports from research.

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EMPLOYER'S RESPONSIBILITY IN THE CONTEXT OF COMPANY OCCUPATIONAL PENSION SCHEMES IN THE CZECH REPUBLIC AND GERMANY

Thomas Schiller

Abstract

Purpose: To prevent old age poverty in the Czech Republic and Germany, this paper contributes to the debate on increasing the employer participation rate in the occupational pension schemes on offer. As such, we analyze whether, in recent years, employers have acted in accordance with their corporate social responsibility by offering occupational pension schemes and adequately informing their employees.

Design/methodology/approach: The basis of this research was a cross-sectional data set consisting of three independent questionnaires which addressed employers and their employees. The randomization applied ensures a comparative study between employers and employees.

Findings: The survey highlights a large information asymmetry between the employers and the employees. The employers act responsibly by, in general, providing occupational pension plans, although the participation rate is low. The employers also make use of extensive information campaigns on the subject. Nevertheless, the employees in the Czech Republic remain largely uninformed, with the situation in Germany only slightly better.

Research/practical implications: The information asymmetries suggest that the employers' existing information strategies fail to provide their employees with sufficient financial knowledge. This asymmetry should be addressed by a two-fold strategy; improving the training of employees about their financial situation and by using automatic enrollment with the possibility of opting out.

Originality/value: Based on a cross-sectional study, the predominant information asymmetries were identified as the major practical problems in both the Czech Republic and in Germany. This study contributes to the growing literature by focusing on the German and Czech labor markets with regard to an employer's corporate social responsibility.

Keywords: Employer's Responsibility, Occupational Pension Schemes, Opting Out

JEL Codes: J26, L26, M14

Introduction

Due to demographic developments in almost all industrialized countries, reforms of pension schemes will be necessary to maintain stable living standards for employees after their retirement. It follows, however, that contributions to the statutory pension schemes must increase since, otherwise, the pension level will decrease in the medium term. This process has already started, since numerous countries have allowed for a decrease in the pension level in their medium-term pension schemes (Federal Ministry of Labour and Social Affairs, 2017). In the context of corporate social responsibility, employers can take actions to ensure their employees' future financial situations and prevent a decline in living standards. In line with a company's social responsibility, they should also act according to moral principles, in particular since they benefit from positive side effects; namely, in the case of company pension schemes, increased staff retention. Thus, the incentive is not simply the responsibility demanded but, rather, the economic benefit.

Usually an employee's salary increases continuously until retirement age commensurate with the employee's growing work experience. When the statutory pension scheme substitutes the current salary in the countries examined, a gap arises between an employee's last net income from their salary and the amount of their future statutory pension. The global issue of a pension shortfall in old age is also present in the Czech Republic and Germany. The OECD study "Pensions at a Glance 2017 (2017)" covering all 34 OECD states showed that the pension level of an average employee is 62.9%. Based on the assumption that the employee has a complete employment biography, this implies a gap of 37.1%. If an employee was shortly unemployed for some time or earned less than the average income, it is common that the income gap due to pension shortfall in old age is 50% and more. This decrease in income leads unavoidably to a decline in the living standards of the employees. In order to maintain their standard of living, it is necessary to close their income gap by an additional private or company pension scheme.

In this context, the first step is defining the amount of income which should be available at retirement age in order to maintain the standard of living which the employees were used to during their professional lives. To draw a general conclusion on the necessary pension levels relative to prior salary levels, the two opposing trends of the cost structure have to be compared. According to a long-term study by the University of Bochum on the topic of satisfaction during the age of retirement from 1992 to 2011, the old-age provision level aimed at is 87% (Dudel, Ott & Werding, 2013). In practical terms, this means that if a retiree has 87% of their last net income at their disposal at the beginning of retirement, their satisfaction values will not drop significantly.

However, the statutory pension scheme systems in the Czech Republic and in Germany fall far short of reaching an old-age provision rate of 87%. It can be assumed in view of the demographic developments in both countries that the statutory pension level will further drop in the long term (Barsch & Trachsel, 2018). Therefore, socially responsible employers have to make sure that their staff can maintain a decent standard of living during retirement (Empter, Esche & Petersen, 2017).

This paper analyzes a company's willingness to offer occupational pension schemes and the corresponding take-up rate of the employees, based on two cross-sectional data samples in the Czech Republic and Germany. Whilst the Czech Republic data sample comprises 18 firms and 360 employees, the German data sample includes 22 firms and 440 employees. The first step compares data samples between the countries. In the second step the participation rate in occupational pension schemes is compared to the employee pension schemes on offer. In analyzing and discussing the low contribution rate, we use a subjective questionnaire which addresses the employers. We hypothesize that most companies offer pension schemes, but that the employees are unaware of this. Based on the results of an unpublished study by the global insurer Allianz Germany (2015), which the concern has made available to the author, it is likely that the low acceptance of the occupational pensions is caused by an underestimation of the income gap ensuing between working life and retirement. Consequently, employees fail to participate in these necessary pension schemes. To gain insights into the given sets of information, we use three questionnaires addressing companies, HR departments and employees. The results indicate a major information asymmetry in the Czech Republic and Germany. Although the cross-sectional data does not allow for deep empirical investigation, it does, in a first step, indicate issues which reduce employee participation rates in occupational pension schemes.

1 Data Collection and Methodology

The data set was built by approaching 12,876 companies and ascertaining their interest in participating in a survey. We started sending out emails at the beginning of February 2018, continuing with the more extensive questionnaires in May and receiving the final responses by November 2018. The email briefly explained the aims of the survey. The reason presented was an analysis of the effects of pension schemes on staff retention programs. The email contained a short questionnaire with four general questions about the company. The first question dealt with the existence of additional benefits. The second question focused on which benefits had actually been implemented. The third question concerned the information strategy of the company towards newly hired employees. In the event that they had an information strategy, the companies were asked about their approach to

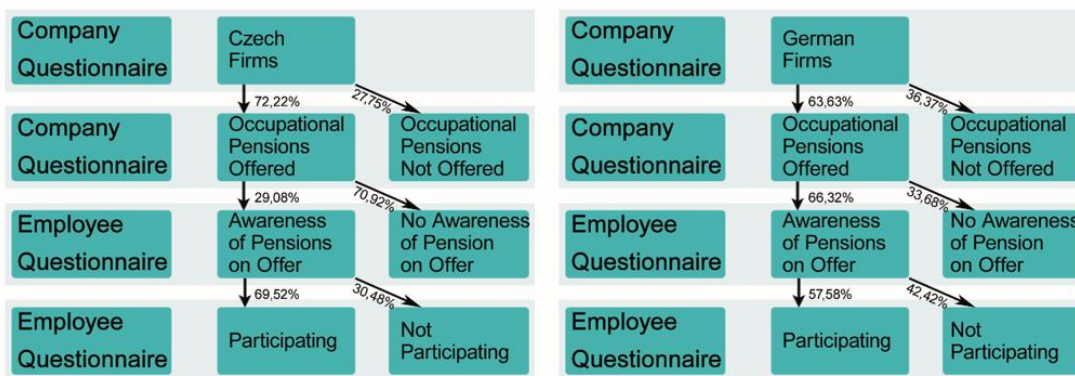
providing information to newly hired employees. In an accompanying mail, the companies were asked if they would participate, on an anonymous basis, in another more extensive questionnaire consisting of a questionnaire for the human resources department and the employees. 946 companies were willing to participate in the extended questionnaires. Randomization was applied to prevent bias and the number of companies was reduced to 40. These 40 companies received one questionnaire for the human resources department and another to distribute among the employees. The employees received their questionnaire in an open envelope which they sealed to maintain anonymity before returning the questionnaire to their company. The companies then returned the questionnaires without any information about the respondent. The questionnaire to the human resources department was returned separately and also without information about the respondent. This was for data security reasons. The lowest number of employee questionnaires returned was 20 and the smallest company had 276 employees. Therefore, all questionnaires from other companies were reduced to 20 by random sampling. This ensured a relative comparison between the occupational pension schemes on offer and the average participation rate of the employees within this small pilot study. Although the study is not representative, the randomization approach ensured a lack of bias which, due to the small sample size, was extremely important. We used a questionnaire for the human resources departments and employees consisting of 20 questions.

The human resources departments provided information as to whether the companies offered occupational pension schemes. Furthermore, they provided information about their information strategies vis-à-vis the employees. The questionnaire included Yes/No questions (Do you expect an income gap between professional life and retirement?), questions where the respondents were asked to rank their answers from 1-15, for example “Please estimate the income gap after the retirement by ticking the boxes” (15 boxes ranging from 5%-75%). Furthermore, questions with pre-defined answers were used, such as: “Please select those non-salary benefits offered by your company.” We had previously prepared lists of the most familiar non-salary benefits. In these cases, one category named “others” was used to collect additional benefits not listed. In this paper only the non-open questions are discussed. Companies were also asked if they used extensive information strategies to ensure their employees are informed about an existing gap between working life and retirement and to name these strategies. Furthermore, the employees were asked if the companies offered occupational pensions. They were then asked if they participate in an occupational pension. The methods applied were mainly based on average comparisons and an analysis of the information provided based on the nominal scale questions.

2 Results

The results of the questionnaire from the human resources departments showed that many companies in both countries offer occupational pensions. Figure 1 provides information about the percentage of companies- offering occupational pensions. In the Czech Republic the percentage of occupational pensions offered by companies is higher. However, the awareness of the existence of occupational pension programs is higher in the case of Germany. The participation rate in the Czech Republic for those who are aware of the existence is higher than in Germany.

Fig. 1: Questionnaire results: offer rate and take-up rate



Source: Own computations

Thus, fewer employees in the Czech Republic are aware of the existence of occupational pensions, but the participation rate based on the given set of information for the Czech employees is higher than the one in Germany. To test for significance, we use a chi-square test to check if the participation rate is systematically different between the Czech and German sample. The result shows a significance level of 95% ($p=0.048$) supporting the assumption of a systematic difference. The following results show a similar picture for the German and Czech sample. In both countries, they adopted extensive information strategies to inform their employees about the income gap between working life and retirement. In Germany 80% of the companies declared that they used an extensive information strategy. This correlates with the results of the employee questionnaire which states that the employees knew about the gap, although this cannot be tested significantly.

Tab. 1: Descriptive Results

| | Czech Republic | Germany |
|--|----------------|---------|
| Companies adopting extensive information strategies (Q1) | 70% | 80% |
| Knowledge about the income gap (Q2) | 88,73% | 93,8% |
| Expected income gap on average (Q2) | 26,79% | 26,09% |
| Real income gap | 40% | 49% |

Source: Own computations

In the Czech Republic 88.78% of all employees state that they expect an income gap after their working lives, whilst in Germany 93.8% similarly expect an income gap. Interestingly, the employees completely fail to accurately estimate the income gap. In the Czech Republic the income gap is assumed to amount to 26.79% on average and in Germany to 26.09%. Since the results seem similar, we applied the two-sample Kolmogorov-Smirnov test for checking the equality of the distribution functions. The result shows ($p=0.007$) that the H_0 hypothesis can be rejected, and the H_1 applies, stating that both samples have no common distribution. Table 1 shows that the real income gap amounts to 40% in the case of the Czech Republic and to 49.5% in Germany ("Pensions at a Glance 2017," 2017) for an employee with an average working income and complete personal employment history, i.e. without unemployment.

3 Interpretation

The hypothesis that most of the companies offer occupational pension schemes is correct, and yet most employees are not aware of the occupational pensions on offer. This indicates an information asymmetry. In the Czech sample, the difference between the possibilities offered and the take-up rate is very high. Combined with the fact that employees overestimate their pensions, this indicates that employees lack the necessary information to understand the importance of this matter. Since employees severely underestimate the income gap, it further implies that employers have failed to introduce an efficient information strategy for their employees.

In Germany the occupational pension participation rate is higher, although the number of occupational pensions offered by companies is lower. Both countries face information asymmetries, but the information asymmetry in the Czech Republic is much larger. With regard to those employees who know about the pension schemes on offer, only 69.5% in the Czech Republic (57.58% Germany)

participate. Based on the results of Berk, Čok, Kosak, & Sambt (2013), the lower income level, especially in eastern Europe, further increases the threat of old age poverty. Since this lack of awareness is a serious threat in terms of later poverty, measures against these issues have to be implemented by the employers as part of their obligation to facilitate corporate social responsibility. As such, it is also the duty of the employers to inform their employees about their future financial situation and support them by offering possibilities to reduce their pension gaps. Berk et al. (2013) points out that the financial illiteracy rate has to be addressed.

Since the employers have already reported that they use extensive information programs vis-à-vis their employees, it seems valid to assume a willingness to take responsibility by the employers. And since a large number of employees also state that they foresee an income gap, information programs could have an effect – but the proven underestimation of the real income gap raises doubts for both countries. In particular, the serious underestimation of the income gap could explain the low number of employees who are aware of the occupational pension schemes offered in their companies, as they seem unaware of the issue in question. It can also explain the low participation rate of these employees who, whilst aware of the pension schemes, still do not participate.

4 Discussion

Following the argumentation of Klazar & Slintáková (2012) that people with a low income, in particular, face a serious threat of poverty in old age, the results of this cross-sectional analysis support the claim of Berk et al. (2013) that the majority of employees lack financial knowledge. The underestimation of the income gap provides further support for the lack of financial education. Maloney & McCarthy (2017) suggest that the bounded rationality theorem can also explain the issue. Since employees are likely to have incomplete information about the subject, insufficient ability and education to fully understand the subject and limited time to deal with the subject in depth, the use of heuristics is very likely. Thus, the probability of mistakes in decision-making is very high. In the context of corporate social responsibility, it is the duty of the employer to assist in their employees' financial decision-making. The high rate of the occupational pensions on offer and the extensive information strategies in place indicate willingness on the part of the employers. Based on this cross-sectional analysis, it is possible to point out that the pension schemes on offer are not working to capacity, since many employees are unaware of the existence of these schemes. This stands in clear contrast to the information campaigns conducted by the employers. Also, the highly underestimated income gap after working life, supports the claim of Maloney & McCarthy (2017) that instruments to increase financial literacy are a necessity. We argue that in the case of the Czech Republic and

Germany a double-sided strategy should be applied. This should include proactive information campaigns by the employers, including investment education classes and periodic information letters addressing the issue of the income gap during retirement. To understand why the extensive information campaigns were not able to provide sufficient knowledge about the income gap and the solutions offered by the employers in the Czech Republic and Germany more research is necessary.

Complementary to this strategy, nudging techniques should also be applied in the Czech Republic and Germany, since the results of Youden (2016) in the US seem very convincing. In the Netherlands, additional company pension schemes with opting-out provisions have become the legal standard. Now, more than 90% of Dutch employees participate in this system, which constitutes the uncontested peak value with regard to the penetration rate of company pension schemes in comparison with other European countries (Vogel, 2016). This cross-sectional study demonstrates that this opting-out system with automatic enrollment could also lead to major benefits for employees in the Czech Republic and Germany.

5 Limitations and Shortcomings

Since we only have a cross-sectional data set, no causal conclusions can be drawn when analyzing the data quantitatively. The data set only provides information about the current situation. However, due to the design of the questionnaire, insights as to willingness, intentions and the recent status of information can be analyzed. Since the sample size of the companies used is small, the results cannot be applied generally, but they serve as a first step to investigate the entrepreneurial understanding of corporate social responsibility in the context of occupational pension schemes. Since it is not possible to link the groups of employees to their human resources departments, regression analysis cannot be applied. Therefore, the given approach only serves as a first pilot study to evaluate the foundation for a follow-up study, which can address the effectiveness of different employer information strategies to inform their employees.

Conclusion

This study investigates whether employers act in accordance with their corporate social responsibility by not only offering occupational pensions, but also taking actions to inform their employees about the importance of occupational pension's schemes, to enable them to close the assumed income gap between their working lives and their retirement. Based on three questionnaires, we evaluate the subjective perspective of the employees and the solutions offered by the employers. The key finding is an information asymmetry in the Czech Republic and Germany. Employers act responsibly by

offering a large number of occupational pension schemes, but the participation rate among employees is not very high. In the Czech Republic more employers offer the pension schemes, but fewer employees are aware of them. In Germany fewer employers offer occupational pension schemes, but more employees are aware of them. Employers in both countries use extensive methods to inform their employees, but the results indicate that the employees are not only poorly informed as to whether their company offer occupational pension schemes, but also significantly underestimate the income gap which arises by changing from working life to retirement. This implies that the recent information strategies of the employers are not sufficient. The information asymmetry highlights that the employers are willing to act in accordance with their corporate social responsibility, but that the actions taken fail. A solution to this issue could be two-fold – better and periodic information strategies which include research about the information campaigns used but also, automatic enrollment into occupational pension schemes with the possibility to opt out, as applied in the Netherlands, which leads to a higher participation rate and a smaller income gap. Further research is needed to examine whether, perhaps, the current financial situation of the employees prevents contribution to the pension schemes in the Czech Republic and, possibly, Germany, since this reason cannot be ruled out by this cross-sectional study.

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THE ROLE OF ORGANIZATIONAL CULTURE FOR INFORMATION TECHNOLOGY MANAGEMENT IN DIGITALIZATION

Marcel R. Sieber

Abstract

Purpose: The following paper discusses the challenges and benefits of the Fourth Industrial Revolution for information technology management and the corresponding impact on organizations. Exploring the relationship between organizational culture and information technology management in the era of digitalization, it aims to find a model and hypotheses for further study.

Design/methodology/approach: The paper presents a literature review in the research field of information technology management with a focus on the Fourth Industrial Revolution, digitalization, and organizational culture. It structures the findings and develops a conceptual model about the effect of corporate culture on information technology management.

Findings: Although the cited literature hardly examines organizational culture, the review shows several notes of culture-related topics. The paper structures these perceptions along the dimensions “behaviors,” “artifacts,” “norms,” and “values.” It proposes the dimensions’ direct relationships with success in digitalization as well as mediated effects between them.

Research/practical implications: The study closes a gap in the research of the industry and the field of information technology management. It contributes to the discussion and awareness of the impact of organizational culture in information technology. Further research needs more exploration of the topic, the models, and theory as well as empirical tests of hypotheses.

Originality/value: The paper reflects the role of organizational culture in the information technology research where a shortcoming is observable. It reshapes a layered architecture of corporate culture and proposes an adapted model for the effects of organizational culture on information technology management in the era of digitalization.

Keywords: Organizational Culture, Information Technology, Information Technology Management, Digitalization, Platform Economy

JEL Codes: M14, M15, O14

Introduction

This paper aims to develop a model for the relationship between organizational culture and information technology management in the era of digitalization. It explores the impact of organizational culture on information technology management's performance. The era of digitalization relates to the so-called Fourth Industrial Revolution. Looking at countries' performance and competitiveness (Kraftová, Doudová, & Miláček, 2018), many companies showed for several years a deep interest in the Fourth Industrial Revolution (Brunet-Thornton & Martinez, 2018, xviii). Furthermore, the topic "organizational culture and information technology management" is of interest because of the discussions about the "challenges of the digital transformation" (Deiser, 2018), the "digital maturing" of organizations (Kane, Palmer, Nguyen Phillips, Kiron, & Buckley, 2016), or the "digital intelligence" for competitiveness and sustainability in the digital age (Mithas & McFarlan, 2017). Does organizational culture make a difference in how information technology management performs in the digital age? Generally, studies about the link of organizational culture and performance exist (Sackmann, 2011), and the corresponding impact of organizational culture on innovation (Hogan & Coote, 2014; Kude, Schmidt, Mithas, & Heinzl, 2015), also whether the organizational culture supports the concepts of the Fourth Industrial Revolution (Mohelska & Sokolova, 2018; Schwab, 2017). However, there is a lack of research on the impact of organizational culture in information technology management. This paper contributes to the research in this field.

The research method is a literature review that discusses the Fourth Industrial Revolution, digitalization, and information technology management with an emphasis on cultural aspects. The starting point is the Fourth Industrial Revolution, also called Industry 4.0. Then, the paper defines digitalization and describes the term's characteristics with a focus on culture. The literature review closes with an exploration of the cultural impact of the changing role of information technology and information technology management in the era of digitalization. The paper filters and structures the gathered measures for the aspired model for the relationship between organizational culture and information technology management. Hypotheses about the relationship between organizational culture and success follow. The paper ends with the conclusion that considers the needs for further research.

1 Literature review

The databases for the search of references consist mainly of the following resources:

- Business Source Premier (EBSCO), ABI/Inform Trade & Industry (ProQuest), ERIC (ProQuest), Web of Science (Clarivate Analytics), ProQuest Computer Science Journals, Journals@OvidSP Full Text, the IEEE Database,
- publicly available e-books in the electronic media portal of the Zurich University of Applied Sciences, and
- the publicly available print collection of the NEBIS (Network of Libraries and Information Centers in Switzerland).

First, the paper reviews the literature about the relationship between the Fourth Industrial Revolution and organizational culture. The work of Klaus Schwab (2017) is prevalent and appropriate for an introduction. Therefore, the study includes it. The terms for the search in this field are ‘fourth industrial revolution’ OR ‘industry 4.0’ AND ‘organi* cultur*.’ The term ‘organi*’ finds “organization” or “organizational” but also the British “organisation” or “organisational.” Similarly, ‘cultur*’ finds “culture” as well as “cultural.” Out of the results, the paper includes the study from Mohelska and Sokolova (2018).

The second expression to search references is “digitalization.” Consequently, the next search is with ‘digit*,’ which also gives results with “digitization” or “digital,” AND ‘organi* cultur*.’ The search result is overwhelming and shows the relevance of the topic. Surprisingly, with the search just through the titles, the found references are not about the relationship between digitalization and organizational culture. Instead, the titles are about different topics such as “institutional change” or “digital preservation.” Alternatively, the search terms ‘perform*’ AND ‘innovat*’ AND ‘organi* cultur*’ generate reasonable references about the relationship of organizational culture, innovation, and performance from which this paper presents the study of Hogan and Coote (2014). Furthermore, the paper undertakes searches in other databases on the internet. With this approach, the literature review adds articles of other journals and grey literature. The searches are about the ‘digital transformation’ in organizations (Deiser, 2018), the alignment of organizations for ‘digital success’ (Kane et al., 2016), ‘digitization’ and ‘disciplined autonomy’ (Mithas, Kude, & Reisman, 2017), ‘digital intelligence’ (Mithas & McFarlan, 2017), ‘digital infrastructure’ (Tilson, Lyytinen, & Sørensen, 2010), or the organizing logic of ‘digital innovation’ (Yoo, Henfridsson, & Lyytinen, 2010).

The search for ‘information technolog*’ AND ‘organi* cultur*’ suffers the same fate as the first trial of the search for “digitalization.” The search in full texts or abstracts results in a vast number of hits. If the exploration only performs the titles, the topics do not cover the research interest of this paper or are older than from 2001. That is why the study does not include them. Fortunately, the above-cited sources about digitalization support the examination of the relationship of information technology management and organizational culture.

In the following chapter, the paper discusses the gathered references regarding the connection of the Fourth Industrial Revolution, digitalization, and information technology management with organizational culture, as well as of organizational culture with performance.

2 Discussion

2.1 The Fourth Industrial Revolution and organizational culture

A broad scope characterizes the Fourth Industrial Revolution which integrates the physical, biological and digital spheres, as well as fast-evolving new business models, and enormous benefits and challenges (Schwab, 2017, pp. 6–13). Organizations tend to be less hierarchical, enhance collaboration and connect distributed workplaces and teams. The organizational change leads to platforms as operating models that need a shift in culture to attract and bind talents and the human capital with the appropriate skills (Schwab, 2017, pp. 50–64).

The Fourth Industrial Revolution is a birthplace for the platform economy. Many of the currently successful companies such as Alphabet, Amazon, or Apple, are following a sound platform strategy, with external development of complementary software solutions (Mithas et al., 2017, p. 6). In their research commentary, Yoo, Henfridsson, and Lyytinen (2010) propose a “layered modular architecture” for a better understanding of digital innovations. The layered modular architecture ends up in the platform economy with its business ecosystems. Through platform resources like software development kits (SDKs) and application programming interfaces (APIs) many enterprises are on different layers involved in digital product innovations (Yoo et al., 2010, p. 729). As an example in the automotive industry, many industry-far companies are innovating with new devices, services, and product enhancements, making the automobile itself a digital platform (Yoo et al., 2010, p. 729). Collaboration is a critical factor in the platform business models, not only cross-functional but also across organizational boundaries (Deiser, 2018, pp. 18–19). Although these boundaries provide identification and orientation, they can also mean constraints and silo cultures (Deiser, 2018, p. 19).

Does the organizational culture reinforce the adaptation of the Fourth Industrial Revolution? In her recent study in the Czech Republic, Mohelska and Sokolova (2018) examined the level of organizational culture for innovations in Industry 4.0. The authors referred to Wallach's three types of culture, namely the bureaucratic, innovative, and supportive culture, and tested Wallach's questionnaire from 1983, the Organizational Culture Index (Mohelska & Sokolova, 2018, p. 2231, Wallach, 1983, p. 32). The study has certain limitations such as that the survey ran in just one country and the sample represents only part-time students and their work colleagues. However, the results astonish the reader. Expecting that the perception of the organizational culture in research institutions was mainly innovative, it was more bureaucratic and supportive than innovative (Mohelska & Sokolova, 2018, p. 2238). The study concludes that the respondents are not ready yet for the Industry 4.0 concept; it needs further management support to establish innovative solutions (Mohelska & Sokolova, 2018, p. 2238).

2.2 Digitalization and organizational culture

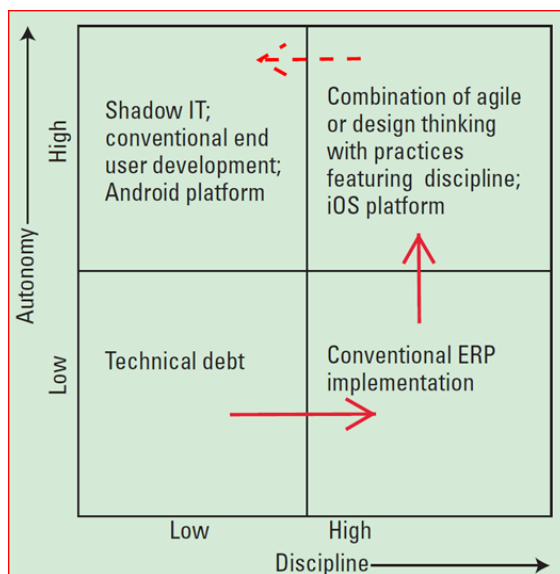
It is essential to distinguish between digitizing or digitization, and digitalization. The first term itself is not new. As "a technical process" (Tilson et al., 2010, p. 749) it is going back to the Third Industrial Revolution. This revolution is still on its way with the fact that what can be automated will be automated (Schwab, 2017). With progress in the field of electronics and the starting use of information technology in industrial processes in the late 1960s (Kraftová et al., 2018, p. 23), the Fourth Industrial Revolution as discussed above took the path. Consequently, digitalization means "a sociotechnical process of applying digitizing techniques to broader social and institutional contexts [...]" (Tilson et al., 2010, p. 749).

Generativity is one of the main characters of digitalization. It indicates that individuals, groups, and organizations create together services, applications, and content (Tilson et al., 2010, p. 750). Generativity requires radically new business models that precede "digital convergence," the conjoint notion of digital and social infrastructures (Tilson et al., 2010, p. 751). Finally, digital convergence is heading toward interaction forms of "connect and coordinate," rather than "command and control" (Tilson et al., 2010, p. 751). One of the challenges of generativity is the typical "duality" of digital infrastructures which means that they have to be both stable and flexible as well as to allow control and autonomy (Tilson et al., 2010, p. 753).

In their essay, Mithas and Kude (2017, p. 5) recommend for the information technology management a careful and appropriate balance of discipline and autonomy. Thereby, the term "disciplined autonomy" means a "combination of agile or design thinking approaches with practices featuring discipline" (Mithas et al., 2017, p. 5) such as providing vision, business strategy, and

overarching goals. The authors view the development of disciplined autonomy as a continuum (Mithas et al., 2017, p. 5). They argue that it is easier to take an anti-clockwise direction from the left-down quadrant with low discipline and low autonomy to the right-up one with high discipline and high autonomy, as shown with the arrows in Fig. 1. However, as the dashed arrow indicates, too much autonomy can lead to shadow information technology where the goals of the team are always more important than the goals of the company (Mithas et al., 2017, p. 5). The fact that enthusiastic and engaged teammates tend to lose the objectiveness also observed Deiser by examining “freedom vs. control” in a case study at Daimler (Deiser, 2018, p. 15).

Fig. 3: The discipline-autonomy matrix



Source: Mithas et al., 2017, p. 5

Traditionally, the focus of information technology management was on the side of discipline, following the waterfall approach with extensive planning, consecutive developing, quality milestones achieving, and specific tasks assigning to individuals with clear responsibilities (Mithas et al., 2017, p. 5). However, that is not adequate anymore, regarding the volatile and fast-changing business environment as well as the more sophisticated consumer needs. These changes address the agile project management framework Scrum and the relatively new approach of Design Thinking, both emphasizing more autonomy than discipline (Mithas et al., 2017, p. 6). Ultimately, disciplined autonomy implicates a focus on goals and visions while giving the business units the freedom about how they solve the customers’ problems and execute the details. A clear strategy and rewards and metrics through particular corporate standards and robust quality assurance are then the action points on the discipline side (Mithas et al., 2017, p. 7).

The authors did not present any research on disciplined autonomy. However, in a prior study with other colleagues, they found out that disciplined autonomy can positively influence the team members' confidence, and with this also the speed and quality of innovation in the software development (Kude et al., 2015, p. 4).

2.3 Information technology management and organizational culture

Information technology should always be a decent part of any strategy discussion. Mithas and McFarlan argue that in a long-term view, achieving “organizational sustainability” only works by integrating the capabilities of information technology in strategy development processes (Mithas & McFarlan, 2017, p. 4). Exploring new technologies by experimenting to gain new insights into applications, technologies, and their potential for change can enable new business (Mithas & McFarlan, 2017, p. 5).

The expanding role of information technology as a value creator in digitalization, developing new digital or digitally enhanced products and services, contrasts to the traditional view as a provider of effective, efficient, and secure information technology infrastructure (Deiser, 2018, pp. 23-24). The twentieth-century organization's paradigm with “command and control, silo mentality, stable business models, product orientation, clear industry boundaries, zero-sum game competition, [...]” (Deiser, 2018, p. 25) comes to an end, or at least, is no longer appropriate for the success in the era of digitalization. The opposite is exact, digitalization affords participative self-organization, non-linear processes, cross-boundary collaboration, ongoing business model innovation, and customer-centricity, and signifies fuzzy industry boundaries (Deiser, 2018, p. 25).

In their fifth study about digital business, Kane, Palmer, Nguyen Phillips, Kiron, and Buckley (2016, p. 11) propose a model with variables that positively influences the “digital culture:” embrace risk, experiment rapidly, invest in talent and provide leaders with “soft skills,” meaning managerial and not only technical knowledge. The study is mainly descriptive and illustrates the findings with business cases, respectively statements of executives as best practices. It ends in “digital congruence” that signifies the alignment of culture, people, structure, and strategy (Kane et al., 2016, p. 14).

“Digital intelligence” signifies that information technology management can understand the alignment of business and information technology strategies (Mithas & McFarlan, 2017, p. 3). Although, the authors suggest to shape alignment as “synchronization,” enabling a balanced view of business and information technology strategies. In this sense, digital intelligence is a mindset with openness to new technologies, with a clear vision of the information technology's potential and its impact on organizations, while ensuring the consistency of information technology and the business' needs (Mithas & McFarlan, 2017, pp. 3-4).

Hogan and Coote (2014, p. 1618) demonstrated that organizational culture partially mediates the effects of values that support innovation on firm performance. Their study has certain limitations, namely a small and biased sample, a poor response rate, and that they surveyed just one country. However, their stated measures for organizational culture are worth to consider (Hogan & Coote, 2014, p. 1618): motivation to take risks and to question the status quo, recognition by the management of the individuals' engagement and efforts, cross-functional collaboration, awarding success, allow and sustain openness, flexibility, and internal communication.

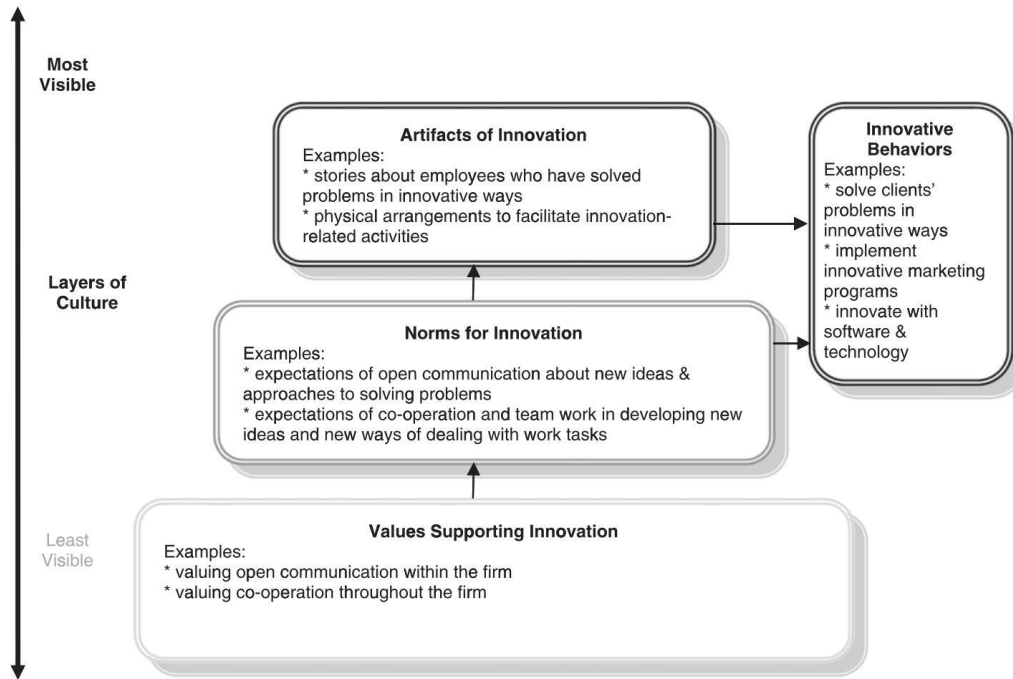
Lastly, the existence and the extent of a subculture, for example of an engineering division, plays a role how people perceive, accept, or perhaps undermine the organizational culture (Krause-Jensen & Wright, 2015, p. 348).

2.4 Organizational culture and performance

The measurement of organizational culture and performance is diverse and problematic. Regarding culture there exist several standardized questionnaires, though researchers tend to develop their specific theory-based scale or they apply a particular part of a theory, framework, or scale (Sackmann, 2011, p. 194). This diversity of research approaches is because of the very dynamic and manifold character of organizational culture. Sackmann states that no study will capture all dimensions and levels of the topic (Sackmann, 2011, p. 218).

The richness in the research field of organizational culture also reflects this paper. Alone, the presented literature counts 32 statements and potential measures for organizational culture in the Fourth Industrial Revolution, digitalization, and information technology management. The paper categorizes these notions of organizational in characteristics as shown in Tab. 1. Then, it structures the characteristics while using the dimensions of Hogan and Coote's theoretical framework shown in Fig. 2, following Schein's levels of culture and their interaction from 1984. The framework represents a broad variety, and with its layers of an organizational culture supporting innovation, it is very suitable for the information technology management in the era of digitalization.

Fig. 4: Layers of an organizational culture that supports innovation



Source: Hogan & Coote, 2014, p. 1610

Tab. 5: Structure of the characteristics of organizational culture for information technology management and digitalization

| Characteristic | Specification from the literature | Dimensions ³⁶ |
|------------------------|--|--------------------------|
| Connection | Organizations connect distributed workplace and teams (Schwab, 2017, pp. 50–64). | Artifacts |
| Non-linearity | Digitalization affords non-linear processes (Deiser, 2018, p. 25). | Artifacts |
| Customer centricity | Solve the customers' problems (Mithas et al., 2017, p. 7), and digitalization affords customer-centricity (Deiser, 2018, p. 25). | Behaviors |
| Innovative | Software development product innovation (Kude et al., 2015); and ongoing business model innovations (Deiser, 2018, p. 25). | Behaviors |
| Rapid experimenting | Exploring new technologies by experimenting (Mithas & McFarlan, 2017, p. 5), and experiment rapidly (Kane et al., 2016, p. 11). | Behaviors |
| Risk-taking | The behavior of embracing risk (Kane et al., 2016, p. 11), and a measure of organizational culture (Hogan & Coote, 2014, p. 1618). | Behaviors |
| Status-quo questioning | The "willingness to challenge the status quo" (Hogan & Coote, 2014, p. 1618). | Behaviors |
| Autonomy | Digital infrastructures with control and autonomy (Tilson et al., 2010, p. 753), disciplined autonomy (Mithas et al., 2017, p. 5), and scrum and design thinking emphasize autonomy (Mithas et al., 2017, p. 6). | Norms |
| Bureaucratic | i.e., one of Wallach's dimensions (Wallach, 1983, p. 32). | Norms |
| Collaboration | Organizations enhance collaboration (Schwab, 2017, pp. 50–64), a critical factor in the platform economy (Deiser, 2018, pp. 18–19), across boundaries (Deiser, 2018, p. 25), and functions (Hogan & Coote, 2014, p. 1618). | Norms |
| Control | Digital infrastructures allow control and autonomy mutually (Tilson et al., 2010, p. 753). | Norms |
| Coordination | Interaction forms of "connect and coordinate," as opposed to "command and control" (Tilson et al., 2010, p. 751). | Norms |
| Cross-boundary | About collaboration (Schwab, 2017, pp. 50–64); and digitalization signifies fuzzy industry boundaries (Deiser, 2018, p. 25). | Norms |
| Cross-functionality | Mainly about collaboration (Deiser, 2018, pp. 18–19, Hogan & Coote, 2014, p. 1618). | Norms |
| Discipline | The balance of discipline and autonomy, i.e., disciplined autonomy (Mithas et al., 2017, p. 5). | Norms |
| Hierarchy | Organizations tend to be less hierarchical (Schwab, 2017, pp. 6–13). | Norms |
| Participation | IT as part of any strategy discussion (Mithas & McFarlan, 2017, p. 4), and participative self-organization (Deiser, 2018, p. 25). | Norms |
| Self-organization | Scrum and design thinking emphasize autonomy (Mithas et al., 2017, p. 6), and participative self-organization (Deiser, 2018, p. 25). | Norms |
| Soft-skills providing | Human capital with the appropriate skills (Schwab, 2017, pp. 50–64) and provide leaders with "soft skills" (Kane et al., 2016, p. 11). | Norms |
| Talent investment | To attract and bind talents (Schwab, 2017, pp. 50–64), and to invest in talents (Kane et al., 2016, p. 11). | Norms |
| Appreciation | The management recognizes the individuals' engagement and efforts (Hogan & Coote, 2014, p. 1618). | Values |
| Flexibility | Both stable and flexible digital infrastructures (Tilson et al., 2010, p. 753), and organizations allow and sustain flexibility (Hogan & Coote, 2014, p. 1618). | Values |
| Generativity | Individuals, groups, and organizations create together services, applications, and content (Tilson et al., 2010, p. 750). | Values |
| Internal communication | The organization values open communication (Hogan & Coote, 2014, p. 1618) and empower information flows (Hogan & Coote, 2014, p. 1612). | Values |
| Mindset orientation | Digital intelligence as a mindset (Mithas & McFarlan, 2017, pp. 3–4). | Values |
| Openness | A mindset with openness to new technologies (Mithas & McFarlan, 2017, pp. 3–4), and a measure of organizational culture (Hogan & Coote, 2014, p. 1618). | Values |
| Subculture | The subculture plays a role in the perception of organizational culture (Krause-Jensen & Wright, 2015, p. 348). | Values |
| Success awarding | The organization values and honors success (Hogan & Coote, 2014, p. 1618). | Values |
| Supportive | i.e., one of Wallach's dimensions (Wallach, 1983, p. 32). | Values |

³⁶ Dimensions of the organizational culture layers (Hogan & Coote, 2014, p. 1610)

Given the findings of Hogan and Coote's study of the mediating effect of norms, artifacts, and behaviors on the effect of values (2014, pp. 1617–1618), this paper adapts their model and reformulates the hypotheses. The performance of information technology management in the era of digitalization is the dependent variable (Y). However, the dependent variable remains a black box; it is not defined and not further explained. Also, this paper does not discuss possible control variables which are, together with the dependent variable, a subject for further research.

Resuming the discussed relations of the Fourth Industrial Revolution, digitalization, and information technology with organizational culture (Schwab, 2017, Deiser, 2018, Mohelska & Sokolova, 2018, Tilson et al., 2010, Mithas et al., 2017, Mithas & McFarlan, 2017, Kane et al., 2016), the first hypothesis is, that there is a relationship between *organizational culture* (X_1) and *information technology management* (Y_1) overall:

$$Y_1 = f(X_1) \quad (\text{H1})$$

Second, *behaviors* (X_2) such as customer centricity (Mithas et al., 2017, Deiser, 2018), innovation (Kude et al., 2015, Deiser, 2018), or rapid experimenting (Mithas & McFarlan, 2017, Kane et al., 2016) have a direct impact on the dependent variable (Y_2):

$$Y_2 = f(X_2) \quad (\text{H2})$$

Third, *artifacts* (X_3) such as connection (Schwab, 2017) and non-linearity (Deiser, 2018) have a direct impact on the dependent variable (Y_3) and influence also the relationship of behaviors with the dependent variable (Y_2):

$$Y_3 = f(X_3, Y_2) \quad (\text{H3})$$

Fourth, *norms* (X_4) such as autonomy (Tilson et al., 2010, Mithas et al., 2017), collaboration (Schwab, 2017, Yoo et al., 2010, Deiser, 2018, Hogan & Coote, 2014), or participation (Mithas & McFarlan, 2017, Deiser, 2018) have a direct impact on the dependent variable (Y_4) and influence equally the mediating effect of artifacts (Y_3) and the relationship of behaviors with the dependent variable (Y_2):

$$Y_4 = f(X_4, Y_3, Y_2) \quad (\text{H4})$$

Fifth, *values* (X_5) such as flexibility (Tilson et al., 2010, Hogan & Coote, 2014), openness (Mithas & McFarlan, 2017, Hogan & Coote, 2014), or supportiveness (Mohelska & Sokolova, 2018, Wallach, 1983) have a direct impact on the dependent variable (Y_5) and influence also the relationship of norms (Y_4):

$$Y_5 = f(X_5, Y_4) \quad (H5)$$

Conclusion

This paper discussed the role of organizational culture in the information technology management for the success in digitalization. After conducting a literature review, it structured the characteristics of the culture of the Fourth Industrial Revolution, the digitalization, and the information technology management in dimensions of organizational culture layers, see Tab. 1. Finally, the paper demonstrated a model and hypotheses for further research.

As shown, the Fourth Industrial Revolution constitutes a sound organizational change, especially with the upcoming of the platform economy with its decent cultural implications. However, there is a shortcoming of the perception of organizational culture. Schwab (2017) remains theoretical; what his “cultural shift” implies, is not clear. Related to the Fourth Industrial Revolution, the socio-technical process of digitalization rules the game. Digitalization highlights “connect and coordinate” in the conjunction of digital and social infrastructures (Tilson et al., 2010). However, digital infrastructures have to be equally stable and flexible. This concept called generativity is linked to the platform economy and is interesting concerning organizational culture. Unfortunately, the researchers did not discuss culture.

Consequently, information technology management has to allow both control and autonomy. Mithas and Kude’s concept of “disciplined autonomy” represents a shifting of the “old” information technology management featuring discipline towards more autonomy, currently needed in agile and design thinking environments (Mithas et al., 2017, pp. 5-6). Unfortunately, the authors did not much research about their concept. Certainly, regarding the expanding role of information technology, the notions of “command and control” are no longer adequate. Maybe new buzzwords, however, “digital culture” and “digital intelligence” afford in organizations mainly an open mindset, allowing and enabling the organization’s members to take risks, question the status quo, rapidly experiment, collaborate across functions and boundaries, and furthermore, to be successful in digitalization.

This paper undertakes the first steps in modeling the relationship between organizational culture and the success of information technology management in the era of digitalization. It proposes that organizational culture affects the performance of information technology management teams (H1). *Behaviors* are introduced, like customer centricity, whereas organizations are trusting their business units or departments to solve problems with a clear customer focus, or innovative conduction, meaning that organizations request their members to develop innovative solutions or continually design business model innovations. The paper postulates that such behaviors have a direct impact on the success (H2). Also *artifacts*, here connection, and processes (H3), *norms*, such as discipline, autonomy, or collaboration (H4), and *values*, i.a., appreciation, flexibility, or openness (H5) have a direct impact. However, there are also mediating effects such as artifacts on behavior (H3), norms on artifacts (H4), and values on norms (H5).

The next steps of the research shall be qualitative and quantitative tests of the model and the hypotheses. In further research are the presented characteristics of Tab. 1 items for a questionnaire. However, first, in a proof of concept, these items will be explored. This exploration includes a further literature review as well as qualitative research methods such as interviews with colleagues, experts, and practitioners. After assurance of the items for measuring organizational culture, the study conducts the survey. The sample for the survey consists of teams of corporate information technology management as well as from external information technology providers.

Although, measuring the dependent variable will be a significant challenge. Regarding objectivity, the information technology management performance' measurement is critical. Mostly, performance measures are biased because the data collection is by questioning the same respondents as for the perception of cultural aspects (Sackmann, 2011, p. 195). For that reason, data gathering for the dependent variable will use publicly available databases such as market indexes, rankings, or innovation awards. Linking the collected data to the results of the questionnaire will be provided by comparing the respondents' indicated company.

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THE UNIVERSAL DIMENSIONS OF INDUSTRY 4.0 MATURITY MODELS FROM THE BUSINESS INFORMATICS PERSPECTIVE

František Simetinger

Abstract

Purpose: This paper is focused on the identified gaps in the Industry 4.0 maturity models for assessment of companies and enterprises readiness. The main output of this paper is a discussion of these gaps, identification of possible causes and solutions, and their integration into the concept of IT management paradigm for Industry 4.0.

Design/methodology/approach: The literature review has a goal to identify the actual situation and solutions for the identified gaps in the areas as economic management, corporate governance, leadership, management, and education. As the following step, the inputs from the literature review were used for adaption of modern management methods which can be used within business informatics in the context of Industry 4.0.

Findings: The concept of Industry 4.0 requires significant changes in the concepts of management and governance of business informatics and its surrounding environment. It is needed the transformation of the relationship from dependency to the regular partnership between business informatics and its organization and enabling of the innovative culture.

Research/practical implications: The proposed concept is relevant for responsible decision-makers and leaders in the organizations which consider the implementation of Industry 4.0 concepts. It helps with the identification of new perspectives to the existing relationships and how to adapt the business informatics to the Industry 4.0 concept.

Originality/value: Another concept with a similar aim of focus is not available yet. Based on gaps in the Industry 4.0 maturity models, it provides a new approach to issues which are constantly getting higher importance. These issues require multidisciplinary solutions and possible way is provided in this paper in a form of the new concept of IT management paradigm.

Keywords: Industry 4.0 Maturity Model, Strategy, Business Informatics, Balanced Score Card

JEL Codes: L21, M14, M15, M21, M51

Introduction

Industry 4.0 is an actual topic in the academic and professional spheres. This concept is based on the recent advancements in technology, automation, management, culture, and many other areas. Industry 4.0 is part of a larger initiative called digitization which brings new opportunities to organizations from various areas including profit and non-profit sectors.

This paper builds on the previous research done at the Faculty of Informatics and Statistics at the University of Economics in Prague. The researchers conducted a detailed comparative analysis of the Industry 4.0 maturity models which were identified as significant. Total of 17 maturity models with their 110 different dimensions were involved in the comparative analysis. The result of this comparative analysis was the definition of shared dimensions which should be considered in the assessment of the organization preparedness or its level of maturity. Within this research, two basic levels of scope were considered – macro and micro; and a new level was defined – nano. The macro level is focused on national and multinational context for Industry 4.0 readiness, micro level is aimed at the readiness of company or organization for the Industry 4.0 concept, and nano level is defined by an individual business unit which is part of such organization (Simetinger, 2019).

The results of the comparative analysis indicate that there are still gaps in the conceptual approach to the Industry 4.0 phenomenon. The main technological perspective was agreed among all analyzed maturity models, but more importantly, the additional key areas were identified: *“...maturity models agree on the importance of areas like strategic alignment between business and business informatics, improvement of leadership across the whole organization, and supporting of the corporate culture opened for innovations, changes, and new business models.”* (Simetinger, 2019). At the same time, the comparative analysis uncovered that these “unexpected” dimensions are not elaborated in needed detail and an individual adaptation to the concept of the Industry 4.0 is required. The coverage of the defined shared dimensions and their areas are visible on Fig 1.

This diagram shows the percentage of full and partial + full covers between significant maturity models and universal dimensions. In other words, the “Full Cover” columns show how many models consider the proposed dimension on the “full” overlap level (activity/area is covered in similar scope and it has defined a similar highest maturity level). The “Partial + Full Cover” columns show how many models consider the proposed dimension on the “full” or “partial” overlap

level (activity/area is considered in both models but with different level of detail or the different definition of the highest maturity level). These results indicate which dimensions are well covered and which will require additional attention in terms of defining their maturity levels.

Fig. 5: Universal dimensions and their overlaps

| Dimensions and related sub-areas vs. Cover by Models | | Full Cover | | Partial + Full Cover | |
|--|---|------------|-----|----------------------|------|
| Strategy | Business-IT Alignment | 12 | 86% | 14 | 100% |
| | Competitive Position | 7 | 50% | 9 | 64% |
| | Processes | 13 | 93% | 14 | 100% |
| | Corporate Governance (including security) | 9 | 64% | 10 | 71% |
| | Investments & Economy | 7 | 50% | 11 | 79% |
| Value Chain | Smart Products | 13 | 93% | 14 | 100% |
| | Customers | 12 | 86% | 12 | 86% |
| | Partners | 12 | 86% | 12 | 86% |
| | Business Model | 11 | 79% | 13 | 93% |
| Organization | Leadership | 6 | 43% | 13 | 93% |
| | Management | 13 | 93% | 14 | 100% |
| | Corporate Culture | 8 | 57% | 11 | 79% |
| Human Resources | Skill Management | 7 | 50% | 9 | 64% |
| | Training & Education | 5 | 36% | 9 | 64% |
| Technology | IoT/Sensors | 12 | 86% | 14 | 100% |
| | Infrastructure/Communication | 12 | 86% | 14 | 100% |
| | Data Analytics & Integration & Management | 12 | 86% | 14 | 100% |
| | Service-orientation | 4 | 29% | 11 | 79% |
| | Smart Factory | 13 | 93% | 14 | 100% |

Source: Simetinger (2019)

These conclusions opened additional questions. How to improve the areas with a low rating of cover (it means coverage under 75%)? What are the requirements and prerequisites for their improvement? What are the best practices for these areas? This paper discusses the identified best practices and recent researches in the subareas with an overall lower level of the cover in dimensions Strategy, Organization, and Human Resources, which provides inputs for the adaptation of the business informatics management framework.

This paper has the following structure: the first part is focused on the summarization of available literature and other resources related to the investigated dimensions. The second part discusses the impact of the gathered inputs from the literature analysis to the business informatics and proposed general measures. The third part proposes a new concept for the management of the business informatics. The third part summarizes the results of this study and proposes next steps in the research.

1 Literature analysis

The dimensions Strategy, Organization, and Human Resources with a lower level of the cover have increasing importance in the Industry 4.0 concept and in the digitization initiative in general. It is also the reason why these areas are subject of interest for popular magazines about business and entrepreneurship, consulting companies, and research centers affiliated to prestigious business schools.

The dimensions and their subareas with a low level of cover were grouped into two groups: strategic group (including Competitive Position, Corporate Governance, Investment & Economy) and management group (Leadership, Corporate Culture, Skill Management, training & Education). But, it is important to understand that the subareas are not isolated islands and they are more or less coupled together and treating them separately is not possible unless limited areas and low maturity levels within the maturity models (Simetinger, 2019).

1.1 Strategic group

The subject of the literature review in the strategic group were requirements imposed by the Industry 4.0 concept to the corporate governance and economic models. The subarea of the competitive position has more or less an informative role on the nano level of business informatics. The activities conducted in this subarea are out of the business informatics department responsibility and they are under the responsibility of the departments which are focused on the market and competitive research (Ganzarain & Errasti, 2016; Lichtblau, Bertenrath, Millack, & Schmitz, 2015).

In the corporate governance subarea, the main fields for the business informatics are security and compliance of the Industry 4.0 solutions. These solutions require new tasks and roles on the side of business informatics department. The study (Simetinger, 2018) elaborates the impacts of the highest level of Industry 4.0 maturity as it is defined in (Kubler, Holmstrom, Framling, & Turkama, 2016; D. Wu, Terpenney, & Schaefer, 2017) to the IT assurance and compliance. This study integrates principles defined in COBIT 5 together with results of an intensive literature review focused on specifics of Industry 4.0 concept (in its cloud-based form) and defines general recommendations. These recommendations are based on the confrontations of newly incorporated components required by cloud-based Industry 4.0 like IoT, product-centric control component, and direct digital manufacturing (Kubler et al., 2016) with security standards

like ISO norms (families 9000, 20000, and 27000). The main conclusion is that cloud-based Industry 4.0 solution has much higher requirements to the user/consumer of this solution due to the need of new reporting tools, negotiations, and related transactions costs related to specific norms applied to their cloud services provider (Simetinger, 2018). Considering the audit as an integral part of compliance and assurance, it is important to mention the “triangular data privacy-preserving model” which defines new roles in the relationship between the cloud provider and cloud consumer (Razaque & Rizvi, 2017). Together with the adjustments of the relationship between the cloud provider and cloud consumer, the key area is the SLA and its components. The new components needed in SLAs and required by cloud-based Industry 4.0 are elaborated in (Rizvi, Roddy, Gualdoni, & Myzyri, 2017). The key new components related to the measures in case of the security incidents and ensuring of compliance with industry-specific standards which are required by the consumers of these services.

The Investment & Economy subarea is under rapid development in the context of business informatics. The outdated methods and models are getting replaced by more relevant and sophisticated methods. There are studies which elaborate the relevant methods for use within the business informatics department (Festa, Cuomo, & Metallo, 2015; S. P.-J. Wu, Straub, & Liang, 2015). These studies present the replacement of the methods ROI (Return on Investment), ROE (Return on Equity), and NPV (Net Present Value) by more advanced methods as BSC (Balanced Score Card) and EVA (Economic Value Added). Also, the models described within studies share an important trait and it is the involvement of financial activities in the planning phase of the IT implementation project. A different perspective is provided by (Saunders & Brynjolfsson, 2016). In this article, there is introduced a concept of the IT-related intangible assets valuation. In the case, when the resources of the business informatics are perceived as assets, it is possible to involve them transparently in the advanced financial methods mentioned above.

1.2 Management group

The subject of the literature review in the management group was new approaches to the management and leadership in organizations which support the openness to the innovations and changes, and overall higher flexibility. In fact, the actual trend of the digital transformation helped rapid development in this area, but the most groundbreaking discoveries are often available in popular magazines.

McKinsey & Company consulting firm launched a series of articles based on analysis of real situations which are published in their McKinsey Quarterly magazine. One of the key shifts in understanding of internal processes and culture opened for change is described in (Koller, Lovallo, & Sibony, 2018) where the benefits of dynamic reallocation of the resources out of the original strategic plans are explained. In general, it is important to be prepared for a change of priorities and reallocation of the resources if the circumstances in the company's environment change. This is not a common practice. According to the conducted research, companies are not willing to change the original plans significantly which results in the lack of flexibility when needed. But, it is not possible to change priorities and reallocate the resources randomly but after the reasonable assessment of change in the company's environment. Such assessment of the surrounding environment requires the adjusted perspective. This technique is described in (Koller & Lovallo, 2018), where the importance of a combination of intuition, expertise, and experience during the assessment of the changes in the internal and external environment of the organization is described. The most proposed method is using of analogical cases which helps with estimation of the results of the adaption to the changes, but for the correct adjustment and extrapolation of the used previous case for the current situation require advanced hard and soft skills in combination with already mentioned intuition.

The organization can be also paralyzed by a reluctance to take risks and experimental effort. The complex elaboration of this issue is in (Nickish, 2019). The mentioned study analyzed several key situations where the circumstances of taking or not taking risks were analyzed. The concept of psychological safety describes the importance of punishments in the case of failure. The companies which have a higher tolerance to the failure in the case of experimental projects and the responsible persons are not heavily (or fatally) punished in the case of failure, reports a higher level of overall innovations. The explanation is that this environment in combination with appropriate education and training are bringing up highly motivated, resourceful, and innovative individuals. But, of course, this concept cannot be used everywhere and in general, there must be ensured balance because no organization can afford infinite loses.

2 Impact on business informatics

The result of the literature review indicates the possible ways how to fill the gaps in the subareas within Industry 4.0 maturity models. Generally, it is possible to conclude that the digital transformation and the concept Industry 4.0 requires improvement of the flexibility and alignment with the business tasks. But, as it is described in the literature review in the management group, this is dependent on changes in the approach and attitude of both sides (business informatics department and the rest of the organization). One reason, why the business model has a higher level of coverage, is that the incorporation of the business models is understood as the reasonable way how to solve this disproportion. The mentioned advanced methods of financial management (BSC and EVA) can be used in the business informatics department for alignment with business models.

Using such innovative methods requires a change in the understanding of the relationship between business informatics and its partners and customers. It requires a shift in attitude. One of the main issues for this shift is: *“pressure on high profitability brings negative side effects. In the context of business models, the significant negative side effect is a reluctance to accepting long-term and resource demanding projects and investments. It is simpler to focus on short or mid-term targeted goals and investments without or with a limited negative effect on the profitability”* (Wit & Meyer, 2014).

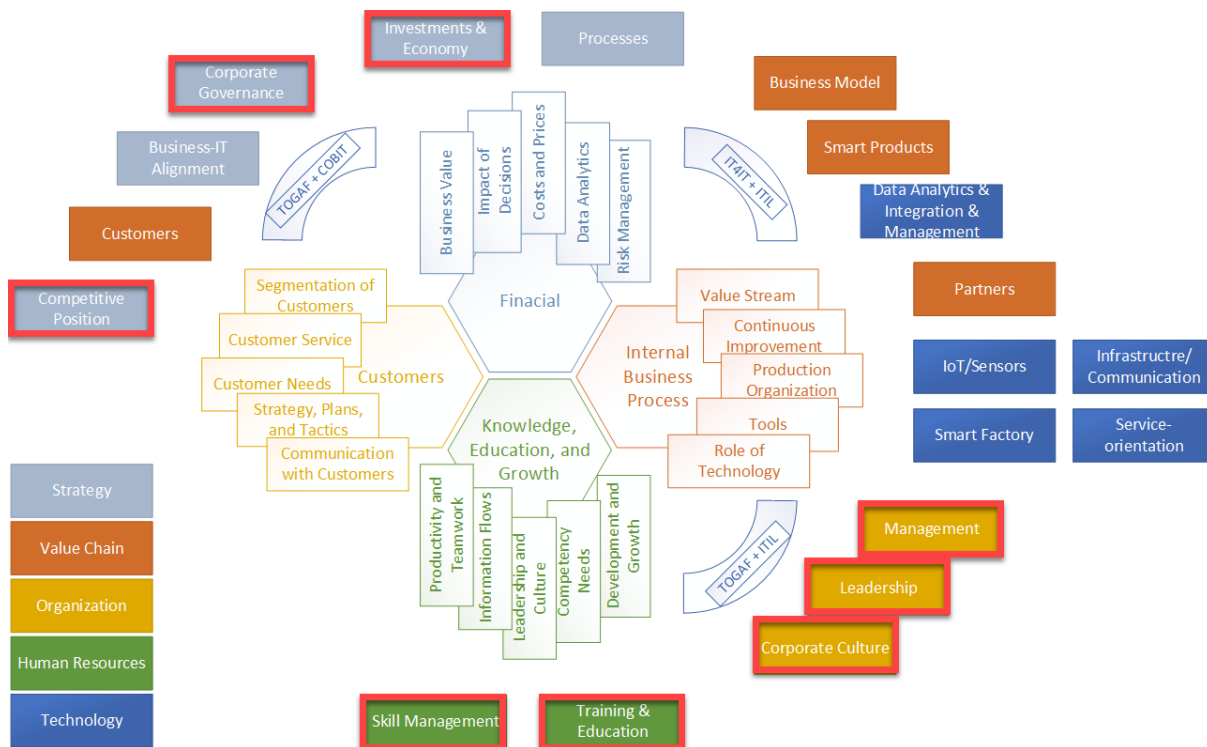
But the origins of this issue can be mitigated. This shift can be supported by an innovative culture. The openness to experimental work and acceptance of failure lead to better performance and motivated employees. As it is described in the study (Pisano, 2019), where companies like Google, Apple, or Amazon are put as examples. These companies have programs for their employees where they can contribute to projects they are interested in and which have the potential to improve the competitive position of the company. For these companies, they are also very important processes related to recruiting, assessment, and development of employees (Pisano, 2019). At the same time, the management and leadership must be handled very well and be able to coordinate experimental work, its assessment, and regular work duties at the same time. But the most important thing is the tolerance to failure when the previously promising project has gone into the dead end. It is also the step to ensuring “psychological safety” in the shape as it is explained in (Nickish, 2019). The conclusions of these studies indicate that freedom and encouragement of competent people result in new innovative products and services.

3 Concept of IT management paradigm for Industry 4.0

The BSC method is in its original form designed for micro level – for the company as a whole. It means that it needs an adaptation for the nano level of business informatics. It is possible to adapt the BSC method and combine it with other methodologies for better use in the business informatics.

The BSC method introduces four dimensions: Customers, Financial, Internal Business Process, and Knowledge, Education, and Growth. Considering this method in the context of the results of comparative analysis, this method also targets the painful subareas – especially cultural ones. There is mentioned the importance of the rewarding system for individuals, teams, or company when the efficiency of monetary rewards is lower than alternative kinds of rewards (Hannabarger, Buchman, & Economy, 2007). Within this introduced concept of IT management paradigm, the methods like COBIT, ITIL, and TOGAF are integrated into the BSC method. The whole concept is shown on Fig. 2.

Fig. 6: Concept of IT management paradigm based on BSC



Source: Author

The dimensions and their key areas of BSC are placed in the center of Fig. 2. The subareas identified in the comparative analysis are spread around according to the corresponding context within BSC. The colors indicate the universal dimension to which subareas belong and the red rectangles label the subareas with the low level of cover. The pie arcs then provide information about the useful IT-specific methodology which can be used for enhancement of the original BSC method.

The IT-specific methodologies are chosen according to mutual recommendations. As it was mentioned in the literature review, the methodology COBIT 5 was used by several authors for related to the compliance and assurance activities which are an integral part of the Corporate Governance on the nano level. COBIT 5 methodology recommends the ITIL v3 2011 for handling economic and financial tasks in IT (IT Governance Institute, 2012). TOGAF methodology is then possible to use as an umbrella concept for both (The Open Group, 2010). TOGAF is prepared for cooperation and integration with ITIL v3 2011 and COBIT 5 and provides them broader perspective within the whole organization. It is also mentioned methodology IT4IT in Fig. 2. The IT4IT methodology is a (relatively) newly introduced concept which extends TOGAF, and it is even more prepared for cooperation with ITIL v3 2011 and COBIT 5. The IT4IT is primarily focused on value streams in business informatics (The Open Group, 2017). But in the context of discussed subareas of this paper, it is not so important.

These methodologies provide actions and processes which are better prepared for use in the business informatics but can still benefit from including in the BSC. The output of IT-specific methodologies can be used within templates developed for BSC and then get consistent and transparent information value for management of business informatics and rest of the organization. It is important to mention that the incorporation of all methodologies within BSC provides the better inputs for definition and use of business models within business informatics because dimensions of these two concepts are very similar (Hannabarger et al., 2007; Wit & Meyer, 2014).

Besides the security, compliance, and assurance, the COBIT 5 introduces the process which helps to create a connection between subareas Corporate Governance and Investments & Economy. These processes are: APO06 Manage Budget (recommends ITIL v3 2011) and Costs and BAI09 Manage Assets. These processes elaborate the conception of units costs in IT (IT Governance Institute, 2012). It is a mandatory element for enabling the possibility to use the previously mentioned method EVA and it can be used in the dimension Financial. There are available tasks

which can be used for determination of costs, target prices, and risk assessment. The combination of ITIL v3 2011 and COBIT 5 provide more relevant methods for the business informatics environment and in the form suitable to BSC. In the case of Competitive Position, the BSC method provides better capabilities for assessment of the competitive situation and preparation of the future steps and plans. In this area, the business informatics should use the BSC in its original form (if the Competitive Position subarea needs to be covered) because IT-specific methodologies are not able to provide a comparable alternative.

In the subarea Human Resources, the methodology TOGAF is helpful. This methodology has a complex framework for the definition of needed skills and competencies and their mapping to the IT services (The Open Group, 2010). There are even elaborated the needed skill sets for some roles and they can be used as a base and provided to the competent department for adjustment of staffing strategy within the organization.

On the other hand, there is remaining the subarea Organization. This subarea cannot be simply solved by the application of some methodology. But the improvements can be achieved as a side product of this concept based on BSC. As it was mentioned, the innovative culture can be supported by openness to the experimental projects which have benefits for employees and their organization. In the context of recommendations in BSC, the participation in such experimental projects can be part of rewarding measures. In combination with the transparent economy based on business models, business informatics should have the resources for financing such projects because in the prices for IT services, the costs of these activities can be included. At the same time, the BSC can provide an understandable rationale for these activities.

Conclusion

This paper discusses issues and possible solutions related to the planning and realization of Industry 4.0 solutions. The ongoing research is based on the results of the comparative analysis of the significant Industry 4.0 maturity models and it addresses the identified gaps which are not well covered in the analyzed maturity models. These gaps are represented by subareas like economical and investment management, human resources management, education, and training, or concept of leadership and corporate culture. Despite the fact that these areas are not covered, they are essential for the success of the Industry 4.0 projects.

The literature review confirmed that these subareas are already aimed by other researches and there are available techniques and approaches on how to solve the organizational issues. There are methods like EVA and BSC which in combination with business models provide an opportunity for improvement of the flexibility and support of the innovations in the business informatics and its organization. BSC method, as a concept for management, can be adapted by methodologies used in IT nowadays. It results in the combined IT management paradigm which aligns the understanding of IT operations, IT costs, and IT benefits within the rest of the organization. Such adaptation was not introduced yet, but the potential of synergic benefits is imminent. Combination of IT-specific methodologies with BSC method provides a new common interface between business informatics and the rest of the organization.

At the same time, it is still important to mention that the shift in perception and behavior of people cannot be taken for granted. This is the most difficult task in this internal transformation and it will require something more than training and education. These conclusions confirm the Industry 4.0 as multidisciplinary topic which is influenced by culture and attitude of involved people. One of the main topics for the following research is the influence of empowerment and leadership on the innovative culture within the organization.

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TELEWORKING AS A MODERN METHOD OF WORK

Pavel Sládek – Tomáš Sigmund

Abstract

Purpose: The aim of this paper was to find out the attitude of students of economic fields towards teleworking and their awareness of the related issues and to analyse the historical development of their opinions. Wider consequences were also drawn from the results.

Design/methodology/approach: We conducted a survey to achieve our purpose. A group of respondents was randomly selected and then the respondents were randomly selected out of the group. The respondents comprised 108 university students. We analysed the results by means of the descriptive statistics and the analysis of correlation.

Findings: Given the fact that the research has been carried out with university students, the numbers of people aware of the concept of teleworking are relatively low. The implementation of teleworking is also not very frequent. The data vary considerably according to age and level of education of respondents. The results from the years 2002 and 2019 are similar. The entrepreneurs should offer their potential employees a combination of classical work and teleworking and they should be especially sensitive towards woman in maternity leave who would opt for teleworking to stay in touch with their work.

Research/practical implications: Our results can help both those interested in this style of work and managers because students will be their potential employees. Students should be more informed about the options, benefits and drawbacks of teleworking at their universities. Employers should be encouraged to offer this type of work to their employees.

Originality/value: There are only a few researches pursuing this type of issues. Usually the awareness of the concept, benefits and drawbacks of teleworking is considered for granted. The research of the respondents' attitude towards teleworking is also relatively rare. The benefit of this work is among other things its so-called longitudinal approach.

Keywords: Teleworking, Homeworking, Home Office, Mobile Teleworking

JEL Codes: J 61, J 81, M12, M14, O15

Introduction

According to Sroka (2018) ascending numbers of teleworkers can be observed both in Europe and in US. In Europe percentage of adults working from home grew from 11.8% in 2006 to 14.5% in 2015. However, the numbers vary significantly between the countries. The highest proportion of teleworkers can be found in Denmark, Sweden, Netherlands and UK – 37%, 33%, 30% and 26% respectively. In comparison, remote work is the least common in Visegrad group countries, Greece and Italy.

According to Brewster et al. (2018, 248) in 2013 on the average 65% of European companies provided flexitime for at least one of their employer. In the Czech Republic it was almost 70%, in Slovakia as well, in Poland and Hungary around 50%. According to the EWCS survey (Sixth European Working Conditions Survey, 2015) from 2015 in the Czech Republic regular home based telework is performed by 2% of employees, high mobile telework on various premises by a similar number of employees, occasional telework as well. In Slovakia it was around 1% for the first two groups and 7.5% for the third one. In Poland, the numbers achieved a little lower level. The results in Hungary were similar to Poland.

Teleworking is the consequence of globalized economy, which aims at the flexibility of the labour market. In order to assess its acceptance among young labour force we have carried out a research focusing on its acceptance among the young people.

Teleworking as a possibility to work anywhere and anytime has been enabled by the modern ICTs. Modern employees may use virtual private networks, broadband internet connection, videoconferencing, cloud computing etc. Their familiarity with the modern technologies is so a prerequisite. With the advance of teleworking the necessity arouse to give them more independence and empowerment in order to perform their work when and where it suits them. This new type of work brought about new challenges and opportunities for both employers and employees. Work is not oriented to where and how the product is produced any more, but becomes more oriented on what it produces. Managerial and supervisory work has to be more focused on the deliverables and not on the direct control of workers. (ILO, 2016) It means that the character of work has changed and we wanted to analyse how the change has been reflected by the new employees – university students.

Our research was carried out at the beginning of 2019 and follows up the previous surveys from the years 2002 and 2003. The previous survey was carried out at the Faculty of Business and

Economics of the Czech Technical University (where economic studies are mainly studied) and the Faculty of Mechanical Engineering at CTU. In the current survey 108 students from the private University of Business (VŠO) and students of the Public Technical and Economic University (VŠTE) participated. The selection was realized as a random two-step process. At first, a group of students was selected randomly and then out of the group respondents were randomly asked to fill in the paper questionnaire. The students' interest in teleworking can be expected to last even after graduating from university. Students of VŠO are mainly focused on economic issues in the field of tourism, where there are many applications for teleworkers. Students of VŠTE study technical and economical fields in which it is also possible to work remotely. Because the semi-structured interview contained no sensitive questions (concerning money, property, etc.), respondents responded immediately and relatively without any problems.

In the 2019 survey 41.7% were men (45 respondents), 57.3% were women (62 respondents). 84.3% of respondents (91) were less than or equal to 24 years of age, 14.7% were 25-29 years old (16). Only one (1%) was older than 29 years. 38.9% (42) were from the VŠO, 61.1% (66) were from the VŠTO. As for the ICT skills 17.6% were beginners, 40.7% were intermediate, 38.9% advanced, 2.8% professionals. 32.4% were from a town with less than 2000 inhabitants, 20.4% from a town with 2001-5000 inhabitants, 47.2% from a city with 5001 and more inhabitants; to sum up 52.8% were from a countryside, 47.2% from a bigger city.

In the survey which was carried out in 2002 406 respondents participated, 257 men (63.3%) and 149 women (36.7%).

The aim of the survey has been to find out to what extent students are acquainted with the concept of teleworking and what their relationship towards this type of work is. The results may be interesting for entrepreneurs who could attract more employees by offering this working option in a design attractive for students. Students are a promising group of potential employees and employers should know what their expectations regarding future jobs may be in order to address them accordingly.

The limitations of our survey consists in the fact that we have analysed the students of two universities only, the number of respondents is not very high and we asked them theoretical questions only. An experiment would be better for the deeper understanding of their attitude, but we were limited by time and resources.

1 Do students know the concept of teleworking?

Remote Work or Teleworking is a way of work in which an employee works for an employer who is mostly in another place. This way of working is related to modern management trends such as knowledge management (Koudelková, 2015). Knowledge of teleworking has not changed much for students between the years 2002 and 2019. Today, 60.2% of students know the term teleworking compared to 61.3% of respondents who knew what teleworking was during our last survey. The positive responses of men and women differed (2018: men 48.9%, women 69.1%, 2002: 62.6% men, 59.1% women). We may ask the question if this number of informed students is high or low. This style of work can be found today under a number of other labels, like homeworking, telecommuting, teleworking, etc. On the other hand, information about this style of work can be already found in some secondary school textbooks of economics (Klínský and Münch, 2017) or in the recommended literature for college students in economic fields (e.g. Kučírek, 2017). The term teleworking is commonly used in academic environments. (Groen et al., 2018). That is why the relatively low knowledge of students about this type of work is surprising. Maybe they know the concept under a different name, e.g. home office.

A similar issue was also dealt with by the DEMA research for the Information Society Association (SPIS) (Vojtášek, 2002). The initial question was if people were informed about the possibility of working from home. According to the survey, only 20% of respondents have an awareness of this way of working. The most interesting finding was, according to the authors, a very low number of people who know something about the possibilities offered by teleworking. This survey considered the whole population unlike our survey which considered university students only.

2 Data and Empirical Results

2.1 How many people practice teleworking or think about it?

When asked if they wanted to work this way, 62% answered positively (62.2% of men, 61.3% of women), which is much more than 17 years ago, when 41.1% wanted to work from a distance (45.1% of men, 34.2% of women). As far as current practice of teleworking is concerned, 11% currently work or worked this way, whereas in 2002 only 10.1% of respondents worked this way. This is a very small increase. These results correspond to the results of the survey conducted

at students of Translatology in Spain (Olvera-Lobo et al., 2007), where not even two percent of the students have some experience with working from a distance. This low result is remarkable because translators are a good profession for teleworking and indeed many of them are working in this way. Teleworking is also a style of work where, in addition to the language skills of workers, the ability to communicate between different cultures is also important (Mustafa, 2004).

Contrary to the above-mentioned survey among students of translatology in Spain, a part of our research did not include a practical course on how to perform teleworking. However, students were given (after this investigation - to be unaffected) information about teleworking in management courses.

In our survey, there were little less men working from a distance (6.7%) compared to women (14.5%). In a similar survey conducted at the Islamic University Malaysia (Ismail et al., 2016), women preferred much more work at a distance (84%). This high figure was apparently due to factors that are specific to the Muslim world.

Today, teleworking is considered a welcomed benefit for employees. Companies most often offer one day a week as a home office. Regarding full-time teleworking, both employees and employers are, however, more restrained.

2.2 Why do responders work remotely and what type of work do they perform?

There are numbers of reasons why people choose to work from a distance or think about it. Often, these reasons are influenced by the gender of the respondent(s) and from that resulting concept of future life roles. Other reasons, such as the type of school or whether the student is from the city or from the countryside, were not visible in the answers. Most respondents work or would work from a distance at the employer's suggestion (39.9%), which is a minimum increase from 36.9% in 2002. In this case, it is important that this method of work is chosen by mutual agreement and is a free choice of the employee. Other potential reasons are maternity leave and care for a disabled person (42.6%). This today very popular reason for working at home was in 2002 represented only by 10.2%. Men would work primarily on the employer's recommendation, while women would choose teleworking as a complementary activity to maternity or parental leave (61.9%), which is almost twice more respondents compared to 2002 (33.3%). Parental leave as a reason for teleworking was even considered by 20% of men, in 2002, there were only three men responding positively to this option. Other reasons (loss of job and health problems) did not exceed 5%.

A specific form of work for students are students' temporary jobs – represented by 22% in our survey. Some students work this way especially during their studies at university, men and women responding almost identically. Temporary jobs have a charm for students, especially because this work does not bind them any further. Many respondents do not intend to return to this type of work after graduation. For some distance students, it is an activity that makes it possible to earn some money while studying, but they do not intend to practice it as a normal job after graduation.

2.3 Type of distance work

Concerning the question of what type of work is the most suitable for respondents, most respondents want to combine work at home and work at the workplace (54.6%). This option is considered by professionals to be very beneficial. The only downside is the need to invest in dual equipment, or, possibly - and this is perhaps a more reasonable option - using a laptop computer. The second place is the mobile teleworking (flexi work) (27.7%), which uses mobile devices, mostly laptops, as well as tablets and even mobile phones. Classical homeworking, that is work at home, gained the popularity of 15.7%.

Women prefer work at home more than men because it allows them to combine work from a distance with the care for a relative or maternity leave (women 20.9% and men 8.8%).

Men, on the other hand, prefer to combine work at home and office work (55%), which represents a certain increase compared to 2002, when men preferred this most favourite option by 41.1%. In many cases, this option seems to interfere with mobile teleworking, which was preferred by 33% of males, a remarkably small increase compared to 2002 when 31.7% of men preferred this method of work.

Combining work at home and in the workplace is, according to current knowledge (Biron and Veldhoven, 2016; Fonner and Stache, 2012), considered the best option with regards to the needs of employees.

As far as various telecentres are concerned, this option was not used in the Czech Republic and is not used today either. As there are almost no public centres in the Czech Republic, it is natural that this alternative was chosen the least. In the Czech Republic there are some centres only as protected workshops for the disabled people.

Even in the world the centres are losing their importance for teleworking, or focus rather on education, tourism and community support. In the countries where these centres functioned, they were mainly visited by women who, in many cases, nowadays use other support such as kindergartens and the like. An alternative to telecentres which are public may be the coworking which gathers people with similar orientations and is not founded by the state nor municipalities.

As the research was conducted at universities with an economic or technical focus, respondents opted for distance jobs in areas such as business and accounting (18.5%), translations (7%) and guiding (7%). Answers of men and women's differed significantly only in the case of accounting (25.8% of female volunteers and 8.8% of males), similar to 2002 where we recorded similar results (22.2% of female volunteers and 3.5% of male males).

It can be stated that most respondents are unaware of the health and psychological problems associated with remote work (only 19.4% of men and 16.4% of women in 2002; 11.1% of men and 17.7% of women in 2019). At the same time, this threat is one of the biggest problems in this style of work.

2.4 Knowledge of computing

The knowledge of computer technology is important for expanding work from a distance. Respondents answered the question of how they evaluate their computer skills themselves. In our latest survey, 17.6% were considered to be beginners, and it is interesting that it is more than in 2002 when it was only 7.9% of beginners, 40.7% for the intermediate, which is the same as in the year 2002, i.e. 40.6% and 38.9% of the advanced ones, which can be compared with 46.6% (2002). The number of respondents, who would be rated as professional (2.8%), fell slightly (2002: 4.9%).

Interestingly, more knowledge (or higher self-esteem) has men. This difference is quite striking. For men, 5.4% of respondents are among the beginners, while for women 12.1%. Women are also more advanced (48.3%), while men are less (36.2%). 51% of men consider their knowledge to be advanced. For women, it is only 38.9%, and women who consider their knowledge as professional do not form even a percentage. By contrast, 7.4% of men consider their computer skills to be professional. In this case, however, it is possible to assume that men overestimate their computer skills, whereas women tend to be underestimated. Of course, these results were influenced by the fact that respondents had to evaluate their skills themselves. The question is how the third, impartial person would evaluate the skills.

2.5 Remote work allows more people to work fully

Remote work allows more people to work fully. Only 29.6% agree totally or rather with this statement, compared with 46.4% of respondents in 2002.

Another feature of distance work is independence and mobility. This advantage is described in many expert publications (Jackson, 1998; Stanworth, 1991; Duncombe, 1995), even it is possible to say that it is mentioned in most sources as the main advantage of remote work. 88.9% of respondents feel connect freedom with the work from a distance, which is slightly more than in 2002 (76.6%).

Women's and men's answers regarding the benefits of teleworking do not differ much, men tend to be slightly more inclined to extreme opinions than women. Benefits include also the ability to plan their work, as evidenced from 75.9% of respondents' answers. Sociological researches have so far not dealt with this issue in the Czech Republic, so it is not possible to state what the situation in the whole population is.

Tab. 1: Statistically relevant correlations between two questions; r - Pearson correlation coefficient., α – significance level, 108 respondents

| | |
|--|-------------------------------|
| Respondents know the term teleworking X the question of what school they are studying. | (r = 0.416, α = 0.000) |
| Employee considers working in this way X whether he comes from a town or a village. | (r = 0.282, α = 0.035) |
| I do not have to go to work X sex | (r = 0.452, α = 0.015) |
| I do not have to go to work X the respondent comes from a town or the countryside. | (r = 0.495, α = 0.034) |
| I do not have to go to work X what kind of work I want to do at a distance | (r = 0.681, α = 0.000) |
| I can do work that I could not otherwise have performed X sex | (r = 0.523, α = 0.001) |
| I can do a job I could not otherwise perform X the type of work at a distance | (r = 0.495, α = 0.007) |
| I can plan my work myself X if the respondent comes from a town or the countryside | (r = 0.492, α = 0.036) |
| Conflict of work and family life X what kind of distance work do you perform / would you do? | (r = 0.274, α = 0.038) |
| Lower wage X what kind of distance work do you perform / would you do? | (r = 0.489, α = 0.012) |

Source: Author's elaboration

We used the SPSS for the calculation of the statistics. Every above mentioned hypothesis of the relationship was valid at the 5% significance level.

It is interesting that especially women prefer teleworking because they could work from home. They know the advantages of teleworking which could be combined with their family duties. Students generally know that teleworking is suitable just for some professions.

Conclusion

Today students work from a distance more than at the time of the first research (2002), but the term teleworking is still relatively unknown because it has not taken too much attention among students. Today, students mainly use the term home office, although it is inaccurate.

Respondents today prefer a combination of work at home and work at the workplace. Because of the lower cost of computer technology, there is a great interest in the mobile variant of work at a distance. In 2002, it was a combination of teleworking and work at home (homeworking). The centres were not very popular, much like in 2002. However, this option has its advantages because in classical distance work the employees suffer from a feeling of isolation. Different centres also originated on the principle of protected workshops. On the other hand, in another research it has been found that, in the case of patients with IBD (Crohn's Disease), remote work and flexible work have a positive effect. (Coenen et al., 2019)

In some researches, the answers of the so-called millennials (born 1981-1999) and the rest of the population (Nicholas and Guzman 2009) are compared. Unfortunately, this comparison cannot be done in our research because our researches have been carried out on students who are labelled that way, even though our investigation is divided by 17 years. Today, we also divide the Old-Millennials and New-Millennials. For the same distribution of these generations, the term "digital native" and "digital immigrants" (Burch and Smith, 2017, Wang et al., 2019) is relevant.

Women would work from a distance primarily on the maternity and nursing care, and men would start working remotely if offered by an employer. Women on maternity leave, who would otherwise have to interrupt their careers and would find it therefore more difficult when returning to their jobs later on, are another group suitable for teleworking.

To work at a distance as a solution of disability has been considered neither by men nor by women. In contrast to the 2002 survey, more men were willing to work remotely during parental leave.

The results of our survey confirmed the results of the EWCS survey (Sixth European Working Conditions Survey, 2015) according to which teleworking is not so frequent in the new EU countries, including the countries of the Visegrad group. Its popularity among students hasn't changes much since 2002. We can hope that with the introduction of industry 4.0 and internet of things the frequency of teleworking will increase. For the future we could concentrate on the older generation for which teleworking is also a promising alternative work practice.

In the international economic world teleworking is gaining popularity because of many benefits it provides. Among the most important advantages belongs reduction of costs (on the employee's part no travel expenses, no time for commuting, more time for family and hobbies, on the employer's part saving on overheads, possibility to hire employees regardless of their geographic location). (ILO, 2016). On the other hand, some companies like IBM, Yahoo etc. have started reducing teleworking on the assumption of increasing productivity, creativity and innovation. Reasons consist in agile methodologies, theory of the so called water cooler effect according to which people are more productive when they work together and share information and working environment. (Sroka, 2018).

Teleworking suffers from the problem of employees' isolation as they miss the shared social environment. That can be compensated by the concept of coworking (Rus, Orel, 2015) which is especially suitable for creative work. The worker doesn't have to go to work every day, but can use a coworking space as an alternative to teleworking. He can get new insights, be inspired, can feel solidarity, commitment and trust. On the other hand, he doesn't have to spend his whole working time in an office and so is free. With the rise of creative work we are facing this combination may seem promising. In the coworking environment not only workers of one employer must meet and so the worker can meet get experience from colleagues who work for different companies and so extend his perspective and experience.

With the rise of creative work and the introduction of ICTs into work teleworking will become more used and the combination with coworking spaces may reduce its drawbacks. Teleworking provides independence without sociability, coworking offers sociability and presupposes independence on the employer's office. Unfortunately, students don't know the drawbacks of teleworking very much, not to mention the concept of teleworking. That is why the educational institutions should intervene and teach students about these new trends.

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THE IMPORTANCE OF SOCIAL COMPETENCIES FOR THE DEVELOPMENT OF CREATIVE ORGANISATIONS

Aneta Sokół – Karolina Drela – Agnieszka Gozdek

Abstract

Purpose: The aim of the article is to present theories that refer to the impact of social competencies on creativity in creative organisations. The considerations have become the basis for formulating the research hypothesis: recognizing and knowledge about the pattern of social competencies favours to the development of creativity in creative organisations.

Design/methodology/approach: The research procedure was based on literature studies in the field of social competencies, creativity and creative organisations and in the empirical part surveys were carried out - a questionnaire regarding Creative Life Orientations and questions regarding social competencies were used.

Findings: The research carried out in this article allowed to indicate the components of social competencies that are essential for the development of creativity, including creative organisations. Their indication will allow the organisation to create such conditions that will support the development of creativity by strengthening selected social competencies.

Research/practical implications: Undertaking this subject allowed to notice some deficiencies in theoretical and empirical analysis in management sciences, which can be described as a practical gap. In connection with the above, the conclusions of the research concerned the development of recommendations aimed at showing and then directing the development and its strengthening, so as to shape a specific pattern of social competencies that will support the development of creativity, and thus creative organisations.

Originality/value: The results from the study allowed to indicate the pattern of social competencies conducive to the development of creativity in creative organizations.

Keywords: Social Competencies, Creative Organisation, Creativity

JEL Codes: L26, 015

Introduction

Social competencies have been of interest for a long time, however, it seems that the greatest interest in them falls in recent years. Unfortunately, in the literature on the subject social competencies have not been defined in an unequivocal and generally accepted way. Researchers dealing with social competencies ask themselves whether they are a general social skill that manifests itself in all kinds of situations, or whether they include many specific, sometimes unrelated skills. Effective functioning in relationships with others is an essential skill, especially for those people whose work requires constant contact with people. Teachers, managers, advisers, doctors, social workers, and business employees are groups of professions in which sensible and fruitful contacts with others are a necessity, and social competencies are determinants of the effectiveness of the unit's functioning in real life situations.

In colloquial language, the term social competencies is associated with the ability to live among people, including cooperation with others, for example, with meeting their commitments, risk-taking, knowledge, information, conversation, compliance with agreements concluded with other persons, or conflict resolution. In some contexts, social competencies are also understood as interpersonal skills, self-presentation skills, coping with stress or being assertive.

Since "hard competencies" refer to professional skills, "soft competencies" have to do with the psyche and social skills. And indeed: behavioral competencies focus on the way people behave, attitudes that enable them to behave effectively in a given situation. Soft competencies are primarily: personal skills (efficient self and work management, the ability to motivate oneself, organize classes) and interpersonal skills (include communicating with people, persuading them for their reasons, motivating, inspiring, managing teams).

Regardless of what work is done, we need to cooperate with other people, communicate with them, to work out a common position. All the time you should also maintain motivation, work on it, develop hard skills. In fact, soft competencies are the basis of all work due to their universal character and universality of use. Although it is worth noting that they are of particular importance for the development of creativity in creative organisations. It is primarily all these competencies that determine the effectiveness of creative organisations' functioning, including the number of generated innovations. Social competencies are a reflection of the level of generated new solutions in creative organisations.

1 Theoretical approach to social competencies

Since the appearance of the term social competence (Oppenheimer, 1989), scientists have been introducing new definitions of this concept to the literature. The way of their express depends both on the adopted theoretical assumptions and on the way of measuring variables. Social competencies may be referred to using terms such as: communication competence (effectiveness) (Kowalik, 1984), relational competence (Spitzberg, Cupach, 1989), competencies for effective operation (Raven, Stephenson, 2001), social and communication skills (Riggio, 1986), social ability (Argyle, 1999; Oppenheimer, 1989), communication skills (Wojciszke, Pieńkowski, 1985), adaptation skills (Jakubowska, 1996), rhetorical sensitivity (Jakubowska, 1996), and as a collection of many different abilities, skills and traits (Pilecka, Pilecki, 1990). Social competencies are also identified with social intelligence (Piotrowska, 1994). It should be noted that there are so many definitions in literature, how many authors, and the concept of social competencies can be defined and understood by individual authors either in the same way, or slightly differently or completely differently (Martowska, 2012, p. 15).

Social interaction always occur in a specific social context. This context can have both a direct character – i.e. refer to interpersonal relationships that are "face-to-face" and indirect – happens in the case of contact taking place via electronic media or printed (Martowska, 2012, p. 16). Therefore, social situations can be understood as two-person relationships (and their different types: friendly, social, professional, etc.), as well as group interactions (public communication, impact on groups), such as conducting election campaigns, advertising, rallies, conferences (Jakubowska, 1996).

The authors who deal with the subject of social competencies are very different in the understanding of their nature and structure, and they all agree with the statement that the measure of social competencies is the efficiency of functioning in social situations (Martowska, 2012, p. 16-17). The most common criteria for the effectiveness of social behaviour are: effectiveness in achieving goals (Argyle, 1999; Oppenheimer, 1989; Wojciszke, Pieńkowski, 1985), ability to build interpersonal relationships (Jakubowska, 1996; Spitzberg, Cupach, 1989), sense of satisfaction of interaction partners, i.e. lack of excessive psychological and psycho-physiological costs (Jakubowska, 1996; Wojciszke, Pieńkowski, 1985), and the adequacy of behaviour in relation to social standards guaranteeing social adaptation (Kowalik, 1984). The condition for generating socially approved behaviours is the use of existing knowledge about the norms and rules of social

life (Oppenheimer, 1989; Riggio, 1986). Thus, human behaviour can be considered as socially competent when it is both artistic and socially acceptable (Kowalik, 1984).

On the one hand, achieving the goals by the individual, and on the other hand, the compatibility of its behaviour with social expectations, make the notion of social competencies close to the concept of assertiveness - some of the authors even consider these concepts as identical (Jakubowska, 1996; Spitzberg, Cupach, 1989). The scope of this instruction includes trained skills that a person can use depending on their needs. These skills include: communication skills, freedom of expression feelings and views, defending their own rights, accepting or rejecting criticism and achieving goals without violating the rights of other people.

2 Social competencies, creativity and creative organisation

Social competencies determine the qualitative aspect of human functioning in interactions with others. These interactions concern a variety of situations: from close relationships between two people (friend, spouse, etc.) through functioning in small communities (family, friends, co-workers, etc.) to contacts of representatives of different cultures (Argyle, 1999). The effectiveness of these relations, understood in terms of the subjectively felt satisfaction with interpersonal contacts, is determined by both external factors - the environment as well as the internal resources of the individual. For example, emotional intelligence determines the improvement of social competencies, but hypothetically it could also contribute to the formation of a creative attitude, expressed by an active attitude to the surrounding reality, manifested in its exploration and processing (Popek, 2008).

In the literature is presented many different positions regarding understanding the concept of creativity. Some focus on the psychometric, cognitive, personality, motivational aspects, others on social, cultural and historical, to those that are characterized by an integrating approach (Sternberg, 2001). In spite of the fact that each of them takes into account a slightly different aspect of the functioning of the individual considered to be creative, in each of them the nonconformity and heuristic behaviour are indicated as distinctive features of creative person (Popek, 2008).

These considerations lead to reflection on the differences in the shaping of social competencies and creative attitudes. It should be added that the concept of creativity has so far only been associated with the production of new and valuable things, ideas. Whereas, the psychology of creativity dealt mainly with creators of outstanding abilities, manifesting themselves in their

extremely valuable works for culture and civilization. At present, apart from the elitist approach to creativity, an egalitarian approach is developing. It defines creativity as an individual human characteristic that manifests itself in everyday life. Speaking of creative people, we mean people with an active attitude to reality, creatively solving problems, open to changes and crossing their own borders, that is, striving for their development (Kušíp, 2004).

The most important thing in business today is technical, social and economic creativity, referring to scientific creativity, and artistic creativity is particularly important in cultural management. It is, however, obvious that at the foundation of all individual creativity is personal creativity (shaping oneself), and team creativity - organisation creativity (shaping the team).

A creative organisation is an organisation that generates new quality and products, is innovatively oriented, has a specifically creative atmosphere and has creative management in all the previously mentioned aspects. Creativity becomes a continuous process penetrating all its structures. This organisation generates innovations in all possible aspects: product, production methods, means and distribution channels, forms of marketing, markets, and forms of management.

This organisation makes a cumulative and integrated process of information, energy and matter transformation. Information is transformed into knowledge and art, and these are the basis for new information, new art and knowledge. In the creative organisation the most important is human being – that is why it is worth repeating that creative management is also a humanistic management. Man is fully integrated, not only as an employee, but as a person. Not only his/her knowledge and skills matter, but also emotions, motivations, imagination, even fun. Man in all his/her wealth is the basis of the creative process. Therefore, the creative organisation cares for the full development of its employees, leaving at the same time the liberty and inner freedom that is needed for a truly creative process to exist (Mirski, 2006, p. 85).

In such an organisation, creativity manifests itself at all stages of its operation, ranging from creative mission and strategy, through innovative production to creatively conducted marketing, distribution, relations with clients and the environment.

The appropriate organisational culture is very important, which should be connected with the creative atmosphere. The quality and nature of communication in the company is extremely important. The creative organisation is created by creative groups, composed of creative entities, working in a climate that is favourable to innovation and managed in a creative way.

According to T.M. Amabile (Amabile, 1989), the possibilities of using the creative potential of individuals and the significant achievements depend on three main components (Lipka, 2012):

- intrinsic task motivation (autotelic) - can be shaped by assigning remarkable solution, free from constraints and limitations tasks, which solution can give joy and satisfaction;
- domain skills - shaped during formal and informal education;
- creativity relevant skills - which can be shaped during trainings.

Popek (2003) introduces two extreme ways of social functioning, which differentiates the pursuit of conformism. Divides people into conservative and creative ones. People from the first group are characterized by conformism, functioning in accordance with the expectations of others, with stereotypes, norms and social customs. And the more creative people tend to be self-directed, and the rigid social rules imposed on them cause them to be frustrated - and consequently, to change and reorganize the existing order. Popek mentions a non-conformist personality, as it promotes the development of human creativity in the cognitive sphere and its behaviour. Therefore, the intensification of the creative attitude will have a significant impact on the effectiveness of behaviours in various social situations and on the remedial strategies undertaken in a stressful situation.

Creative people will be better at situations that require assertiveness, as indicated by Strzałecki's research (Strzałecki, 1969).

M. Kuśpit, in his research (Kuśpit, 2004), points to a positive correlation between creative attitude and the general indicator of social competencies. In addition, creative people function more efficiently in social exposure situations than non creative one. And the imitative people cope better in close interpersonal relations. Kusá (2000), verifying the relationship between creativity and social competencies, showed that the students with high scores in the scale of creativity were much better at interpreting the interpersonal meanings contained in proverbs, which points to potentially higher social competencies.

The image of a creative person, style of coping with stress and social competencies is ambiguous. Popek (2003) indicates that creative people are ready for emotional disintegration, periodic depression, sometimes they exhibit inhibitions in social situations, they have a strong need for loneliness and, at the same time, a high level of empathy. They are characterized by a strong cognitive motivation and action, they display constructive non-conformism (the need for independence and transformation of the surrounding reality), they are tolerant towards other

people, but critically oriented to the environment. They are also characterized by the ability to accept conflicts and social tensions, high resistance to stress and resistance in failure situations (Popek, 2003, pp. 49-52).

3 Empirical results

Social competencies can affect the effectiveness of creative work and creative organisation. Therefore, the aim of the article is to present theories that refer to the impact of social competencies on creativity in creative organisations. The considerations have become the basis for formulating the research hypothesis: recognizing and knowledge about the pattern of social competencies favours to the development of creativity in creative organisations.

The aim of the paper was achieved and the hypothesis was verified on the basis of the results of the empirical study. The research was conducted on a group of 241 creative employees working in creative organisations. Entities for the study were selected from the group of organisations included in the creative sector. Their selection was based on the assumption that these organizations employ creative employees and create creative services and goods, which after being implemented into business practice are called innovations. These were entities classified as: Advertising (59 people), Media (15 people), Education (27 people), Culture (33 people), Design (2 people), Architecture (1 people), Marketing (20 people), Fashion (10 people), Stuccowork (2 people), IT (26 people), Creative animator (5 people), Publishing (14 people). The survey were made and developed from April to December 2017 by Sokół. The research area of the presented subject includes both learning about the issues discussed at the theoretical level (literature studies in the field of social competencies, creativity and creative organisations) and empirical (surveys were carried out - a questionnaire regarding Creative Life Orientations (Cudowska, 2014) and questions regarding social competencies was used - prepared on the basis of original research (Krzeminiowska, 2010). In the recognition of the preferences for the creative life orientations, the standardized written interview and the scaling method as the way of gathering empirical material, typical of qualitative studies were applied. The questionnaire consisted of 48 statements and allowed diagnosing creative and conservative life orientations. The questionnaire statements are concerning important, in terms of everyday creativity, areas of the human being. Three areas of the studies were distinguished: innovation, originality and value. These listed values regardless of the accepted concepts of creativity, theoretical inspiration or methodological depictions were repeated

in all the characteristics of the phenomenon, both in static and dynamic terms. Cudowska (2014) shows that the questionnaire is of high reliability of the author's tool. The first stage included the estimation of the creative potential in the group of respondents. According to the obtained results, the group with creative potential was 63 people, that is 29.44% of the respondents. While, the conservative potential was held by 151 people, i.e. 70.56% of people. Next, the respondents were asked to indicate their level of competence on a scale of 1 to 5 (from the smallest to the largest) by providing answers to the individual question: Question 1. Do you talk to people? Question 2. Do you feel ready to cooperate with others? Question 3. Can you skillfully resolve conflicts? Question 4. Do you establish relations easily? Question 5. Do you get information easily? Question 6. Do you have a tendency to take risk? Question 7. Do you feel ready for change? Question 8. Do you think that your knowledge is sufficient about how the world works? Question 9. Do you comply with agreements concluded with other people? Question 10. Do you meet your obligations in a timely manner? After obtaining the answers in the third stage, important interdependences between creative potential and individual social competencies were searched.

3.1 Tools and statistical methods

During the statistical analysis of the results, the following statistical tools were used: elements of descriptive statistics and comparing structure indexes (percentages). The main information obtained from the questionnaire was the answer to the question, therefore for each question (statistical feature), the number of each response option was determined and the basic parameter for the features expressed in the qualitative scale, i.e. the structure index (percentage). In order to analyze structure indexes (percentages) of the studied statistical feature (for the value of a feature whose results are expressed in qualitative scales) between groups, the significance test of differences for two structure indices was used. The main goal of the study was to explore the creative or conservative potential and creative competencies, hence during the statistical analysis, the focus was on the calculation of the creative or conservative potential index for each of the respondents. To calculate the index, a set of 48 questions with the following answers was used: T - yes, N - no, NW - I do not know or A - it fits me; a - it fits me a little bit, b - it does not fit me a little bit, B - does not fit to me. The results of the questionnaire provided the information on the number of the points obtained within a given factor.

In order to determine the statistically significant difference between the values of the examined feature, the p-value was given. Because statistical tests were carried out at the level of significance (probability level of error) 0.05 - statistical significance occurs when p-value is less than 0.05.

The method chosen was determined by the type of analysis, its scope, the level of detail, the length of the period considered, the degree of information availability and the time, financial, technical and organisational capabilities of the entity conducting the research. The study consisted of stages with a similar sequence. A common feature of the discussed research processes was their cyclicity and interdependence. Through cyclicity of research, the author of the chapter understands that the information user (decision-maker) is both the starting point and the final stage of the study.

3.2 Research results and discussion

Competencies are an important determinant of the effectiveness and efficiency of creative work, they are a reflection of the level of generated new solutions in creative organisations. Nowadays, they are characterized by variability, and therefore also development, they are also characterized by measurability - that is why they should be subjected to systematic assessment. Currently acquired knowledge and experience do not guarantee the success of the individual, above all the importance of the ability to use them in practice. Therefore, people with creative skills should have the competence of the so-called hard – e.g. industry expertise, and - soft skills, which lead them to development. As a result of research presented in the literature, it was found that the characteristics of a creative person can be categorized into three groups: openness, independence, perseverance (see: Hennessey, 2003; Klijn, Tomic, 2010; Mueller, Melwani, Goncalo, 2012; de Sousa, Pellissier, Monteiro, 2012; Dørum, Vollen, 2016). These features are particularly important in the development of creativity, especially those employees who work on creative solutions and thus innovations. The indication of these features is of particular importance to the process of managing creative organizations. Their emergence allows to shape the working environment of creative people so that they can create the meaning of more creative works, or innovations. Openness is understood as sensitivity to stimuli, ease of assimilation of new experiences, which leads to the generation of new quality. This process can be done through independent thinking and acting. It should be noted that openness and independence are related to the acceptability of new content,

solutions that are often incoherent, unclear or contradictory. People with creative potential are willing to work hard and long-term, postponing even gratification. Unfortunately, it is difficult to refer the results to analyzes carried out by other authors because no research has been found in this field implemented in the world. Therefore, the dependencies that have been discovered in the present research process are presented in table 1. It turned out that the important correlation in groups with creative potential occurred in the question: Do you feel ready to cooperate with others? Respondents (who specified this competence at level 5) representing the creative potential constituted 5.95% and this group was superior to people with conservative potential, which constituted 3.34% of the respondents. The significant dependence was at the level of p-value 0.0070. In the case of further questions correlations were similar. Namely, in the question Do you establish relations easily? There was a similar correlation at level 5, which is recognized as the highest level of competence. Thus, people with creative potential constituted for 4.73%, and with conservative potential - 2.15%. The significant dependence was on the level of p-value 0.0029. However, in the questions: Do you get information easily? – level 5; Do you have a tendency to take risk? - level 4; Do you feel ready for change? - level 5; Do you comply with agreements concluded with other people? - the level 4, correlations in the questions were shaped successively: people with the creative potential of 4.37% in relation to people with conservative potential of 1.67% with p-value 0.0012; people with the creative potential of 1.65% compared to people with the conservative potential of 0.00% at p-value 0.0015; people with the creative potential of 3.51% compared to people with the conservative potential of 1.91% with p-value 0.0331; people with the creative potential of 3.23% in relation to people with the conservative potential 1.91% with p-value 0.0049.

In summary, the development of creative potential, including creativity in a creative organisation, is influenced by the following social competencies: readiness to cooperate with others, easiness of establishing relations, easiness of obtaining information, tendency to take risks, readiness for change and compliance with agreements concluded with others.

Tab. 1: Interdependencies between social competencies and creative potential

| Response | Number* | % | People presenting creative potential | % | People presenting conservative potential | % | p-value** |
|---|---------|-------|--------------------------------------|-------|--|-------|---------------|
| Do you feel ready to cooperate with others? | | | | | | | |
| 2 | 16 | 1.15% | 11 | 2.63% | 5 | 0.51% | 0.0007 |
| 3 | 31 | 2.22% | 15 | 3.58% | 16 | 1.64% | 0.0242 |
| 5 | 83 | 5.95% | 14 | 3.34% | 69 | 7.07% | 0.0070 |
| Do you establish relations easily? | | | | | | | |
| 3 | 62 | 4.44% | 28 | 6.68% | 34 | 3.48% | 0.0079 |
| 5 | 66 | 4.73% | 9 | 2.15% | 57 | 5.84% | 0.0029 |
| Do you get information easily? | | | | | | | |
| 3 | 36 | 2.58% | 18 | 4.30% | 18 | 1.84% | 0.081 |
| 5 | 61 | 4.37% | 7 | 1.67% | 54 | 5.53% | 0.0012 |
| Do you have a tendency to take risk? | | | | | | | |
| 4 | 23 | 1.65% | 0 | 0.00% | 23 | 2.36% | 0.0015 |
| Do you feel ready for change? | | | | | | | |
| 5 | 49 | 3.51% | 8 | 1.91% | 41 | 4.20% | 0.0331 |
| Do you think that your knowledge is sufficient about how the world works? | | | | | | | |
| 1 | 7 | 0.50% | 5 | 1.19% | 2 | 0.20% | 0.0166 |
| Do you comply with agreements concluded with other people? | | | | | | | |
| 3 | 33 | 2.37% | 16 | 3.82% | 17 | 1.74% | 0.0193 |
| 4 | 45 | 3.23% | 5 | 1.19% | 40 | 4.10% | 0.0049 |

*number of observations: 214

**p-value < 0,05

Source: Own study

Conclusion

Social competencies affect all elements of human life: professional work and private life. And also have an impact on creative organisations and their significance is constantly growing. It must be emphasized that the ways of evaluating creative work have also changed. The initiation of ideas, the ability to adapt to constant changes, or to put oneself in someone's situation, or the ability to convince others of their own interests is becoming more and more important than the knowledge, education and hard skills. You can be convinced by the data based on the conducted research that it is not only a matter of fashion, but the reality that affects us.

Creativity requires the use of appropriate resources, above all social, functional and constructional, from the individual as well as the entire organisation and the task of the creative organisation is their development. Then the creative capital of the organisation arises and the organisation can be called a creative organisation.

Taking into consideration, it is worth noting that at many levels of managing a creative organisation, social competencies play a significant role. The results of the research show that the following social competencies are particularly important (it allowed to indicate which social competences determine the development of creativity, thus successfully verified the hypothesis): readiness to cooperate with others, easiness of establishing relations, easiness of obtaining information, tendency to take risks, readiness for change and compliance with agreements concluded with other people. It is these distinguished competencies that are particularly relevant to the development of creativity of individual and organisation. Strengthening them and creating appropriate conditions for them to develop is an important issue in the management of this type of business entities. This knowledge will be able to serve in the management of this type of entities because the key issue for the development of creative organisations and employees creativity is the creation of an appropriate work environment that should support the development of creativity. It is claimed that the success and the number of generated innovations is related to the environment that creates this possibility. This has been confirmed in numerous studies in creative organisations presented in many periodicals around the world.

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RISK EVALUATION OF INCREMENTAL INNOVATION IN LOGISTIC INFORMATION SYSTEM

Adam Sorokač – Luca Rigali

Abstract

Purpose: The portfolio of automation tools with information communication technologies is extensive. We know many tools for their implementation, but insufficient reputation and mistrust in the digitization of production processes inhibit progress in obtaining information about manufacture processes within Industry 4.0. One of the known toll is the implementation of incremental innovation in logistic information system.

Design/methodology/approach: For the implementation of incremental innovation (3I model) have been used this case presented 2 years ago. The incremental interdisciplinary innovation model – 3I model describes the process of introducing automatization tools with ICT into the logistics information system. Each step in the process is analyzed as a risk of nonobservance of the model's step. Follows the minimization of risks and case studies to illustrations procedure.

Findings: Risks have been identified in introducing incremental innovations into the logistics information system. Risks were categorized as reversible an irreversible.

Research/practical implications: According to the 3I model, a case study model with identified risks of introducing incremental innovations in the construction of buildings and structures was briefly formulated.

Originality/value: Risk identification leads to the prevention or elimination of this risks. We can predict the origin only of known risks. If the risk arises, then the risk categorization in the article determines whether the risk can be rectified or the innovation process should be interrupted.

Keywords: Risks, Incremental Innovation, Automation's Means with ICT

JEL Codes: O33, D81, L74

Introduction

Current trend Industry 4.0 is realized through the digitization information of the manufacture or logistic processes. We have a lot of tools to digitize information as automation means with ICT (Evgenievich et al., 2013; Bisogno et al., 2015). However, we don't have clearly defined a procedure for introducing changes. The procedure, more precisely a rule that determines the sequence of steps so that the risks of failure to innovate can't be created. Therefore, there is often a lack of confidence to innovate either from the point of view of the innovation process or from end-users (Brzozowska, 2014).

While failure of the incremental innovation (Harty, 2008) is less "painful" than stopping the radical innovation. But if we will not set the mechanism for controlling the innovation process, it will be difficult to set frequency of incremental innovation. Incremental innovations are not final, but linked to previous ones and give us a new function into the existing information system. The innovation process is divided into 3 parts. The risks are assessed of all parts and then minimized risks, out of the last part of the innovation model. After risk assessment a case study models extended for better illustration.

Main idea of this paper creating guide for implementing incremental innovation with risks prediction. Each part is composed of 3 sections. First section define possible risks for given processes in given phase of innovation model, so we was assessed risks of each process of given phase. Second section describe prevention respectively wrong way in innovation process. We are referring to first section. Some ideas isn't understood, therefore was created third section with illustration previous statement in case study.

1 Actual analysis

Digitalization of production is introducing via change in manufacture processes or logistic process. But, change is often not accepted, because many company are frustrated from results of new technology. Resistivity of change or new technology of operator in manufacture is innate characteristic of their production. Operators join new technology with educations or serviceman join new technology with additional failures (Ishak & Newton, 2016). On the other side, we don't know very well opportunities of mutual cooperation between ICT and automation's means. Not only end users but mainly integrators of this technology to companies. Of course, it's not only about knowledge of new technology but we need discuss about financial aspects (Forés &

Camisosón, 2016). Second aspect of possible disillusion is low functionality of integrated expensive solution. This is risk which we need eliminates or minimize.

2 Methodology and Goals

We use risk assessment for describe a risk during innovate processes in logistic information system. At the first, we identify risks by describe processes in phase of 3I model. We know a sequence of processes and at the same time we asses to methods.

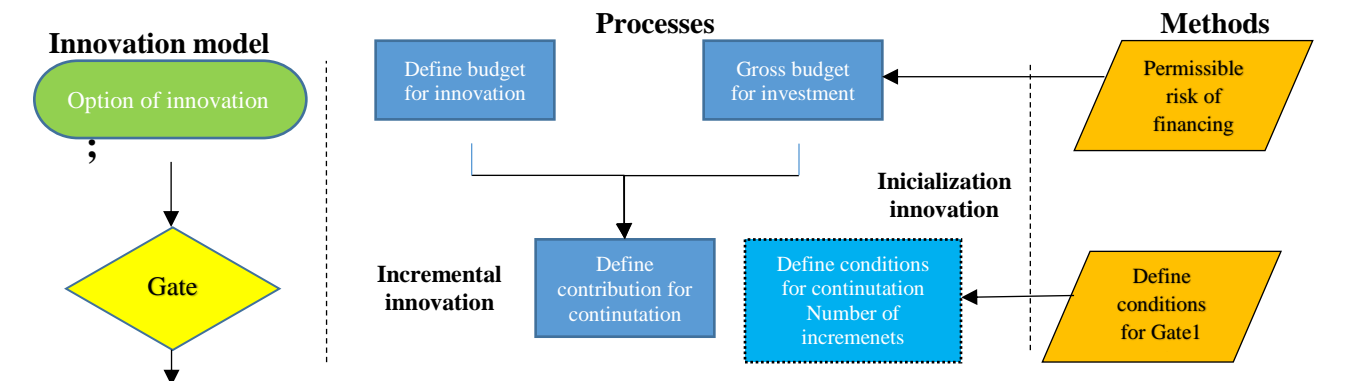
We divided 3I model to a 4 part. We argue application of processes in each part and in the next step we define what's happened if we don't use processes or methods in 3I model. In the last step we created case study for illustration of usage processes in phase and question in gate.

We evaluated risks via categorization and created two categories. First category of risks we can reverse, but second category can to stop innovation processes. General goal is specified risks of implementation of new technology via incremental innovation. If we know a risks, then we can to predict and eliminate risks respectively frustration from innovation.

Secondary goal is create categorization of risk. Especially category of risk, which we know to manage and category of risk which can to stop innovation process.

3 Part I. – initialization

Fig.1: Initialization part of innovation



Source: Author

3.1 Risk assessment of I. part

1. Before each long-term and short-term innovation, the investment (Cooper, 2008) is important to consider the funding and financing (see Figure 1) only of one innovation but also of several successive incremental innovations. This means creating a long-term funding plan for at least 3 years or more. However, not only funding, but also the definition of specific people with sufficient time to manage investment projects. Under control, we understand professional supervision of the subcontractor supplying the new information system or adding the existing information system.
2. One of the possibilities of delivery is engineering and implementation with own employees within the construction company. This implementation is considered as a risk.

3.2 Risk minimization of I. part

1. The construction company is not expected to have experience in the financial planning of long-term investment projects, but risks can arise in the form of realization of these projects. Therefore, the risks arise in other processes of the innovation model. If a construction company decides to provide engineering, that is to say, designing a new LIS concept using their own designers, we can expect complications leading to the failure of the new LIS or the addition of the existing LIS. Electro designers in the construction industry do not have sufficient knowledgeable about industrial automation and industrial ICT (Brzozowska, 2014), which may have fatal consequences for the completion of the project.
2. If a construction company decides for a supply company, which is supplying information and control systems in the industry, there may be a risk of inadequate management by the customer. The gesture takes place in the form of consultations on the design of the new LIS concept or its addition. The professional guarantor of the construction company defines not only the material flow of the building site, but also the important user interface of the LIS. If the user interface is inadequate, there may be a risk of inadequate use of LIS or resistance to the LIS introduced by construction workers. The supplier must have general knowledge of the current technologies, because if the supplier is familiar with several leading manufacturers of automation tools, he is more likely to be able to combine ICT and achieve a balanced performance/cost ratio. Selected supplier must to accept current trends in automation - Industry 4.0.

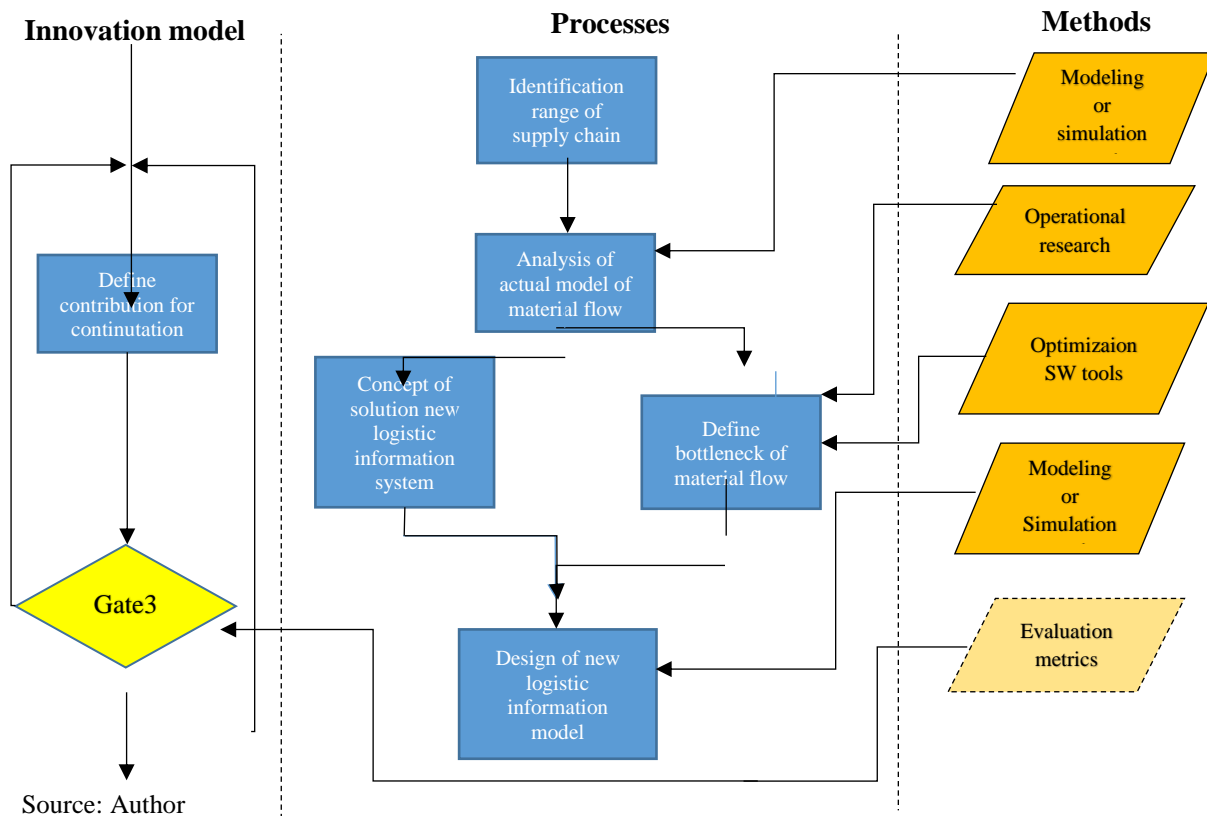
3.3 Case study – part I.

Assume that a construction company has a budget of 6000 € for development. The budget is limited by the implementation of the investment plan, where at least 2/3 must be spend up to 11th month of the following year and the project must be developed up to Gate 3 within the 2nd part of the innovative model (Peansupap & Walker, 2006).

The selected vendor should have references of simulation models within the logistics of manufacturing processes or has references of implementation technology within tracing material flow.

4 Part II. – definition

Fig. 2: Definition part of innovation model



Risk assessment of part II.

The first process of second part (see Figure 2) of the innovative model is the identification of the supply chain's range in construction. The selected range should match the needs of material positioning based on the needs of site managers. The next process is the analysis of the current material flow determined by the range of the supply chain from the previous process. We can analyze it with multiple methods. After analyzing the material flow, it is possible to create the concept of a new information system or to extend the existing system.

4.1 Minimization risk of part II.

If the prescribed procedure wasn't followed, the first process would not determine the supply chain, and then it is necessary to analyze the entire supply chain. If we allow whole chain analysis even in cases where it is not determined by the supply chain identification. If we omit or move it to a lower position in the sequence then it is necessary to count the time delay of part II. due to the material flow analysis, and also with the risk of misidentification of a narrow site.

An immediate possible step after determination of the scope of supply chain is its own analysis as the basis for determining bottleneck of material flow. Therefore, we cannot change the sequence of the innovation process in Part II. The process of analyzing current material flow is not intended to determine a bottleneck but to faithfully model current material flow, so created model can be considered as a real model only after its evaluate by gestor the construction company. Only when we have verified the real material flow model, we can be determine bottleneck.

4.2 Case study - part II.

Specifying an application is requires multiple step. The first step is to define the radius of monitoring, next step, the builder will, based on experience, choose to monitor the mixers from a concrete point of view to the building site. At this point, we already have a fairly clear idea of minimal frame processing, that is, the specification for a particular application.

The proposal will be created by the supplier company, which will implement the project. The chosen production process was the concrete technological stage of casting. By simulating a mass-oriented production process in the proposed material flow models, the predicted quantitative benefits are verified.

5 Part III. - realization

5.1 Risk assessment of part III.

Unique solutions must be compared with their budget which was defined in Part I. But, there is no need to change solutions, if we exceed budget. Either we keep the concept and cheaper means, or we will divide the designed project into a few independently functional units.

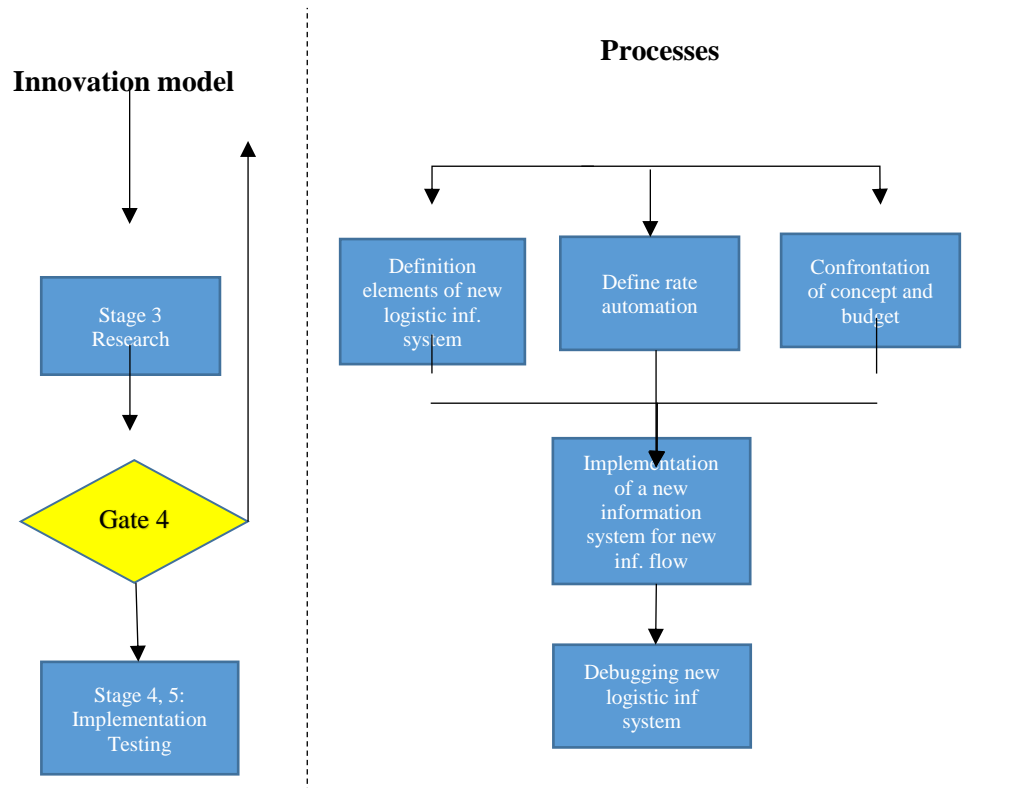
Implementation of material flow information system includes the production of switchboards with industrial automation components, the creation of cable connections in cable routes and a steel construction for switchboard and sensor. The start of the information system is a gradual implementation of control system's software.

It is an algorithm for the I/O system where the action on the outputs of the control system will be evaluated based on the information from the individual sensors and the implemented software. An action in our case can be understood as a graphical interpretation of the results.

5.2 Risk minimization of part III.

During the design of an information system, that means definition of information system's elements, it is necessary to check other usable automation elements in case of a failed confrontation with the innovation budget. Therefore is required characteristic of vendor - cooperates with several automation and ICT manufacturers. At this stage of the innovation process, it is possible to minimize the risk of changing concept of a new information system. It is sufficient to change an element in the project from another manufacturer with the required specification and price.

Fig. 3: Realize part of innovation model



Source: Author

An innovative way of using automation tools for an application that has not been yet tested in a real manufacturing process also carries the risk of wrong choice of sensor for monitoring material flow on a building site. Therefore, during the process of information system implementation, we can minimize the risks associated with incorrect setting of the control system by intensive communication with gestor-site manager.

The second risk resulting from the setup and creation of software is part of the visualization, human-machine interface. Visualization in the form of web pages is a graphical interpretation of the output of an information system accessible through an Internet browser. This human-machine interface is associated with the user's comfort (Ishak & Newton, 2016) and risk with the use of the new information system for the purpose of monitoring the material flow of the site. If the graphical environment is comfortable enough for the end-user, then he will be accustomed to the use of the new information system, and will be willing to innovate in the next innovation increment.

5.3 Case study of part III.

Construction site as a production area is divided into sections according to production phases, such as warehouses, pre-assembly and construction itself (Juríček, 2001). Thus, we can locate a particular location where logistics assets such as loaders, mixers and others have to be traversed. If we are able to define parts of construction site, we can define traceable material flow entities. If we choose sensing or identification technology of vehicles, it is possible to monitor the material flow not only in one case.

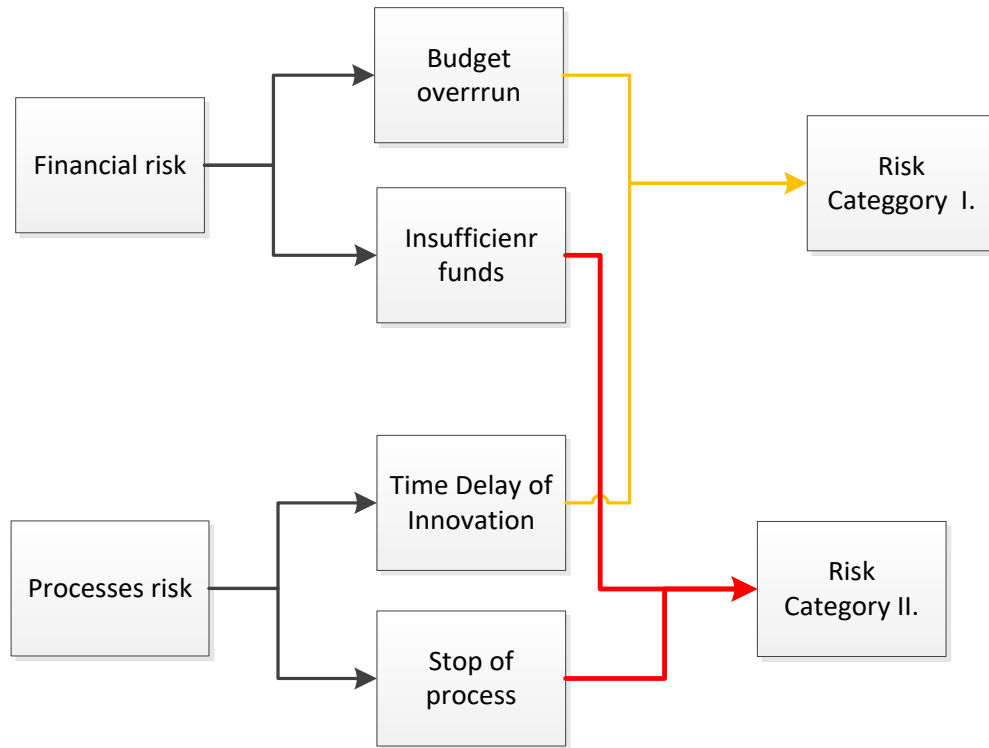
The basic concept of information flow will be a contactless RFID identification system for transport means with additional parameters. We consider one entry / exit for concrete mix, which will have positioned passive RFID tags (without power source) with required information. The application is designed as fully modular and mobile.

6 Assessment and discussion

A simplified risk assessment scheme was developed to assess the weighting of risks (see Figure 4.). Outcome of the assessment is the categorization of risks. Two categories have been identified. If we don't eliminate risk of category I, potential consequences can be corrected or reversed. But, if we don't eliminated risk of category II, it is possible to expect much more serious consequences or even a failure of the innovation process.

For a formulation of a risks we needed a description of processes of incremental innovation. In each part of innovation process, we analyze wrong decision and via this this decision we identified threats. Next step was be created case study to illustrated process without threats. If we know risks then we know describe minimized risks and from minimization we can formulated two categories of risk. First dividing is to reversible risk (category I.) or to non-reversible risk (category II.). Second dividing is problem with financial or resources. Risk assessment and minimization give us knowledge about risks during implemented new technology via incremental innovation.

Fig. 4: Risks categorization



Source: Author

Conclusion

Industry 4.0 as a digitization of information about production process supports the flexibility of the production process. Implementation of complex logistic information systems which provide relevant information are not only about cost but also about time constrain. The way to minimize the costs and time constrain is to divide complex system into smaller functional units. Functional units are implemented as incremental innovations. If we set incorrectly procedure of implementation increments, then failure of one innovation can be affect to the success of whole innovation. Therefore we need to know the possible risks and how to prevent these risks. In the article, we defined the individual risks and, in the end, we categorized these risks.

In general, we can talk about the consequences of the risks, which will slow down the innovation process. In the second category, there are risks whose consequences we cannot stop. If we await any of the risk of the innovation process, then we can predicted them.

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YOUTH LABOUR MARKET IN SLOVAKIA: FROM EDUCATION TO SELF-EMPLOYMENT

Paulína Stachová – Magdaléna Musilová

Abstract

Purpose: The aim of the paper is to provide an insight into the relation between the education system in Slovakia and position of young people on the labour market after finishing their studies, with special focus on the readiness of young people to start their self-employment.

Design/methodology/approach: The research is based on the analysis of secondary data, searching for relationship between the youth unemployment rate and number of self-entrepreneurs in the group of young people under 30 years. The reason of the analysis is to find out if self-employment could be interpreted as a solution to the problem of high youth unemployment rate.

Findings: There is logical assumption that increase in the self-employment activity of young people is connected with the decrease of their unemployment rate. The correlation analysis for Slovak data proves negative relation between those two. It seems that the exerted effort to prepare and motivate young people to become entrepreneurs has positive effects on the labour market and Slovak economy as a whole.

Research/practical implications: The further research is needed, but already from the presented partial results could be clearly seen the need for bigger linking of education system with practice and greater emphasis on acquiring business skills during studies.

Originality/value: The paper contains the partial results of the research which contributes to the discussion of how education system can lead to improvement of the position of young people on the labour market.

Keywords: Youth Unemployment Rate, Self-Employment, Education System, Labour Market

JEL Codes: A13, I25

Introduction

The position of young people on the labour market is in general quite specific. In this paper, we will focus mostly on the situation in the Slovak Republic. Young people nowadays are facing their access to the labour market under very special conditions, with the result of persisting higher unemployment rate compared to the rest of economically active population. On the one hand, the economic situation, which has emerged from a severe economic crisis led the economies to the need of looking for more effective rules for managing the labour markets. On the other hand, the changing dynamics of the labour market requires workers with high levels of training and mastery of information and communication technologies (ICTs), having business skills and courage being a big advantage. This leads to the increasing attention given to the interconnection of the education system and practice and the need to enforce the entrepreneurial spirit during the studies. Within the potential efforts and strategies to boost employment and job creation for young people, entrepreneurship is increasingly accepted as an important means and a valuable additional strategy to create jobs and improve livelihoods and economic independence of young people. Given the demographic trends globally, Slovak prognoses not being very optimistic, it is important that the social and economic contributions of young entrepreneurs are recognized in the society. Entrepreneurship can unleash the economic potential of young people.

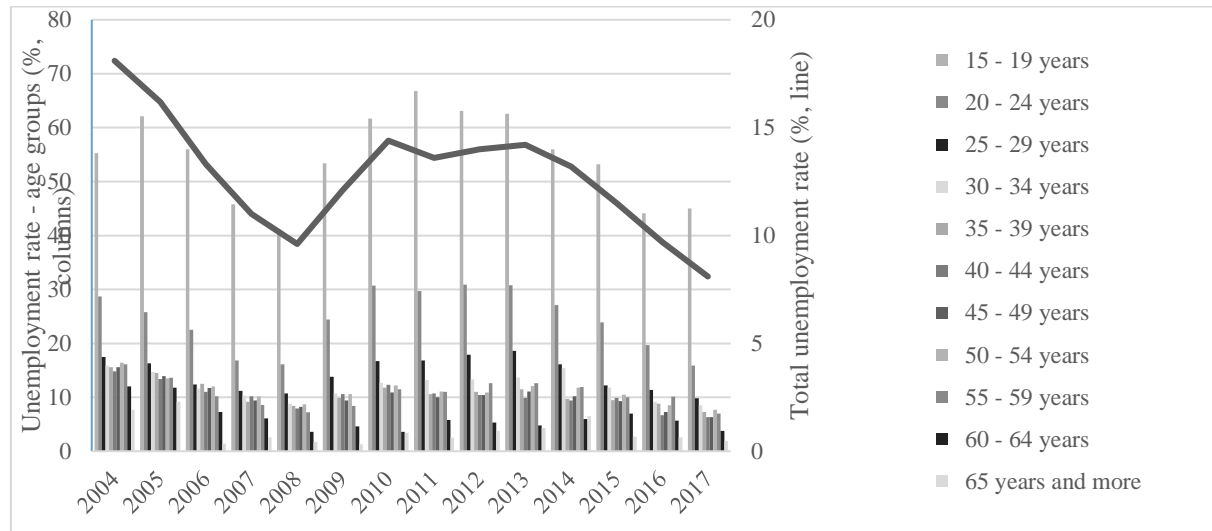
1 Transition from school to work

The problem of youth unemployment has roots in the long-standing structural obstacles that prevent many young people from making a successful transition from school to work. While looking in depth of the problem, it is clear that education system in the country plays in this situation an irreplaceable role. According to the International Labour Organization (ILO, 2018), young people are increasingly having trouble when looking for their first job, not being relevantly prepared to start their self-employment as an alternative. The rate of youth unemployment is much higher than that of adults in most countries of the EU. The situation in the Slovak labour market is not an exception (see Fig. 1).

Even though the post-crisis recovery within Slovak economy could be clearly seen (total unemployment rate has at present very low values; the value for 3Q 2018 was 6.4%), the problem of the youth unemployment rate (in age groups 15-19, 20-24, 25-29 years) is persisting, with slight improvement of the situation in these age groups also evident. The problem is even more

serious while taking into account regional disparities within Slovakia. (Delaneuville, 2017 or Rentková, 2018).

Fig. 1: Unemployment rate, 2004 – 2017, total and aged groups, Slovak rep. (%)



Source: Datacube

Unfortunately, the school-to-work transition can be a long and difficult process. For young people there are several possibilities how to become employed: to find a stable job, to find a satisfactory temporary job, or to start as self-employed person. Improving these transitions is a policy priority for many countries. How easily and effectively young people make this transition depends on the demand for labour; how well prepared they are for the labour market (skills and experience), the availability of information and assistance on employment opportunities, as well as development of the business environment and simplification of the conditions for establishing the business. (ILO, 2018)

The system of education can be considered as one of the key factors for regulation or lowering of youth unemployment rate. An easy transition from education either secondary or tertiary to the labour market is necessary to avoid the emergence of the high levels of youth unemployment rate. Education plays very important role in making the process of transition from student life to economic activity smoother. In environment of universities, students have access to broad knowledge and networks (opening doors to interdisciplinarity), and their student status gives them, in general, more possibilities to create or at least plan own business, and become self-

employed after graduating. Within the overall entrepreneurial dynamics, also student entrepreneurship is an important phenomenon. There is a space for interconnection of different study fields, while students with lack of entrepreneurship education and/or coming from non-business fields of study are often equipped with specific proficiency suitable for commercialization, so they could be linked to business students with higher entrepreneurial appetite. Concrete actions and instruments (quality entrepreneurship education and training together with support services and facilities) shall be developed and systematically provided to student populations. (Holiienka et. al., 2017)

There were a lot of researches made to find out the relationship between the development of the unemployment rate and the number of entrepreneurs. Nice review of different opinions on that topic offers Fritsch et al. (2015). Based on their review the studies could be divided into those which analyse factors on the micro-level and those which focus for the macro-level explanation. The first group of them is explaining how factors as demography, education, but also personality characteristics influence the decision to start an own business. The second group look at the macroeconomic environment, e.g. phase of economic cycle, unemployment rate, number of job opportunities. Different theories point out that the relationship between entrepreneurial activity and macroeconomic development could be both pro- or counter-cyclical. There are basically three macroeconomic forces that may influence entrepreneurial entry: GDP in pro-cyclical way (the general assumption mostly expects start-up rates to increase during growth periods, e.g. because of a positive environment for investments), the level of unemployment and the availability of alternative employment opportunities working counter-cyclical (e.g. people may switch from employment or unemployment into self-employment if starting an own business appears to be more rewarding than the status-quo, on the other hand the number of start-ups may be relatively low in periods of low unemployment when opportunities for dependent employment are well available), the development of interest rates (with low interest rates in recessions lowering the cost of capital and stimulating the investment activity, while high interest rates in boom periods deterring some potential founders from setting up their own firm, because of high cost for borrowing the capital). Some researches explain the necessity driven entrepreneurial activity, while out of necessity some unemployed individuals decide to start their own business or become self-employed, especially when there is a substantial increase in the unemployment rate. That means that not having a better option on the labour market the unemployed individuals decide to start their business/become self-

employed until there is a better alternative for them on the labour market. (Dvouletý, 2018; 2017) As it is indistinct from a theoretical point of view which effect on new business formation prevails, in general an empirical analysis for each concrete economy is required.

In the region of East-Central Europe the start-up culture has been booming over the last few years, while giving to the skilful young people the possibility to start their own business instead of becoming an ordinary employee. Start-ups in general are often seen as an important factor in economic growth and job creation. Technological entrepreneurship is believed to become one of the main boosters of the economic growth and therefore is given a lot of attention by both business community and public sector policy makers (e.g. through the different kinds of support measures). (Kottulová and Mitková, 2016) The educational reality does not have a direct impact on the business environment, but it can help the individuals to have a better orientation in it and also to supply them with such competencies that will enable this orientation in the future (e.g. experimental learning, problem solving and project- based learning). Studies show that changes in the unemployment rate significantly correlate with changes in the number of start-ups and it is not possible to clearly demonstrate that quantity is explanatory and explained. (Ježek and Vavrečka, 2017)

European Commission is aware that start-up support within the member states is a must for their economic progress. It has therefore entrusted a group of experts to prepare the special report for Slovakia: *Boosting the Slovak start-up ecosystem: Progress assessment*. Between other recommendations within the report, important role plays the need to reinforce entrepreneurial education and commercialization of research (other factors needed to be improved are e.g. e-government, starting a company in three days or even one day). According to the report Slovakia has made significant efforts to introduce a substantial number of changes that will improve the business environment for small and medium enterprises (SMEs) and ease the start-up phase. Unfortunately, there is evidence that the interest in start-ups declined in 2017. In addition, Slovakia could be more ambitious in harvesting the potential of universities and research institutions to create entrepreneurs and start-ups. (European Commission, 2018)

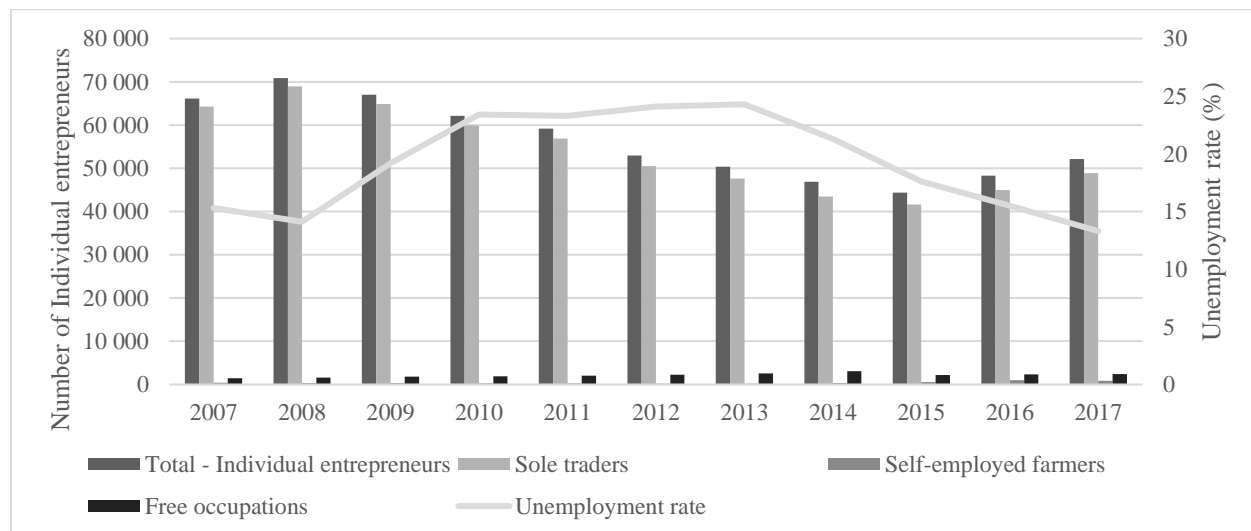
We need to have in mind that small and medium-sized enterprises (SMEs) are an important element of prospering economies, with micro enterprises playing crucial role. They are considered to be the engine of society development. The situation in Slovakia is the same as in the whole EU. SMEs constitute of more than 99% of the total number of businesses. The number of SMEs in

Slovak economy is growing over time. This positive development is based on the openness of business environment for establishing the SMEs. Low entrance barriers contribute to the growth of competitiveness, innovation and quality improvement. There were also several structural changes in the recent years. (Mrva and Stachová, 2014)

2 Results and Discussion

As was already mentioned the fundamental relationship between the unemployment rate and entrepreneurship depends on different factors and could indicate that with increasing number of self-employed people, the unemployment rate should decrease, so the relation between the two is negative. The motivation could be so called “out of necessity scenario”, meaning higher unemployment rate leads to higher motivation of people to start own business. On the other hand, the circumstances can indicate that motivation of people to start own business leads to decrease in the unemployment rate. The basic picture of the development of youth unemployment rate and number of young entrepreneurs in the Slovak republic offers Fig. 2.

Fig. 2: Unemployment rate (15-29 years, in %) and number of young entrepreneurs (total and in individual categories), 2007 – 2017



Source: Eurostat, SBAa

The ratio of young people on the number of individual entrepreneurs in Slovakia shows that since 2014 the ratio of entrepreneurs under 30 years of age has been increasing. During the crisis period the ratio of young entrepreneurs was decreasing yearly. Value for 2017 (see Tab. 1), 15% of all entrepreneurs are young entrepreneurs under 30 years of age, still did not reach the pre-crisis level of 16.9% in 2008. From the data of Slovak Business Agency (SBA) is clear that the development of the number of entrepreneurs reflects the demographic development in society (with undoubtedly population ageing), while the ratio of individual entrepreneurs above 60 years on the number of entrepreneurs under 30 years is increasing (from 14.5% in 2008, to 66.6% in 2017). (SBAa, 2018)

Tab. 1 Structure of individual entrepreneurs based on age, 2017 (in %)

| Age/Legal form | Sole traders | Self-employed farmers | Free occupations | TOTAL n. of entrepreneurs |
|----------------|--------------|-----------------------|------------------|---------------------------|
| under 30 | 15.1 | 16.6 | 12.8 | 15 |
| 30-39 | 24.5 | 26.2 | 24 | 24.5 |
| 40-49 | 27.6 | 19.8 | 21.4 | 27.2 |
| 50-59 | 22.8 | 19.3 | 19.8 | 22.6 |
| 60-69 | 8.8 | 12.9 | 18.1 | 9.4 |
| 70-79 | 1.1 | 4.2 | 3.5 | 1.2 |
| more than 80 | 0.1 | 0.9 | 0.3 | 0.1 |

Source: SBAa, 2018

We conducted the simple correlation analysis looking if the development of the number of young entrepreneurs reflects the youth unemployment rate development with the one, or two years delay (for the period 2007-2017). The analysis was based on the available data from the Eurostat (for the youth unemployment rate) and Slovak Business Agency (the number of young entrepreneurs; those data are available only for the mentioned period, limit for an analysis). Results prove negative correlation, stronger, and statistically more significant, in case of 2 years delay, meaning that the lower youth unemployment rate is reflected in the higher number of young entrepreneurs 2 years later and vice versa the period of higher unemployment rate is connected with the decrease of the number of young entrepreneurs. In order to define the reasons of this relation another analysis is needed, but it seems that the theory of “out of necessity” entrepreneurial activity could not serve as an outright explanation of the relation between the two measures concerning Slovak young people.

Tab. 2 Correlation analysis (Pearson, Spearman correlation coefficients) - relation between the youth unemployment rate and number of young entrepreneurs

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| u (in %) | 22.6 | 18.7 | 15.3 | 14.1 | 19.2 | 23.4 | 23.3 | 24.1 | 24.3 | 21.3 | 17.6 |
| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| nENT | 66129 | 70887 | 66990 | 62104 | 59140 | 52984 | 50383 | 46864 | 44393 | 48267 | 52168 |

| Pearson Correlation Coefficients, N = 11 Prob > r under H0: Rho=0 | | |
|--|----------|----------|
| | u | nENT |
| u | 1.00000 | -0.61694 |
| | | 0.0432 |
| nENT | -0.61694 | 1.00000 |
| | 0.0432 | |

| Spearman Correlation Coefficients, N = 11 Prob > r under H0: Rho=0 | | |
|---|----------|----------|
| | u | nENT |
| u | 1.00000 | -0.69091 |
| | | 0.0186 |
| nENT | -0.69091 | 1.00000 |
| | 0.0186 | |

u – unemployment rate (15-29 years, reference period 2005-2015); nENT – number of individual entrepreneurs (under 30 years, reference period 2007-2017)

Source: Elaborated by the authors based on the data from Slovak Business Agency (SBAa, 2018) and Eurostat

Actually, with the available data the results could be referred to just as a hint that the relationship between the two monitored variables (unemployment rate and number of entrepreneurs for the age group under 30 years) is negative. The correlation analysis was made for the quite short period (10 years) and unfortunately there are several limitations to our findings. The basic one is the short time-series with only a limited number of observations. We cannot ignore the influence of the economic crisis during the monitored period as well. For being able to state if increase in the self-employment activity is the result of macroeconomic growth, or mostly of the necessity in the period of high unemployment rate, more detailed panel data and long-time series, as well as individual level characteristics (e.g. concerning the finished level and orientation of education) are needed. However, we could stay that lower youth unemployment rate and higher number of entrepreneurs are signs of improved overall economic situation of the state. But it seems that based on obtained findings, entrepreneurial activity increases above its initial state, two years after the shock in unemployment rate. (compare with Dvouletý, 2017)

While trying to measure people’s attitude towards doing business, there are internationally several methodologies already used, some of them focused especially on the tendency of young people to start a business. We will mention 2 of them, which are used to map the motivation of young people in Slovakia as well. The Global Entrepreneurship Monitor (GEM) is the world's

foremost study of entrepreneurship, able to provide high quality information, comprehensive reports and interesting stories, which greatly enhance the understanding of the entrepreneurial phenomenon. (GEM, 2019) Global University Entrepreneurial Spirit Students' Survey (GUESS) is other one of the largest entrepreneurship research projects in the world, with the main research focus in students' entrepreneurial intentions and activities, including the topic of family firm succession. (GUESS, 2019)

GEM analysis is not focused specifically on young. Interesting findings for our paper from last report (for year 2017) for Slovakia are e.g. that Slovaks with the university education are the most engaged in entrepreneurial activity, followed by Slovaks with graduate and post-secondary education (15.2%). This trend is consistent with the average of Europe although in Slovakia the values in higher education categories are higher. Just a part of the research was oriented on the attitudes of the young people. In that group were reached the highest values of Index of Inclusivity of Initial Business Activity. On the other hand, the participation of young people in established businesses is the lowest among the monitored groups and therefore young people have difficulties in keeping their business and overcoming the initial problems associated with establishing the business. From the regional comparison it is clear that the Bratislava Region reached the best values of individual attributes (high perceptions of opportunities and self-confidence, low fear of failure), while other regions are better off in social attitudes towards entrepreneurship. Thus, media are paying more attention to entrepreneurs, entrepreneurs have a higher status and entrepreneurship is considered a suitable career choice. (Pilkova et al., 2018).

The last GUESS report for Slovakia for 2016, found out that most of the Slovak students (80%) expect entering the employee career path after finishing their university studies, while postponing their entrepreneurial ambitions and dreams. However, on contrary, almost half of the students (46.1%) would like to run their own business within five years after graduation. This pattern is generally in line with the European average. While looking at the university students there are 6.9% active entrepreneurs, i.e. individuals who already run their own business or are self-employed. Looking at the different study fields, the highest proportion of active entrepreneurs can be found among students of the science of art (20.7%) and sports (17.6%). The nascent entrepreneurship rate of Slovak students is very close to the average of the European countries (16.9% vs. 16.7%), while the share of active entrepreneur students is slightly lower in Slovakia

(6.9% vs. 7.4%). Unfortunately, the conditions which Slovak universities offer to support and create entrepreneurial activities are considered as insufficient. (Holienska et. al., 2018)

While looking at the start-up establishment in Slovak economy, the low level of entrepreneurial education is one of the main problems. The lack of knowledge and skills leads to high death rate of businesses in their critical initial phase. In search of possible improvements of this situation, introducing the elements of entrepreneurial education directly into the curriculum at primary, secondary and tertiary education institutions is a must. The aim of this initiative is the support of business thinking and understanding of business culture among young people. That is the long-term goal and challenge for the Slovak economy and education system. In the meantime, the support for creating start-up incubators and accelerators is very important. The weakness of Slovak start-up ecosystem is its concentration in the Bratislava Region (which is the most developed region of the Slovak economy compared to the underdeveloped regions in the east of Slovakia). As unused opportunity seems to be the missing effort to interconnect academic research with practical needs of the private sector, which serves in many developed economies as an engine for innovations. In the present state the use of student's innovative ideas is very weak. (SBA, 2018)

Conclusion

The practice shows it clearly that enterprise birth could serve as an engine of employment growth in the economy, and so creating a good business environment is an important tool of economic development even in the periods of recessions. The intensity at which entrepreneurs launch new ventures is a key indicator of economic dynamism within a country, and an important driver of job creation and innovation. The studies to that topic show that several macro-economic forces could operate in different directions, and actually we can distinguish between the so called opportunity entrepreneurs (having more positive impact on economic development) and the necessity entrepreneurs.

The paper presents the partial results of the analysis of the status and opportunities for young people on the Slovak labour market. Further research is needed, but already based on the presented results the need for bigger linking of the education system in Slovakia with practice could be clearly seen. Our experience confirms the fact, that the support of entrepreneurial education, the support of students and connecting theory and practice are meaningful. Entrepreneurship education

can help to promote an entrepreneurial and innovative culture by changing mindsets and providing the necessary skills. Slovakia's competitiveness, innovation and economic growth in the future depend on the ability to produce leaders with skills and attitudes to entrepreneurship in their professional lives, whether by creating their own companies or innovating in larger organisations. At the same time, there are still big differences between Slovak regions, which need to be considered. Based on the research already performed it is clear, that youth entrepreneurship needs to be more encouraged in regions with lower economic power. In such settings, young people may have found less attractive and less paid job opportunities, so opportunity costs of getting involved in risky and less stable own businesses decrease. Also, lower economic power leads to an increased volume of necessity-driven activities. (Pilková et al., 2017)

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EVALUATION OF CLUSTER POLICY IN RUSSIA. ANALYSIS OF PUBLICLY SUPPORTED INNOVATIVE TERRITORIAL CLUSTERS

Ekaterina Stepanova – Kolchinskaya Elizaveta

Abstract

Purpose: Today many programs supporting clusters are introduced in Russia and other countries. The purpose of the research is to provide a relevant quantitative study assessing the effectiveness of cluster policy.

Design/methodology/approach: In this paper, the effectiveness of Russia's cluster policy is analyzed using regression analysis. The survey covers data on 516 Russian enterprises divided into two groups: companies from supported clusters and firms that are members of similar but not supported clusters. To the classical variables of Cobb-Douglas production function (companies' revenue, number of workers, capital of the company) we added cluster program dummy variable. The main question of the research is whether companies in supported clusters operate more effectively than other companies.

Findings: The analysis provided quite interesting results. It was found that governmental support which was received by 27 innovative clusters didn't have any effect on the revenue of the companies. This means that Russian innovation clusters work equally efficiently, regardless of whether they have government support.

Research/practical implications: We have not found short-term effects on the enterprises associated with the supported clusters. The obtained results indicate that cluster policy conducted from 2012 to the present time requires adjustment. In this regard, the authors propose recommendations on further implementation of cluster policy.

Originality/value: We have described the production function of Russian companies which work in the clusters. We have found that there is no significant effect on companies' output from government supporting of the clusters in Russia. Effectiveness of cluster policy has never been evaluated empirically before this research.

Keywords: Cluster, Cluster Policy, Cluster Policy Impact Assessment, Innovative Territorial Clusters

JEL Codes: C10, C23, L52

Introduction

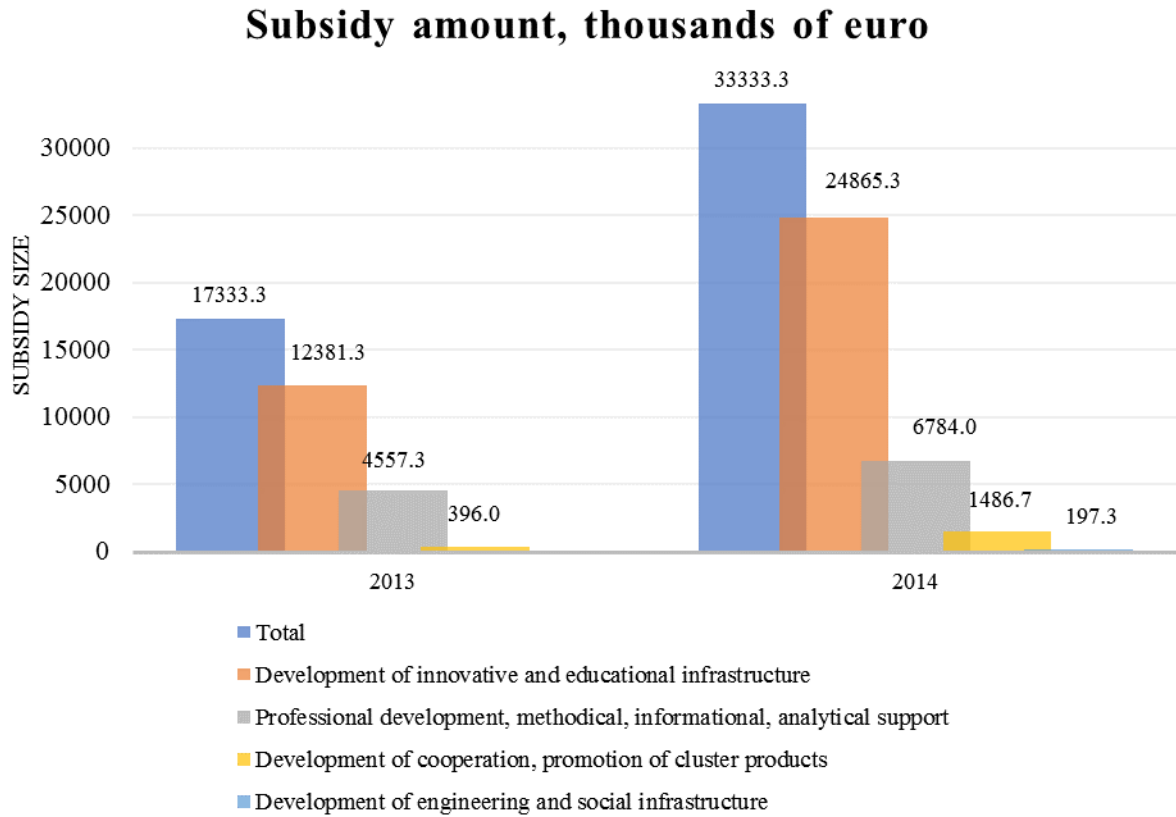
Nowadays, economies of different countries are focused on searching and implementing additional stimulating tools. The Russian government, like many other states, pays much attention to finding new approaches to economic development. One of the approaches is based on interaction of several actors: the state, industrial and service enterprises, as well as representatives of science and business. This form of cooperation can be realized in the form of an economic cluster.

Since its implementing in late 1990s, the concept of "cluster" has become widely used in the world scientific literature, regulatory legal documents of states and various publications. According to the European Cluster Observatory reports, the number of clusters in the world continues to grow in recent decades. The importance and necessity of cluster's existence are increasingly being emphasized by both economists and politicians in Russia and abroad. Moreover, government support of clusters is considered important and relevant in many reliable studies. In particular, this statement was proved by researchers Ketels and Protsiv (2013).

Cluster policy is one of the directions of improving its economic policy measures. Even though it was implemented in Russia relatively recently (the first cluster development centers were established in 2010), every year the measures of supporting clusters become more and more extensive.

As it shown on the figure 1, significant amounts of public funds are allocated to support innovation clusters. The subsidies are given to region authority to support specific directions for the development of clusters such as innovative infrastructure development, marketing promotion events or workers' education. Although the program started in 2012 and is still lasting only financial reports for 2013 and 2014 are available for public access. In this sense, research of the cluster policy effectiveness is becoming even more important. It should be highlighted that financing is aimed at cluster level (not at cluster enterprises directly). Subsidies can be spent on creating coordinating centers, research laboratories or on employee training programs.

Fig. 1: Cluster subsidy distribution in 2013-2014



**Currency rate: 1 Euro ~ 74.5 Russian rubles*

Source: Ministry of economic development of Russia; author's elaboration (2015)

Despite the large number of articles and scientific papers confirming the positive effect of cluster policy implementation, quantitative methods of evaluating its efficiency is hardly presented. In this regard, the question arises: what quantitative effect does the Russian enterprises receive from state cluster policy? By examining key features of clusters and providing calculations this paper presents the answer to this question.

The paper is structured as follows. Chapter 1 contains a literature review. Chapter 2 describes a methodology basis for regression analysis and used data. Chapter 3 describes the resulting assessments. Chapter 4 sets some conclusions on the study and ideas how these conclusions could be used in Russian cluster policy.

1 Literature Review

The theoretical base of this research is presented by various articles and scientific papers which are related to cluster policy aspects. Besides, the study provides an overview of existing classifications of clusters, highlights major characteristics of clusters given by different authors.

The prerequisites for the approval of the cluster as an independent economic actor existed for many years. Back in 1920 Marshall in his scientific works (Marshall, 1920) argued that "agglomerations of homogeneous types of economic activity are the central tool of economic geography." Under the agglomerations, the author meant a prototype of modern clusters, the formation of which provides closer internal cooperation between the participants, which helps to accelerate the pace of development and reduce the organizational barriers to economic activity.

Despite earlier references to agglomerations, the concept of the cluster entered the scientific literature much later. Only in 1990 the American economist Michael Porter introduced the term "cluster", which is still fundamental today. The author defined the cluster as "a group of companies, suppliers, firms and related organizations concentrated on the same area, carrying out interrelated activities in a certain sphere, and the value of all elements of this group as a whole is higher than the simple sum of its constituent parts" (Porter, 1998). Michael Porter defines the positive impact of clusters on regional development. The author suggested that the presence of clusters in a certain territory increases its competitiveness in the domestic and world markets. The economist notes that the presence of clusters is more typical for countries with developed economies.

Later this idea was developed jointly by scientists Delgado and Stern (Delgado, Porter and Stern, 2014). They discussed the significant impact of clusters on regional indicators, arguing that employment growth in some areas depends on the degree of the cluster environment development. Thus, authors claim that the cluster environment positively influence on the economic indicators of the region.

Cluster policies and cluster development programs have become important instruments of state regulation around the world over the past decades. In many States of the European Union, special governmental structures are responsible for cluster policy implementing. Usually such structures are presented as a part of various ministries.

In one of the European studies, scientists have proven that state supporting of cluster initiatives positively affects the level of the country's overall economic development. In this way clusters are seen as one of the key instruments of economic policy (Ketels and Protsiv, 2013).

The international experience of cluster policy was analyzed by Russian scientists (Polozhentseva and Klevtsova, 2015). Two major types of cluster policy are presented in Table 1.

Tab. 1: Cluster policy models

| Countries | Cluster policy model | Directions of state support |
|--|------------------------------------|--|
| Japan, South Korea, Singapore, Sweden, France, Finland, Slovenia | Model of state economic regulation | Active role of public policy in support of clusters |
| USA, UK, Australia, Canada | Liberal model | Cluster is considered as an element of the market structure. The role of the state is to remove barriers to cluster development. |

Source: Polozhentseva, Klevtsova, 2015.

To date, the analysis of the world experience shows that successful examples of cluster development mechanisms exist in both groups of countries. Some researchers argue that the implementation of a "mixed" model that combines elements of both types of cluster policy is optimal, as it allows taking into account the interests of the state and business, using the existing infrastructure and channels of cooperation.

In one of the studies (Giuliani et al., 2013), a methodology for quantifying the impact of cluster programs was proposed. In the paper, the researchers conducted an extensive analysis of the two phases of the introduction of cluster policy: the initial and the active. The authors conclude that the analysis should be carried out as carefully as possible, taking into account the specific features of each individual national cluster policy.

Another approach to evaluating the impact of cluster policy was proposed by Spanish scientists in 2014 (Aranguren et al., 2014). The purpose of the research was to measure how the productivity of firms changes under the influence of the main drivers of cluster development: agglomeration effects, cooperation, innovations (expressed by R&D activity), the level of technical development (expressed by the presence of ISO certificates in the field of technical management) and the quality of cluster management.

Another methodology refers to assessing the effect of public support for the firms in Czech Republic. (Dvouletý and Blažková, 2019). Authors suggest several financial indicators (KPIs) to measure firms' profitability: price-cost margin, value added per labor cost, the growth of sales and growth of tangible asset. Researchers conducted a regression analysis with a dependent dummy

variable showing whether the firm was publicly supported or not. Two time periods were compared in the study: before and after financing. Authors used propensity score matching in combination with a difference in differences approach. This methodology has some similarities with the method we used, but it doesn't observe clusters.

Additionally, the topic of the evaluation of the effectiveness of the cluster policy was considered by the following scholars: Schlump and Brenner (2011), Fontagné et al. (2013), Maffioli and Pietrobelli (2016), Shekhtman (2017), etc.

It can be noted that to date, there is a wide range of scientific studies and examples from the international experience that confirm the positive impact of clusters on the state of the regional economy and underscore the importance of developing effective cluster policies. It can be concluded that there are only a few methods of impact evaluation applicable to Russian cluster policy developed mostly by foreign authors. Therefore, creating a model for assessing this impact seems to be relevant and significant.

2 Background and methodology of the research

As noted above, the main goal of the research was to evaluate the impact of state cluster policy in Russia. However, it might be quite difficult for several reasons. First, it was discovered that the research methods of evaluation of the impact formulated previously is developed insufficiently. In addition, they are mostly created by foreign scientists, which significantly limits their use in Russia.

The second reason is the lack of raw data for analysis. Even when a suitable methodology is found, the researcher may be faced with the lack of quantitative data on industrial enterprises of the country. A substantial difficulty here is that clusters do not provide any special reports, at the same time, statistical information on individual enterprises is not always complete.

In this study the impact of state cluster policy was evaluated by using economic indicators of Russian enterprises. Calculations were based on regression analysis.

At the first stage a set of clusters needed for the further analysis was identified. This list (Resolution of the Government of the Russian Federation of March 6, 2013 N188) included 27 innovative territorial clusters operating in 4 sectors located in various regions of the Russian Federation. Data covering all the cluster associated firms of these clusters were considered in this study. The main question of the research is whether companies in supported clusters operate more effective than other companies.

Thus, the aggregate data included 27 territorial innovative clusters, supported by the Government. Moreover, to estimate the policy impact, after formation the list of cluster -associated enterprises, similar clusters which do not receive governmental support were picked empirically. To match similar clusters several factors were observed: cluster specialization, number of firms in cluster, number of employees, year of cluster’s foundation. Thus, the data for another 27 territorial clusters (which are non-participants of any state support program) was analyzed.

In the total set, panel data for 304 enterprises of the first group and 212 enterprises which are non-receivers of state support (altogether 516 enterprises) for the years 2012-2016 was found. For calculations and regression model construction Cobb – Douglas function (Cobb and Douglas, 1928) was used, which is presented as follows:

$$Y = AL^{\alpha}C^{\beta} , \tag{1}$$

where Y is the dependent variable, expressed by the amount of production, L (labour input), C (Capital) and A (technological factor) - factors affecting the volume of production. It should be noted that this type of production function was chosen by the author because of its versatility, compactness and simplicity of interpretation of the results.

Using data collected on the industrial firms regression analysis based on Cobb-Douglas function was carried out. In order to test how state support effects company’s economic performance, the author constructed the random effects regression model using the program STATA. The main variables used in the analysis, their types and decoding are presented in Table 2.

Tab. 2: The main variables used in regression analysis

| Variable type | Name | Explanation |
|--------------------|-----------------|--|
| Dependent variable | Return | Revenues from sales (turnover), thousand rubles. |
| Regressors | Employee | Number of employees. |
| | Capital | Own capital of the enterprise, thousand rubles. |
| | Cluster_Program | Variable indicates, whether the cluster to which a firm belongs was supported (dummy variable) |

Source: Compiled by the authors

The dependent variable in this case is the revenue from sales. Labor rate was presented by number of employees, the volume of own capital was used in Capital variable.

It should be noted that in addition to the "classical" variables such as Return, Capital and Employee, a dummy variable Cluster_Program was introduced. The last variable takes the value 1 if the company is included into supporting cluster, and 0 if not. This regressor allows to estimate its influence on the dependent variable (revenue).

The main hypothesis of the analysis was following: public cluster policy (expressed by state support program) has positive impact on the revenue of clustered firms. We assumed that firms operate more effectively in supported clusters comparing to firms in similar not supported clusters. Within the framework of the analysis 3 regression models were constructed (pooled regression model, fixed effects model, random-effects model). After determining the optimal model using the Wald, Hausman and Breush-pagan tests, the impact of state support was estimated.

3 Obtained results

The dataset contained of panel data for 516 enterprises for the years 2012-2016. 1560 observations were covered, so the sample can be considered comprehensive and representative. Based on the data, the variables were analyzed in STATA.

At the first stage, to analyze general information about all observed variables, descriptive statistics (summary) were obtained. After that, pooled regression model was implemented to analyze the influence of the variables Capital, Employee, Cluster_Program on the variable Return. In addition, a fixed-effect model was constructed. The model is largely similar to the pooled regression, but it also takes into account the influence of non-variable unobservable factors on individual enterprises. Tab. 3 presents summary statistics for variables observed.

Tab. 3: Summary statistics

| Variable | Mean | sd | Median | min | max | Range | se |
|-----------------|---------|--------|--------|-----|------|-------|-------|
| Revenue | 1010.84 | 683.19 | 1013 | 1 | 1984 | 1983 | 13.46 |
| Capital | 1121.99 | 64.75 | 1127 | 1 | 2045 | 2044 | 12.78 |
| Employee | 218.72 | 119.64 | 207 | 1 | 403 | 402 | 2.36 |
| Cluster_Program | 0.5 | 0.49 | 1 | 0 | 1 | 1 | 0.01 |

Source: Author's elaboration

Finally, the analysis was supplemented by construction of random effects model. This model is a trade-off between fixed-effect regression and pooled regression. It imposes fewer

restrictions and at the same time allows to obtain estimates with a higher level of significance. The regression models were compared by using Wald, Hausman and Breusch-Pagan tests.

The results of the assessing are presented in the table 4.

The optimal model for assessing the impact of the cluster policy is the Random Effects Model. Within the framework of this model, the hypothesis put forward at the beginning of the research was not confirmed (Model's determination coefficient is quite high = 0.71, but the variable Cluster_Program is not significant).

Obtained findings make it possible to conclude that cluster programs do not demonstrate significant influence on basic economic indicators of cluster enterprises in a short-term perspective. The Cluster_Program variable is insignificant and therefore it can be stated that government efforts to improve the efficiency of cluster enterprises do not show results for 2012-2016.

Tab. 4: Impact evaluation of state support on the cluster enterprises

| Variable | Model 1 (pooled regression) | Model 2 (between regression) | Model 3 (fixed-effects regression) | Model 4 (random-effects GLS regression) |
|-----------------|-----------------------------|------------------------------|------------------------------------|---|
| Capital | 0.39*** (0.01) | 0.42*** (0.03) | 0.20*** (0.02) | 0.29*** (0.02) |
| Employee | 0.77*** (0.03) | 0.77*** (0.05) | 0.78*** (0.03) | 0.78*** (0.03) |
| Cluster_Program | -0.10 (0.07) | -0.13 (0.14) | omitted | 0.07 (0.14) |
| Constant | 3.37*** (0.92) | 2.52 (1.97) | 14.3*** (2.03) | 10.02*** (1.4) |
| Observations | 1941 | 1941 | 1941 | 1941 |
| R ² | 0.72 | 0.72 | 0.68 | 0.71 |
| Wald chi2(3) | | | | 2054.48 |

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$

Source: Author's elaboration

Some limitations should be considered before making final conclusions. The first limitation is that several important external factors that have a significant impact on the result may not be taken into account in regression analysis. For example, a decrease or increase in the volume of the company's revenues may be explained by the influence of the regressors that are not considered in the equation. It is also quite possible that both the result and the regressors are affected by some unobservable factor, raising or lowering economic indicators. Additionally, there is a significant threat of distortion of statistical data due to inaccuracy of the information provided. This

information is often incorrect and may not reflect the real situation due to the use of various illegal schemes of information concealment.

However, the main result of the research did not prove the positive effect for firms that took part in government support program. At the same time, the obtained result does not deny the possible usefulness of cluster policy in the long-term perspective. Therefore, it is recommended for the government to conduct a long-term oriented, comprehensive and competent cluster policy.

Moreover, it seems advisable to continue supporting clusters of the Russian Federation, but some key performance indicators measuring intermediate results of the programs need to be implemented. Thus, an important direction is to expand measures of state assistance to clusters and effective use of existing tools. Also, a more thorough study of the cluster policy evaluation should be performed.

Conclusion

As the international experience shows, systematic and careful implementation of cluster policy can improve the economic performance of cluster-oriented enterprises. At the same time, as it was emphasized in this study, supporting program does not show immediate results in cluster firm's performance. Cluster policy is a complex and long-term oriented government activity that eventually should lead to the sustainable growth of the regional economy.

The research indicated that government support of clusters does not influence the basic economic results of cluster participants significantly. However, the study covered only four years of implementation of the program. It can be assumed that supporting clusters may show a steadier growth compared with clusters that are not supported by government in the longer term.

This result is compared with MacDonald et al. (2006), examining 43 European industrial clusters, argues that government policies do not have a significant impact on the development of industrial clusters. Martin et al. (2011), after conducting a similar study on the cluster policy of France, come to the conclusion that it is not capable of either stopping the decline in the productivity of cluster enterprises or the effect on employment and export of the cluster. So Russia is not alone in this problem.

But despite this, we do not believe that the cluster policy in Russia is meaningless. But it needs some improvements:

1. It is necessary to conduct a more thorough study of the evaluation of cluster policy.
2. Cluster policy should be less unified, take into account the regional and clusters' characteristics. However, in this case it is important to stop attempts of lobbying the interests of enterprises groups located in the region and not being key figures in the development of the cluster.
3. Policy interventions should be selected in accordance with the life cycle of the cluster (Brenner & Schlump, 2011).

As a conclusion it should be said that Russian cluster policy is a complex set of measures and mechanisms to improve the competitiveness of the regional economy. To evaluate it, it is necessary to apply a comprehensive assessment of all areas of its implementation, taking into account the long-term perspective. The problem hasn't been thoroughly analyzed and therefore requires further research to identify effective models of cluster policy impact evaluation.

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META-ANALYSIS OF LONGITUDINAL STUDIES ON ONLINE CSR COMMUNICATION

Richard Szántó

Abstract

Purpose: The concept of corporate social responsibility (CSR) has been changing since its creation. As the concept has been evolving, new definitions were born, and academics and practitioners have changed their focus over the years. In this paper longitudinal studies dealing with online CSR communication are reviewed to explore general tendencies and patterns.

Design/methodology/approach: In order to find longitudinal studies on online CSR communication within EBSCO Database related papers were sought. In addition, a further investigation was made with Google Scholar search engine to find more relevant papers about online CSR communication. At the end of the search process, 7 articles were identified. The selected longitudinal studies together cover a period between 2003 and 2017.

Findings: The longitudinal analyses that were selected used similar research methodologies. All studies applied a content analysis where researchers were looking for predefined keywords and categories on corporate websites. Findings suggest, that communicating about CSR activities and principles on corporate websites is evident for larger companies in the western world, and it is becoming the norm in other parts of the world as well. The salience of different CSR topics on the websites, however, has been changing, and there are no constant key themes that would have been dominated the online CSR disclosure in the last 15 years.

Research/practical implications: By analyzing longitudinal studies researchers and practitioners may have deeper insights about (online) CSR communication, and they can predict future tendencies of the field.

Originality/value: Although research on internet-based CSR communication is abundant, longitudinal studies are rare. To the best knowledge of the author, this paper presents the first attempt to perform a comprehensive review of these studies.

Keywords: Corporate Social Responsibility, Communication, Corporate Web Pages, Longitudinal Analysis

JEL Codes: A13, M14, M30

Introduction

The concept of corporate social responsibility (CSR) has been changing since its creation. Some decades ago it was an irrelevant, obscure idea, now it is an orthodox and widely accepted concept of the business field (Lee, 2008). There are plenty of definitions of CSR (Crane et al., 2013), as the concept has been evolving new definitions were born, and academics and practitioners have changed their focus over the years. Longitudinal studies can help us understand how CSR has been transformed in the last decades, especially how companies changed their interpretations and perceptions of the concept. In this paper longitudinal studies dealing with online CSR communication will be reviewed to explore general tendencies and patterns. The author is certainly aware of the fact that CSR is not equal to CSR communication, yet, CSR communication is a good proxy to the firms' perception and interpretation about CSR.

1 Literature review

Since internet became an essential tool of corporate communication, myriads of studies demonstrated the importance of the corporate websites in the communication of organizational responsibilities (Capriotti & Moreno, 2007). As Ralf Isenmann (2006: 247) puts it: "...companies need to communicate on CSR with different stakeholders via online relations, not just with shareholders in terms of market communication and via investor relations. Information supply evolves from local focus, strict monologue, and one-way company controlled exercise towards a more interactive and participatory approach, while communicating (online) with a greater audience, trying to get feedback from a number of stakeholders, or even to engage interested parties and then providing CSR communication tools exactly meeting these requirements."

Although research on internet-based CSR communication is abundant, longitudinal studies are rare. Most studies dealing with online CSR are mainly descriptive trying to reveal connections between the intensity and diversity of CSR communication on the web and different explanatory variables like company size, industry, contextual factors, etc. (Pataki et al., 2015) at a certain point of time. Nonetheless, longitudinal studies can address the evolution of CSR and CSR communication in particular. The longitudinal analyses of online CSR disclosure of companies are supposed to explore how the interpretation of corporate social responsibility change over time, what major tendencies can be seen in certain industries or countries/regions, what themes are salient, and what CSR topics become less important for companies. The increasing consumer

demand, growing regulatory obligations, and pressure from NGOs and other stakeholder groups all can motivate corporate disclosure about CSR activities and principles (Mann et al., 2014), therefore we can hypothesize that longitudinal studies will present an increasing reporting and communication activity throughout the years they investigate.

2 Methodology

In order to find longitudinal studies on online CSR communication within EBSCO Database related papers were sought. Some keywords such as ‘online’, ‘website’, ‘corporate social responsibility’, ‘CSR’, ‘communication’, ‘disclosure’, and ‘longitudinal’ were used. As a result, a limited set of academic papers were compiled. In addition, a further investigation was made with Google Scholar search engine to find more relevant papers about online CSR communication.

Several studies were excluded from further analysis. Studies published before 1995 were not considered, since the World Wide Web, as a phenomenon was practically unknown to larger audiences before that year. Esrock and Leichty (1998) were among the first researchers studying CSR disclosure on the web, but they had no opportunity to publish a longitudinal study at that date. The selected longitudinal studies together cover a period between 2003 and 2017 (14 years total), while the first paper by Basil and Erlandson was published only in 2008.

Papers dealing with the communication practice of only one company were also neglected. Koep (2017) for example analyzes the CSR reporting practices and sense making processes of the Swiss multinational giant Nestlé in the period of 2002-2016. Although these types of papers may provide great insights to understand the underlying processes of (online) CSR communication, they are very difficult to compare with other studies observing a set of companies in their research. Moreover, the practice of a single firm might be very much context dependent and it may reflect on several specificities that the given company has. (Nestlé for example was under attack for many reasons by its stakeholders for many years.)

There has been a growing interest in analyzing the role of social media and social networks in CSR communication. These studies clearly show that World Wide Web is not the sole platform to disclose CSR-related information online (see for example the study of Etter (2014)). Nevertheless, for the sake of comparability studies concentrating on social media platforms like Facebook or Twitter were not considered in this research.

Finally, for practical reasons, in this study only papers published in English language were analyzed, and only journal articles were selected for further examination. At the end of the search process, 7 articles were identified. Basic characteristics of the studies carried out are summarized in Table 1. One has to note that although the observed periods of different longitudinal studies overlap in some cases, they differ significantly. In one special case (Mann et al., 2014) the timeframe is only one year, while in another case (Hetze & Winistörfer, 2016) the authors made a longitudinal analysis of the CSR reports they downloaded from the websites only (and not the content of the entire websites). This makes comparison of the findings of the studies challenging, but the author believes that even considering these limitations, insights about the evolution of online CSR communication are still valuable for other researchers and practitioners.

Tab 1: Selected longitudinal studies

| Study | Observed period | Sample | N |
|---------------------------|-----------------|--|-----|
| Basil & Erlandson, 2008 | 2003-2006 | The Canadian Report on Business' Top 1000 | 50 |
| Del Bosco, 2017 | 2003-2011 | Listed companies on the Italian Stock Exchange | 82 |
| Hetze & Winistörfer, 2016 | 2000-2012 | Banks from all continents | 106 |
| Mann et al, 2014 | 2011-2012 | Leading specialty apparel retailers in the US | 17 |
| Smith, 2017 | 2011-2015 | Fortune 500 companies | 500 |
| Szántó, 2018 | 2009-2017 | Top 200 companies in Hungary | 120 |
| Tang et al, 2014 | 2008-2012 | Top 50 Chinese companies based on Forbes China | 50 |

Source: own elaboration

3 Empirical results

The longitudinal analyses that were selected for further investigation used very similar methodologies. All studies applied a content analysis where researchers were looking for predefined keywords or categories on corporate websites, and they registered the presence of these keywords, and/or calculated relative frequencies and other statistics. Content analysis is a widely used scientific tool in CSR research in general, hence one cannot be surprised experiencing this pattern. All samples included mainly large companies (in the case of Hetze & Winistörfer (2016) banks), hence the selected longitudinal studies basically neglected the practice of small and medium sized firms. In the next paragraphs the findings of the selected studies will be briefly introduced.

Basil and Erlandson (2008) were might be among the first researchers who published a scientific paper on a longitudinal study of online CSR communication. In their paper they analyzed a Canadian sample of 50 firms, and even during a relatively short period of time (between 2003 and 2006) they experienced a drastic increase (from 27% to 67%) in the presentation of CSR activities on corporate websites. At the beginning of the period, charitable donations were the most often mentioned CSR activity, while 3 years later code of ethics became the most important CSR-related item on the webpages. Beyond code of ethics, topics like health and safety policies, environmental policies, and sponsorship have been increasingly presented over the years according to the authors.

In case of the Italian sample of Del Bosco (2017) at the beginning of the observed period (in 2003) only the topic of environment was primarily addressed on the websites, while 8 years later (in 2011) CSR disclosure concentrated on environmental issues, occupational health and safety, and other HR-related issues. According to the author, online CSR communication of the listed Italian companies has become more diverse, less one-dimensional over the years. One was able to see a massive increase in the diffusion of codes of conduct and code of ethics on corporate webpages by the end of the observed period. Yet, philanthropic activities were not so often mentioned on corporate webpages in 2011, which can be explained that CSR were considered in a broader perspective by the companies in the sample (Del Bosco, 2017). In general, one can state that CSR disclosure was growing in the analyzed period among the selected Italian firms, and it became more heterogeneous. Nevertheless, in both years it was true that larger the company was, the more intensive and more diverse CSR disclosure were carried out. Regarding their functionality, websites have become more interactive; on many sites, stakeholders had a chance to give feedback to the companies during the period examined by the researcher.

Hetze and Winistörfer (2016) by looking at the CSR reports downloaded from corporate websites of banks from different continents, stated that CSR reporting had started around the year of 2000, and at the beginning Australian, European, and American banks had taken part in more CSR reporting activities than their Asian and African counterparts had. The two latter groups have started CSR reporting later (around 2004), and Asian banks showed a CSR reporting activity that had reached the global average in 2011. Whereas it is fairly obvious from the study of Hetze and Winistörfer (2016) that CSR reporting had been steadily growing in this sector over the years

observed, the authors unfortunately do not report their findings on the changing CSR topics and themes in the online communication of the banks in the given period.

Tang et al. (2014) compared the corporate websites of leading Chinese companies in 2008 and 2012 (this was a follow-up study related to an originally cross-country comparison between the US and China). Researchers identified more CSR-related topics on the Chinese companies' webpages in 2012 than 4 years earlier, and they had realized a closing gap between the American and Chinese approaches to online CSR communication throughout the years.

The study of Mann and his co-authors (2014) observed the shortest period of time among the selected studies – only 1 year. According to the authors the leading American specialty apparel retailers in question changed their communicating practices even in this 1 year: at the end of 2012 all of them placed a statement about labor issues on their websites, while only half of them did it in 2011. This was likely a result of the introduction of the California Transparency in Supply Chains Act that took effect in January 2012 (Mann et al., 2014). Nonetheless, such short-term changes in communication may be expected only in case of abrupt measures in the legal environment.

Smith (2017) analyzed the largest sample among the selected studies, when she was looking at the websites of the Fortune 500 companies in 2011 and in 2015. According to the author, human rights violations and supply chain management issues have been more and more covered on company websites throughout the years. Regarding supply chain issues there was a major shift on the corporate websites, this topic was practically unknown on the websites in 2011 (although the term 'sourcing' was sometimes used instead). In general, the number of CSR headings on websites increased (4.9 in 2011, and 6.4 in 2015 respectively). In the same time, meaning of CSR is altered. 'Community' was the most often used keyword in both years, but the usage dropped with 12% during the 4 years. However, the occurrence of the heading 'diversity' drastically increased, and in 2015 that was the second most often mentioned keyword. One was able to see a drop of 19% regarding environmental issues, but it was still in the top three in 2015. Yet, it does not necessarily mean that companies deal less with environment since under other labels like 'green' or 'sustainability' they still discuss these or similar issues.

Finally, Szántó (2018) in his study also shows that the largest Hungarian companies had been more and more active in their online CSR communication in the period observed (from 2009 to 2017). They were talking about more topics at the end of the period than at the beginning of it, and more companies used their websites to communicate about their CSR principles and activities

in 2017 than 8 years earlier. In the same time a larger proportion of the companies in the sample created dedicated subpage on their websites dealing with CSR issues at the end of the period analyzed. Analyzing the Hungarian sample, it became obvious that some topics and themes were more widely discussed in 2017 than 8 years before. More and more companies place their ethical code of conduct on their websites, and in the same time, the topic of anti-discrimination, equal opportunities, and ethical commerce also became a more significant topic, at least in the online communication. Nevertheless, sport, culture, and other regional sponsorships were not mentioned so intensively at the end of the observed period than 8 years before, that may be a sign of the changing understanding of CSR over the years.

Conclusion

The results presented above generally show that although the observed periods and samples greatly vary across the selected studies, the importance of corporate social responsibility as a phenomenon has been continuously growing in the world, and companies have put more and more emphasis on communicating their CSR activities on the World Wide Web in the last 15 years. All research studies presented a greater activity at end of the observed periods than at the beginning, regardless the timeframe, the geographical location, or the industry. One may suggest that communicating about CSR activities and principles on corporate websites is evident for larger companies in the western world, and it is becoming the norm in other part of the world as well. Findings of Tang et al. (2015) and Hetze and Winistörfer (2016) indicate that differences between developed and emerging economies have been diminishing, CSR communication has been more and more standardized and homogeneous across continents. Yet, we still do not know much about the tendencies of online CSR communication of small and medium sized companies, but we can hypothesize that those firms are also increase their CSR disclosure on the net.

It is apparent that salience of different topics and themes of CSR communication have been changing in the last 15 years, and there are no constant key themes that would have been dominated the online CSR disclosure in the last decades. Ethical (and especially ethical sourcing or supply chain management) and diversity issues, and the provision of equal opportunities seem to be hot topics in the field of CSR communication recently, but the findings of this paper also suggest that new CSR topics will appear soon on the websites. It is also clear that convergence on the level of

the most important CSR themes cannot be seen across countries or regions, emerging economies seem to be following the matured economies with some distance in this regard.

One may not forget the limitations of this study. The observed the periods in the selected longitudinal studies were fairly different, and samples of the selected studies regarding their size, composition vary a lot (even if they all included large leading companies), therefore generalization and direct comparison of the studies are not possible. Yet, some tendencies can be seen that were presented previously.

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INNOVATIONS OR MODERNISATION? THE IMPLEMENTATION OF AGRICULTURAL PROGRESS IN INDIVIDUAL FARMS IN THE REGION OF LOWER SILESIA

Barbara Szczepańska – Jacek Szczepański

Abstract

Purpose: This article concerns the implementation of agricultural progress in individual farms. Its aim is an attempt to answer the question whether the development of Polish individual farms takes place through absorbing innovations of biological type or through modernisation expressed in the purchase of new agricultural machinery.

Design/methodology/approach: A holistic approach to studying agricultural progress was applied. The data comes from quantitative surveys conducted among individual farmers who manage farms from 5 to 300 ha. 200 structured interviews with farmers were conducted (124 questions). The data analysed comes from surveys conducted in 2013 in Lower Silesia.

Findings: The farmers declared that after Poland's accession to the EU, first of all, they made changes in the field of applied plant protection products, in equipping the machinery park and only at the end of changes in the use of new varieties of agricultural plants. There are two ways of explaining this state of affairs: 1) The productivity and competitiveness of agriculture is determined by farms over 20 ha, there are less than 10% of them. In other farms, their owners combine farm work with commercial work or social sources (The Characteristics of Agricultural Holdings 2010: 56). 2) The tractors have been before - but are also today a factor significantly affecting the status of a good farmer in the rural community.

Research/practical implications: The studies have shown little knowledge about biological progress. Farmers do not share about benefits resulting from the application of biological innovations, they do not know that kind of programs.

Originality/value: The work presents its author's own research which is an attempt to analyse the process of implementing agricultural progress in farms.

Keywords: Innovation, Agricultural Progress, Biological Progress, Individual Farms, Lower Silesia, Poland

JEL Codes: A14, O3, Q1

Introduction

Processes that take place in farms are set to be described in a long-term perspective. The issue of implementing agricultural progress in farms is important for several reasons:

1) Polish agriculture is included in the Common Agricultural Policy, where the concept of sustainable development is an obligatory paradigm. Agricultural policy emphasizes the ability for changes and innovations in a broad sense. An innovative approach towards sustainable development of agriculture is a process which involves many parties and different sources of information. Promoting innovation is a key element and a priority of “Europe 2020” strategy (Moravickova and Adamickova, 2014). In the last 100 years in the sociology of rural areas and agriculture the research concerning an implementation of progress has been related to innovations. Each change in running a farm was too hasty considered an innovation. On the other hand, an innovation cannot be reserved only for a narrow group of specialists and institutions. In our work, we use the term - agricultural progress, which has several definitions developed by representatives of agricultural and social sciences (Herdt, Toenniessen and O’Toole, 2007; Józwiak, Kagan and Mirkowska, 2012). In addition, it is pointed out that farmers must rely on quickly-growing knowledge in the field of biological and agronomic progress; a knowledge specific for agro ecosystems, regions, soil types (Tilman, Cassman and Matson 2002; Trethowan, van Ginkel and Rajaram, 2002).

2) According to Polish constitution, the basis of the agrarian system constitute family farms. We can highlight the multiplicity of productive, social, environmental and cultural functions that they perform .

3) Notwithstanding the non-productive functions assigned to and implemented by farms, an absorption of various types of agricultural progress (especially including the biological progress) is extremely important for increasing their productivity, reducing the use of live labour, including unfavourable demographic processes of the entire rural population (Śleszyński, 2018) and for simultaneous increase in agricultural income.

4) In accordance with the market economy, economically strong farms absorb innovations and agricultural progress, wanting to maintain abilities for development. In Polish agrarian structure, also in Lower Silesia, small farms prevail (Tab. 1). The owners of those farms have non-agricultural sources of income (mainly from wage labour and social resources) and they are not

interested in increasing farm productivity – therefore, an external involvement, including public institutions, is needed in the process of implementing agricultural progress.

This work presents the issue of implementation of agricultural progress in the sociological aspect. The implementation of agricultural progress is understood very broadly, as introducing to the farm progressive changes in the varieties cultivated, species, plant protection products applied and in machines. In accordance with the market economy, several types of entities operating in the external environment of agriculture can be distinguished. They affect the process of implementing progress in individual farms to a different extent. Namely: 1) Polish and foreign companies involved in the production and popularisation of industrial factors of production (seed, plant protection chemicals, mineral fertilizers, machinery and equipment indispensable in agricultural and animal production). 2) State and local government institutions that aim to promote innovation and progress in agriculture (for example: agricultural advisors, innovation brokers). 3) Institutions of the knowledge triangle, agricultural universities, research institutions that deal with education, research, and innovation. 4) Modern large private enterprises, as well as fiscal farms that provide examples of good practices.

1 Research methodology

The data analysed comes from surveys conducted in 2013 in the province of Lower Silesia. The first group to be researched were managers of agricultural holdings ranging from 5 ha to 300 ha. The structure of the area of farms managed by respondents reflects the surface structure of Lower Silesian holdings that are over 5 ha (Tab. 1). The study did not cover farms smaller than 5 ha – defined as very small area (up to 5 ha) and very weak economically (4 ESU) (Dzun, 2013). At the same time, all specialist farms with a significant production are excluded from the researched group, i.e. farms of: poultry, pigs, vegetables, orchard and floricultural farms. Specialised farms did not participate in the study.

The research was carried out with the use of the author's own structured interview questionnaire. Sets of questions aimed for farmers focused on changes introduced in farms after Poland's accession to the EU, on external entities bringing changes to farms, knowledge and evaluation of Post-registration multi-environment trials program. The questions focused also on the impact of large-scale farms (over 300 ha) on changes in the farm, sources of household income, the impact of EU instruments, and the assessment of personal situation of the farmers who were

surveyed and their future plans. Statistical analyses were performed with the use of the IBM SPSS Statistics 24 statistical package.

Tab. 1: The number of agricultural holdings in Lower Silesia by area group of agricultural land in 2010, percentage structure in area groups.

| Area group of individual farms | Number of individual farms | Structure in area groups in % | % | % | Number of interviews |
|--------------------------------|----------------------------|-------------------------------|------|------|----------------------|
| Till 1 ha inclusively | 43 871 | | | | |
| 1-2 ha | 14 163 | 22.5 | 52,5 | | |
| 2-5 ha | 18 839 | 29.9 | | | |
| 5-10 ha | 13 548 | 21.5 | 47,5 | 45.3 | 91 |
| 10-15 ha | 6139 | 9.8 | | 20.5 | 41 |
| 15-20 ha | 2944 | 4.7 | | 9.9 | 20 |
| 20-30 ha | 2758 | 4.4 | | 9.2 | 18 |
| 30-50 ha | 2107 | 3.3 | | 7.0 | 14 |
| 50+ ha | 2422 | 3.8 | | 8.1 | 16 |
| Together (1-50+) | 62 920 | 100% | 100% | 100% | 200 interviews |
| Total | 106 791 | | | | |

Source: The Characteristics of Agricultural Holdings 2010 (p. 442 and 443) and own calculations.

2 Data and results of the research

Since Polish farmers entered the CAP, a significant inflow of funds has taken place and it has been destined for both the farms themselves and the rural environment, as well as to external entities (government agencies, companies, universities, research centres). There may appear the question whether changes in the functioning of those external entities influenced the implementation of agricultural progress in farms. The main objective is to answer the question whether the development of Polish individual farms takes place through absorbing innovations of biological type or through modernisation expressed in the purchase of new agricultural machinery. The main hypothesis of the conducted research was, the larger the area of the holding, the greater the susceptibility of the owners to absorb the factors of agricultural progress.

After 2004, the surveyed farmers most often changed to new and better qualitatively – mineral fertilizers (45.5%), new plant protection products (46%) and introduced new varieties of plants that are already cultivated (34.5%). 39% of respondents declared purchase of new machines and devices. This indicator requires a comment, for - the farmers bought the equipment they needed, primarily on the secondary market, and they were present in the primary market of machines and equipment to a lesser extent. *New* means, therefore - better equipment in terms of performance parameters, regardless of its source of origin. The Tab. 2 presents answers of respondents from particular area groups.

Tab. 2: Changes introduced in the different area groups of farms in % (N=200)

| | New varieties of plant | New plant protection products | New mineral fertilizers | New machines | No changes |
|---------|------------------------|-------------------------------|-------------------------|--------------|------------|
| 5-10ha | 34.2 | 41.1 | 45.2 | 31.5 | 26.0 |
| 11-15ha | 37.2 | 46.5 | 44.2 | 37.2 | 16.3 |
| 16-20ha | 31.8 | 59.1 | 45.5 | 36.4 | 18.2 |
| 21-30ha | 33.3 | 51.9 | 48.1 | 29.6 | 14.8 |
| 31-50ha | 47.2 | 52.9 | 47.1 | 61.8 | 88 |
| 50+ha | 50.0 | 50.0 | 41.2 | 82.4 | 11.8 |

Source: Own research

Only one in three farmers declared the implementation of biological progress expressed in the cultivation of new plant varieties on smaller farms. In farms of over 30 ha, respondents often decide to cultivate new varieties. An open question was asked: What plant varieties are currently grown on a given farm? The name of one variety was mentioned by 29% respondents, two varieties by 21.5%, three varieties by 15%. The majority of respondents do not know the names of plant varieties they grow on their farms.

Aiming at popularisation of the knowledge about new varieties, the Post-registration multi-environment trials program was established. The program has been operating now in Poland for many years. Its aim is to facilitate the choice of the right varieties for cultivation for farmers; varieties adapted to local natural conditions and the cultivation technology used. In literature there are information, that this program provides reliable information on varieties of cultivated plants,

is run in accordance with farming practice, and fulfils its tasks. 90% of farmers declared that they do not know about the program. Here raises the question about the effectiveness of the promotion this program. It is co-financed from budgetary appropriations and a vast majority of people, to whom it is addressed is not interested in the results of the program. Research on innovation education in rural areas confirms, that it is essential in this process to promote innovation ‘partnerships’ between research institution and local practices. (Iacovo, Moruzzo, Rossignoli and Scarpellini, 2014, p. 347). The results obtained confirm the need for further actions, to raise awareness of the benefits of biological progress.

Tab. 3: The role of representatives of companies agricultural advisers agricultural advisers in introducing changes in agricultural holdings in % (N=200)

| | New varieties of plant | | New plant protection products | | New minerl fertilizers | | New machines | |
|------------|------------------------|------|-------------------------------|------|------------------------|------|--------------|------|
| | A | R | A | R | A | R | A | R |
| very small | 22.5 | 13 | 24.5 | 17.5 | 24 | 13 | 33.5 | 27.5 |
| small | 50.5 | 49.5 | 48 | 55.5 | 43 | 59.5 | 36.5 | 40.5 |
| medium | 2 | 4.5 | 2.5 | 5 | 3.5 | 4 | 4.5 | 8 |
| big | 15 | 22 | 15.5 | 12.5 | 20 | 14.5 | 13.5 | 10.5 |
| very big | 9 | 11 | 9 | 10 | 9 | 9 | 12 | 14 |

Source: Own research

Respondents were asked to assess the role of representatives of companies (R) and agricultural advisers to (A) in implementing changes in agricultural holdings. Most often the answer was given that their role in the opinion of farmers is small (Tab. 3).

In the light of the information obtained, the assessment of the work and involvement of private companies and state institutions in the opinions of Lower Silesian farmers is quite ambiguous. Both categories of professions present in the external environment of farmers are rather treated as ‘necessary evil’. Farmers who want to run their farms efficiently have to enter into relations with advisors and representatives (the wider the network, the better), however, according to the respondents' declarations, their role in introducing changes in farms is small. The perceived reticence in evaluations is partly related to the self-definition of the farmer, the manager of the holding, one of the most important features of which is the widely understood independence (Krzyworzeka, 2014, pp. 299-308).

Every fifth household's respondents declared, that they have not introduced any changes in the last 9 years (2004-2013). This situation may be explained as follows: some households have invested appropriations in the purchase of land. The remaining respondents from this group made sufficient changes in the process of adapting their farms to the conditions of the market economy in the pre-accession period.

In order to examine the dependence of the plans in the application of biological progress on the purchase of machinery with the area of the holding in use, a test of the quadrant independence may be applied. The chi-squared test statistic is 22.02 with an associated $p < 0.001$. At the level of significance $\alpha = 0.05$ and degrees of freedom $(r-1)(k-1)$, the calculated value of the considered statistics is greater than the critical value for the considered parameters. This means that the hypothesis of independence of the analysed variables should be rejected in favour of an alternative hypothesis, which leads to the conclusion that there is a correlation between plans to apply biological progress and the realisation of purchases of machinery while managing the area held.

2.1 The role of agricultural machinery

In the researched farms, there prevailed the number of tractors - 233. In every second farm, from 11 to 30 ha there were two tractors. Every third respondent from the group of 31-50 ha indicated that there are three tractors in their farm. The value of R. Pearson's correlation coefficient as for the farm's area size and the declared number of tractors was $r=0.571$, $n=0.01$, $N=233$, It was the biggest value compared to the correlation of the farm area and other agricultural machines.

The research shows that 80.5% of the respondents said that farmers aim at making the farm fully self-sufficient in terms of the necessary machinery. At the same time, 61% of respondents agreed with the opinion, that farmers use neighbourly exchanges of the machinery this way organising work in their farm. The highest number of positive indications was obtained in the group of 16-20 ha (Tab. 4). Only one of two respondents from the group of over 51 ha is willing to borrow machines, which may result from fears of good use of the machine. Often new machines purchased by farmers from larger farms are equipped with computer systems, the operation of which requires appropriate training.

Tab. 4: Borrowing of agricultural machinery and equipment to neighbours in different areas of farms in % (N=200)

| | Yes | No |
|---------|------|------|
| 5-10ha | 57.1 | 42.9 |
| 11-15ha | 65 | 35 |
| 16-20ha | 80 | 20 |
| 21-30ha | 61.1 | 38.9 |
| 31-50ha | 57.1 | 42.9 |
| 50+ha | 50 | 50 |

Source: Own research

Issues of quantity and diversity of equipment in machines, also of borrowing or not borrowing machines are much more willingly commented by respondents than, for example, issues concerning elements of biological progress.

The respondents were asked to determine the indicative age of their machines and they mostly did not have any problems with that. For 185 tractors, their age has been told, what allows a better assessment of the condition of the equipment of farms. Only 41 tractors (22.2% of the total number) are up to 10 years old. In the researched farms in Lower Silesia over 60% of the total number constituted tractors that were over 15-years-old in 2013. This fact confirms the observation of adaptation processes in the pre-accession period. Majority was represented by tractors that were between 21 to 30 years old (Tab. 5).

Tab. 5: The average age of tractors (N=185)

| Number of years | Number of tractors | % |
|-----------------|--------------------|------|
| Do 5 lat | 19 | 10.3 |
| 6-10 | 22 | 11.9 |
| 11-15 | 31 | 16.8 |
| 16-20 | 46 | 24.9 |
| 21-30 | 51 | 27.6 |
| 31-45 | 16 | 8.6 |

Source: Own research

Data from the General Agricultural Census does not allow to present information concerning the purchase of tractors including the area group and a specific voivodship. In order to grasp this phenomenon there is data which concerns whole Poland. In individual farms over 180 000 tractors were purchased in the period from 2004 to 2010. Vast majority of them were used,

the number of brand new tractors was 50 300 (27.9% of the total). The number and power of new tractors was increasing together with the area of the farm (Pawlak, 2013).

Getting the equipment, machinery and facilities from secondary market is financed from one's own resources, often independently from agricultural income. Funds destined for this purpose were impossible to be obtained from an EU-funded program, for example from the farm modernisation program (that one assumed the purchase of new machines).

An important issue of the study was to determine features that, according to the respondents, characterize a farmer who will be able to develop his farm in the most effective way. Namely: 1) farm mechanization - 124, 2) having experience in farm management - 112, 3) ability to apply effectively for EU funds - 101, 4) owning a large area farm - 98 indications (N=200). In Sokołowska's research, more than half of the farmers declared that their farm's abilities for progress are improved in 53% with purchase of machines and in 27.9% with investment in new plant and animal varieties (Sokołowska, Bisaga and Szwiec, 2006).

In relation to these results, it is easy to assume that it is still important to believe how a good farmer should be, i.e. someone who owns all the machinery and equipment necessary for agricultural production. Similarly to the second half of the 20th century - also now a new machine is a visible determinant of modernity, progress, a modernised farm.

Conclusion

Integration of the Middel-East Europe economies into the EU has intensified competition, forces entrepreneurs to operate more efficiently and innovatively and facilitated an influx of ideas and know-how, which followed for economic growth, on the one hand, but greater demands on entrepreneurs in terms of technological capabilities and managerial skills (Blažková and Dvouletý, 2019). Similar processes take place in agriculture. Changes implemented in farms after accession of Poland to the EU concerned mainly changes in the use of fertilizers (45.5%) and plant protection chemicals (46%), later in the equipment of machinery (39%) and only at the end in the use of new varieties of agricultural plants (34,5%).

Farms in Poland but also in the EU remain largely family-based and small economic dimension. Farms often do not have sufficient financial resources to adopt radical innovations, especially when these require huge investments (Détang-Dessendre, Geerling-Eiff, Guyomard and Poppe, 2018). Factors of biological progress: seeds of properly selected varieties of cereals,

of industrial plants, also varieties of potatoes; breeds of animals are economically available also for small and medium-sized farms. In accordance with strategy of sustainable development, it is biological progress which is said to be the main factor enabling the departure from industrial agriculture or at least lowering its status in the structure of EU agriculture, at the same time maintaining the productivity of agriculture and maintaining its ability to compete on the global market. However, the interviewed farmers do not identify this kind of progress with a factor affecting the status of a good farmer and host and his esteem in the rural community. The name of one variety was mentioned by 29% respondents. 90% of farmers declared that they do not know about the Post-registration multi-environment trials program.

Farmers who want to run their farms efficiently have to enter into relations with agricultural advisors and representatives of companies (the wider the network, the better), however, according to the respondents' declarations, their role in introducing changes in farms is small. One of the most important features of the farmer is the widely understood independence.

The surface structure of agricultural holdings in Poland is characterized by a relatively low level of concentration and specialisation of production, what translates into relatively economically low survivability of farms (Wilkin and Nurzyńska, 2018). The micro-economic weakness of most agricultural holdings determines the sectorial weakness of the Polish agriculture on the European Single Market. It is necessary to introduce changes consisting in continuing the reduction of labour resources in the agriculture and modernisation of fixed assets (Wigier, 2014, p. 100).

80.5% of the respondents said that farmers aim at making the farm fully self-sufficient in terms of the necessary machinery. Farmers who manage farms of up to 15 hectares, even if they use forms of support from EU, do not have sufficient resources to make use of the offer of industry which provides increasingly complex and at the same time expensive machinery and equipment necessary for modern agriculture (Kłopot and Trojanowski, 2016). They buy on secondary market, retrofitting their farms with machinery and equipment according to the stereotype of a modern farmer which was developed in the period of People's Republic of Poland. In the process of modernization of individual farms in Poland, there appeared the conviction of their owners that farms, regardless of their area, should strive to self-sufficiency if it comes to machinery and equipment necessary in their farm, that this equipment is an indicator of progress. As it is shown in the own study (farm mechanization is the most effective way to develop farm), that belief is relatively permanent.

American research indicates that primarily large corporations are those that benefit from introducing the factors of biological progress (Fernandez-Corneji and McBride, 2002). While analysing Lower Silesia reality, there is a noticeably greater tendency to use factors of biological progress by farmers up to 50 ha, where all types of agricultural progress are implemented (e.g. 50% of the holdings in this group declare sowing new variety, 82% buying new machines). The study confirmed the hypothesis that the willingness to absorb agricultural progress increased with the area of the farm.

In Common Agricultural Policy knowledge development and knowledge exchange are essential. The strategic problem is still the question how to make owners of smaller and medium-sized farms take advantage of opportunities of development offered by biological progress. In further research we want to know the reasons that cause limitations in the use of biological progress in small and medium-sized farms.

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PERFORMANCE MEASUREMENT SYSTEMS: APPROACHES AND PROBLEMS OF SMES

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Abstract

Purpose: The aim of the research was to evaluate the level of application of the performance measurement systems (PMS) in small and medium enterprises (SMEs) operating in Slovakia.

Design/methodology/approach: We gathered the data by a questionnaire survey conducted in the 2018. We analysed and evaluated the data using three nonparametric methods – Kruskal-Wallis test, Dunn's test and Spearman's correlation coefficient. Our sample consisted of 253 SMEs operating in Slovakia. Within the framework of the theory, we tried to set the main problematic areas in SMEs by already published findings and then by comparing them to our results.

Findings: The level of implementation of PMS in SMEs is still very low, although we could find some positive and interesting improvements of SMEs towards the studied topic. In general, there is insufficient number of complex PMS specifically designed for SMEs. Only a small number of SMEs has experiences with PMS or specific tools designed for performance measurement and evaluation. The major reasons are linked to the understanding of importance and benefits of such systems, they have lack of knowledge and information about implementation and also lack of time, human, material and financial resources.

Research/practical implications: Major outcomes of the paper are connected to identification of reasons why SMEs do not apply PMS and also to identification of factors causing problems in this area in general for SMEs. We pointed out certain benefits that can help SMEs to improve their performance and competitiveness connected to performance measurement and evaluation. Our recommendations are also linked to the increase of interest and education of managers in this area and to the development of more suitable approaches or specific tools that can better match the conditions of SMEs.

Originality/value: We set the original research and present current findings on the approaches of SMEs towards performance measurement in Slovakia with the intention to provide their managers with suggestions for improvements.

Keywords: Performance, Performance Measurement System, SME

JEL Codes: L10, L25

Introduction

Nowadays, enterprises are operating in a hardly predictable and dynamic environment that has a significant impact on their readiness and ability to react quickly and to adapt to new market conditions. If enterprises want to survive, to maintain their position in the market or to grow, they have to perform as best as possible. The level of performance can be managed by managers. The performance measurement is used for record, analysis, evaluation, control and improvement of business performance. There are certain approaches and tools how to implement a suitable performance measurement system (PMS) in organizations.

However, the concept of "business performance" has been defined by various authors differently. E.g. according to Dwight (1991), performance is the level of achievement of the goal. Lesáková (2004) characterized the performance of the company as the ability to achieve the desired effects or outputs, possible in measurable units. According to Wagner (2009), the performance is a characteristic that describes the way in which the investigated subject carries out a particular activity, on the basis of similarity to the reference pattern. In general, performance measurement provides managers with important information about the development of their business. With the right performance indicators, data and analysis, managers can make appropriate decision of strategic, tactical or operational character and thus drive continuous improvement. The core existence of a business is closely related to measuring and evaluating performance (Gavurová, 2011), as well as to deciding what to measure, how to measure and what reference pattern to choose to compare the results. These decisions relate to the creation of a PMS. As well as term "performance", also for the concept of "performance measurement system" we could observe the diversity of definitions and the lack of consensus due to difference views on PMS and continues development of the theory. In our paper, we want to primarily focus on performance measurement in small and medium-sized enterprises (SMEs) as their approach to PMS can be different from large enterprises.

Our paper is structured as follows: in the theory review, we described the main characteristics of the PMS as well as we focused on specifics of SMEs. In the next part, we specified the methodology of the research and of our sample. Our major results and findings connected to the assessment of approach to PMS in SMEs in Slovakia are presented in the next part. In the end, we summarized our main conclusions and recommendations.

1 Characteristics of PMS with Special Focus on SMEs

The performance measurement system can be defined as an information system, mainly fulfilling two primary functions (Forza and Salvador, 2000): (1) *structuring and supporting communication between all the organizational units*; and (2) *collecting, processing and delivering information on the performance of people, activities, processes, products, business units*. A good PMS should enable to plan, to measure, and to control performance and also to ensure that all activities, initiatives, practices, resources and business decisions are connected with strategy to achieve desired results. (Maisel, 2001) In general, PMS should be created as framework of performance indicators, which can help managers in formulating and better implementing their strategies. (Kohnová, 2013)

There can be found various models or frameworks of PMS. They differ not only in scope, intensity, complexity and structure, but also in versatility and particularity (Garengo, 2005). General PMS are widely applicable, while specific systems could be implemented only in a particular sector or in a certain region or group of companies. According to Katic (2011), we can divide PMS into two groups of models: (1) *Self-rating models*, e.g. the Model of Excellence (EFQM); (2) *Models designed to support business process management and processes improvement*, e.g. Business Performance Improvement (BPI), Performance Pyramid System (SMART) or Balanced Scorecard (BSC). According Taticchi et al. (2010), PMS can be divided also according size into: (1) *Systems that do not consider the size of enterprises* (or have been modified for SMEs based on systems originally designed for large companies) e.g.: Performance Pyramid System, Balanced Scorecard, Performance Prism; (2) *Systems specifically designed for small and medium-sized enterprises*, e.g.: BSC application to SMEs, Activity Based Costing in SMEs, Integrated Performance Measurement for Small Firms.

While studying the specifics of performance measurement in SMEs, we found a lack of theoretical and empirical studies, which is reflected into insufficient number of complex PMSs or approaches specifically designed for the SME environment. The primary focus is still on large enterprises. The first PMSs designed for large enterprises could be dated to the 1980s, while for SMEs they have only emerged in the mid-1990s. (Taticchi et al., 2010) For SMEs, it is mostly recommended that the PMS should be dynamic and flexible, capable to react flexibly to the needs of companies, but to a certain extent be structured to support the future planning of activities. (Venera et al., 2013) A PMS should be also based on an information system that takes into account

the limited financial and human resources of SMEs. (Garango, 2005) The design of PMS should support the strategy, but at the same time it should be focused on operational aspects of SMEs. (Venera et al., 2013)

Based on the general contribution of PMS (Forza and Salvador, 2000; Franco-Santos et al., 2007; Hvolby and Thorstenson, 2000), we can specify five major benefits for SMEs: (1) *it serves as the platform of performance measurement*; (2) *it helps to formalize the process of strategic management, it provides data to the strategy formulation process, to implementation phase and to strategic control*; (3) *it improves overall communication and creates possibilities to benchmarking and compliance with regulations*; (4) *it helps to set up base for compensation of employees, thus influence their behavior and motivation*; (5) *it helps learning and overall improvement as it provide regular feedback and gather the data of progress*.

Despite the benefits and roles of the PMS, the specific environment and features of SMEs may create barriers to the implementation of PMS. Moreover, successful implementation of the system is particularly important for SMEs. If it fails, it has a much more disastrous impact on SMEs than on large companies considering the heavy burden on the resources earmarked for the entire process of implementing the system. (Carlyle, 2013). Based on several studies (Hudson et al., 2001; Garango et al. 2005; Hvolby and Thorstenson, 2000; Carlyle, 2013), we summarized five common problems SMEs are facing globally: (1) *low participation of SMEs in performance measurement projects*; (2) *absence or misuse of performance measurement models*; (3) *absence of a holistic approach to measuring performance*; (4) *informal approach of SMEs to performance measurement and* (5) *absence of planning elements*.

There are some studies (Hudson, 2001; Garango, 2005; Gavurová, 2011) that already pointed out factors that negatively affect measurement and performance assessment in SMEs: (1) *limited human resources*; (2) *overwhelmed managers and their capacity*; (3) *limited capital resources*; (4) *reactive approach of SMEs*; (4) *little attention paid to the formalization of processes and* (6) *incorrect perception and misunderstanding of PMS*. These factors show limits and call for more tailor-made solutions for SMEs.

2 Research Methodology

The aim of our research was to evaluate the level of application of the PMS in SMEs operating in Slovakia. In our research, we focused on the following areas: (1) *application of PMS* and (2) *reasons and factors negatively affecting performance measurement in SMEs*.

The research took place in Slovak Republic during the year 2018. We selected joint stock companies and limited liability companies from the Bratislava region listed in the Finstat database (it provides a comprehensive information about companies in Slovakia and their financial status). There are 18030 SMEs listed on this portal in the Bratislava region. We used a questionnaire as a research instrument to provide comprehensive and representative data. We approached randomly 5814 SMEs as the initial sample and the response rate was 4,4%. The sample consisted of 253 SMEs and can be specified by:

- Size distribution: micro (46%), small (39%) and medium-sized enterprises (15%);
- Age distribution: less than 3 y. (6%), 3-5 y. (8%), 5-10 y. (24%), more than 10 y. (62%);
- Sector distribution: traditional industries (33%), agriculture & food (7%), services (50%), education, R&D and consultancy (9%) and non-profit & public sector (1%);
- Financial situation and development: growth (64%), stagnation (31%), recession (5%).

In the questionnaire, we used closed-ended questions designed in a way that help to find the differences. Subsequently, we also looked for differences in enterprise responses in terms of size, industry, or age, reflecting different approaches and preferences. By evaluating the questions, we obtained nominal and ordinal data. We used Kruskal–Wallis test to compare responses of groups of companies in order to find out whether the groups show statistically significant difference. Since the test does not identify where the difference occurs or how many pairs of groups are different, we used post hoc Dunn's test for pairwise comparisons of groups. In case of groups, which could also be arranged in an order (financial situation and size of companies), non-parametric Spearman's correlation coefficient was calculated.

3 Results and Discussion

3.1 Application of performance measurement system

In the first part, we studied whether SMEs have implemented a comprehensive PMS. In case of implementation, we also verified satisfaction with the application of their PMS. If the enterprise did not have a comprehensive PMS, we also monitored the level of the implementation or possible future aspirations. We evaluated results also based on size classification. The main results are shown in a Tab. 1.

Tab. 1: The application of performance measurement systems based on sizes

| | total | micro | small | medium-sized |
|---|--------------|--------------|--------------|---------------------|
| The company has PMS | 22% | 15 % | 28% | 24% |
| The company has a well-established system and is satisfied with it | 14% | 10% | 15% | 16% |
| The company has an established system but is not satisfied with it | 8% | 5% | 13% | 8% |
| The company has experience with the PMS | 11% | 5% | 16% | 21% |
| The company is in the process of implementation (partial implemented) | 8% | 4% | 12% | 16% |
| Attempts to implement the system were unsuccessful | 3% | 1% | 4% | 5% |
| The company does not have (yet) the experience with the PMS | 67% | 80% | 56% | 55% |
| The company does not have the system, but is considering it | 18% | 22% | 14% | 16% |
| The company does not have a system in place, nor is it considering it | 49% | 58% | 42% | 39% |

Based on the results (Tab. 1), only about one fifth of enterprises use a comprehensive PMS, and about two-thirds of companies are generally satisfied with it. More than half of enterprises (67%) have no experience with implementation of a PMS. Interestingly, small and medium-sized enterprises have very similar results. Moreover, there is more of small (28%) than medium-sized enterprises (24%) with a comprehensive PMS, but we can see slightly better satisfaction with the system in medium-sized enterprises. Unfortunately, many enterprises still do not consider application of the PMS, which is almost half of the enterprises (49%), but the most of them are for micro-enterprises (58%). However, small and medium-sized enterprises have more experience with PMS.

By using the nonparametric Spearman's correlation coefficient, we also identified correlations, although very low, between the level of PMS implementation and the size of the enterprise or the financial situation. We could say, although not with a remarkable effect, that the bigger the enterprises are, the more are they interested in application of PMS. Moreover, we found that in terms of fully / partially implemented PMS, 35% of enterprises are in the period of growth, whereas 22% of them are in the period of stagnation and 18% of enterprises are in the recession. We identified a certain trend; the companies have better financial situations if they use PMS. We also found that up to 27% of companies failed to implement a PMS were in recession. This confirms our claim in theoretical part, that successful implementation of the system is vitally important for SMEs and their development. In case of company age, we have not found a correlation, thus we can conclude, there is no statistically significant difference between the age of the enterprise and the level of PMS implementation.

In this area, we have further investigated to what extent enterprises use specific system or tool of PMS. The most used methods are: Activity-Based Costing (12%), Balanced Scorecard (8%), Business Performance Improvement (7%), Corporate Performance Management (6%) and Performance Pyramid System (6%). Results showed that only a very small percentage of enterprises apply specific system or tool. This can be also a reason of non-satisfaction or low implementation of PMS.

3.2 Reasons and factors negatively affecting performance measurement

Due to the low application of PMS, we also analyze the reasons why SMEs do not use or have not implemented yet a PMS. Major results are in Tab. 2.

Tab. 2: The reasons of not applied performance measurement systems

| Reasons | total | micro | small | medium-sized |
|--|-------|------------|------------|--------------|
| It has not been a priority yet | 57% | 56% | 32% | 12% |
| Lack of time for implementation | 37% | 55% | 35% | 10% |
| Lack of human / material resources | 34% | 48% | 40% | 12% |
| Management does not see benefits / necessity | 33% | 57% | 34% | 9% |
| Lack of financial resources | 26% | 51% | 36% | 13% |
| Lack of information and/or procedures | 24% | 47% | 35% | 18% |
| Concerns about failure of implantation | 5% | 38% | 49% | 13% |

For 57% of the enterprises, application of a comprehensive PMS was not a priority yet. SMEs evaluate their financial and non-financial performance indicators at their discretion and do not feel the need for a complex system. The result also supports the views of foreign authors, which we stated in the theoretical part, that SMEs have more informal approach to measure the performance, lack of planning elements or of a holistic approach while measuring the performance. When we looked closer to results categorized by size, we noticed some differences. E.g. in the case of micro enterprises, the main reasons were mostly that management does not see the benefits of application a PMS or does not yet feel it is necessary for them (57%), or they lack time to implement the PMS (55%). For small enterprises, the most frequent reasons were worrying about the failure to implement a PMS (49%), the lack of human or material resources to implement the PMS (40%), or lack of finance (36%). In the case of medium-sized enterprises, the major reasons were, in particular, the lack of information, procedures or proven techniques for application (18%), worries of failure (13%) or lack of finance (13%).

In the last part of our survey, we focused on identification of specific factors causing problems or negatively influencing measurement of performance in SMEs. We found that the most important problems (with medium to high impact) for SMEs are in particular: (1) *lack of professional / managerial knowledge or experience* (59%), (2) *consideration as not valuable for decision making* (57%), (3) *insufficient knowledge of the application methods and techniques* (52%), (4) *lack of motivation and commitment of management* (45%), (5) *lack of financial resources for performance measurement and evaluation* (45%), (6) *fear of inadequate returns* (measurement does not produce the desired performance improvement effect) *and other reasons* (organization members do not consider performance measurement to be important) (45%). To determine statistically significant difference, we used the nonparametric Kruskal-Wallis test with an α of 5% and in the case of a positive result (p-value is less than $\alpha = 0.05$), we subsequently performed the Dunn's test for comparisons of given groups. The major results are shown in Tab. 3.

Tab. 3: Statistically significant difference of problematic factors in SMEs

| Factors | | Kruskal-Wallis test (p-values) | | |
|---------|--|--------------------------------|--------|----------------------|
| No. | Name | Size | Age | Level of application |
| 1 | Information barriers due to not functioning IT | 0.01559 | 0.9916 | 0.03635 |
| 2 | Insufficient reasoning (consider as not important) | 0.443 | 0.3978 | 0.03072 |
| 3 | Negative perception by employees | 0.001112 | 0.4487 | 0.0005935 |

In terms of the company size, there is a statistically significant difference between the company size and the impact level of two factors: 1 and 3. In the factor number 1, there was a statistically significant difference especially among micro and medium-sized enterprises. The result is not as surprising as the demand for effective communication or information delivery increases with the size or complexity of enterprises. Many micro or small enterprises with a small number of employees are able to operate without established information system. Concerning the factor number 3, there was also a statistically significant difference between micro and small businesses. In terms of company age, we found out that there is no statistically significant difference. This means that age does not affect how enterprises assess the importance of these factors. In terms of level of application, we found significant statistical difference with all of these factors. It means, the level of impact of these factors is increasing with the level of application.

Conclusion

Our paper deals with the topic of PMS. In this topic, we focused on the SMEs, as they account for 99% of all enterprises in Slovakia and are employing more than 70% of the population in the long term. Majority of studies and articles are dealing with PMS which are designed or are more suitable for large companies. Based on the literature review, we summarized some recommendations and major problematic areas in SMEs. Within our results, we proved the same problems still exists within the environment of SMEs in Slovakia and identified some new ones. Based on our research, we can confirm that the level of application of the PMS in SMEs is very low, although we can see some interest and experiences among these enterprises. There are major reasons of this insufficient state in SMEs that are connected to perception of importance of benefits of systematic framework of performance measurement, lack of professional knowledge and experiences in this area as well as they do not consider PMS as contribution for their decision making. Insufficient knowledge is also creating a huge barrier. SMEs lack the quality of information and knowledge how to apply specific methods, which may affect the low level of application of PMS or of specific tools. This can be improved by raising interest and education of managers in this area as there are proven benefits. A suitable PMS can help to improve financial and overall performance of the SMEs but also help with other aspects, e.g. with formalization of strategic management process, communication, regular feedback on achieved results and improved communication and learning. The other recommendation is towards the researchers or specialists to focus on creating systems

that reflects needs and limits of SMEs. SMEs identified as another problems lack of procedures or proven techniques and methodologies for right application and their limits connected to human, material, financial and IT limitations. They are so often trying to implement well-known PMS that were originally designed for large companies, but they are not satisfied with the application and results or their attempts fail. The future research could study more the areas of concrete failures.

There may be some possible limitations in this study. The sample size does not reflect the real size structure of SMEs in the Bratislava region as we tried to achieve the highest number of categories of enterprises in terms of the size. This could cause the sample bias mainly while concluding evaluations based on the size. However, the more representative sample of SMEs would be convenient dealing with the disparity of medium size enterprises which could be addressed in future research.

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SOCIAL MARKETING CAMPAIGNS CARRIED OUT BY BRAND. A CASE STUDY

Beata Tarczydło

Abstract

Purpose: The article was motivated by the question about the role of branded social marketing campaigns in management practice? The purpose of the qualitative research was to obtain information on whether and what social marketing campaigns are conducted under the Ikea brand and what results they bring.

Design/methodology/approach: Literature studies, meta-analysis of available online sources, and own qualitative studies using case study, participant observation, and online content analysis were carried out. Information search focused on the following problem areas: What social marketing campaigns are conducted under the Ikea brand? What issues do they concern? Who carries them out, for whom, with whom? What activities are involved? What are their results?

Findings: The discussion and qualitative research confirmed that the brand's social marketing campaigns are an important management tool in the age of sustainability practices. The article presents Ikea's social marketing campaigns: "Familiarised", "The Room", "Next-Door Neighbours", "Playing is serious business", and "Ikea at COP24". Branded social marketing campaigns bring multiple benefits to all stakeholders.

Research/practical implications: The analysed social marketing campaigns conducted by Ikea concern important issues: social issues, the problem of domestic violence, creating opportunities for spending time in a constructive way, caring about children's right to develop, also through playing which educates, lets them grow, and brings happiness, plus environmental issues and those related to sustainable management and activities.

Originality/value: The conducted literature and empirical studies contribute to expanding knowledge and practical skills in the area of sustainability. Branded social marketing campaigns increase the effectiveness of personified brand management. The need to use them is determined by current market conditions and new management paradigms. The discussed examples may constitute a model for other marketers.

Keywords: Social Marketing, Brand, Social Campaigns Under the Brand, Ikea Case Study

JEL Codes: M31, M14, Q01

Introduction

Contemporary marketers search for optimal marketing activities adapted to the conditions in which they function. The phenomena which are definitely significant (Stabryła, 2012, p. 38) include: strong competition between market players; specific customer expectations; personification of the brands with which various participants of the market game want to establish relationships (Wan et al., 2016); technical and technological progress; development of the resources and functionalities of the Internet and appropriate online marketing activities (Chaffey and Smith, 2017); strong trends related to sustainable (Marriewijk, 2003, pp. 95-105) development and management, social responsibility, and caring about being sustainable (Cohen, 2017), i.e. respecting the social, environmental and economic contexts at the same time. Finally, the management of contemporary market objects needs to take into consideration modern management paradigms, such as (Wysokińska-Senkus, 2013, pp. 42-56): stakeholders; the perspective of broad (economic and non-economic) objectives of an organisation, the method of achieving them and measuring their results; the process approach; and constant improvement and optimisation of resources.

A question comes to mind about what the role of social marketing campaigns carried out by brands is in the management practice, to what extent they are related to the current determinants, trends, and respecting paradigms, how they are carried out, and what results they bring. For the purpose of the article, literature studies, a meta-analysis of the available online sources, and own qualitative studies with the use of the case study, participant observation, and online content analysis methods were carried out.

The aim of the article is to present social marketing campaigns carried out by brands as an important management tool of a marketer, demonstrate market examples, and discuss the results of the studies carried out and formulate recommendations for the interested parties.

The discussion is carried out based on literature sources, market data, and the author's own qualitative studies.

1 Basic terms and a review of available studies and research

The key terms include: social marketing, brand, and social marketing campaigns carried out by brands.

The beginnings of social marketing worldwide date back to the 1970s (Lee and Kotler, 2016). Several dozen years of practice mean that there are multiple applications of, but also perspectives on the discussed concept³⁷. For instance, Donovan and Henley (2010, p. 4) think that we are dealing with social marketing in a situation in which entrepreneurs and social activists implement marketing techniques in order to achieve their desired social objectives. Lee and Kotler (2016) emphasise, in turn, that social marketing should be associated with a change in behaviour for the good of an individual and society.

Methodical social marketing (Donovan and Henley, 2010; Pang and Kubacki, 2015) projects should involve employees and other stakeholders, be oriented at achieving the set objectives (often related to healthcare, safety, the natural environment or social issues) and concrete results thanks to the use of integrated marketing activities. Moreover, the process of holistic (Dahlen et al., 2010; Kitchen and Proctor, 2015) marketing management, the area of which social activities are, should take into consideration a complex of activities addressed to the soul, mind, and body of the audience/stakeholder, which involves holistic treatment of an individual, who reacts at the mental, physical, and spiritual levels all at the same time.

To sum up, the essence of social marketing is a change in people's behaviour achieved through well-thought-out activities, usually in the form of specific projects or campaigns. Contemporary brands which mark various market objects (people, cities, organisations, products, etc.) are multidimensional constructs and, importantly, significant management tools in the hands of marketers. An important phenomenon in brand management is its personification, i.e. the attribution of human qualities (Keller, 2013; Wan et al., 2016; Wang and Korschun, 2015), thanks to which it "may communicate with" the stakeholders or even, in a sense, "enter into relationships with them". Research shows that brands have personalities (which helps them stand out even in a saturated market), they are recognisable, and have market capital (Keller, 2013; Witek, 2014). Contemporary brands play an important role in stakeholders' lives – they not only offer products

³⁷ On account of the availability of studies defining social marketing (including those listed in the bibliography) and the need to limit the length of this paper, their review was intentionally limited.

and/or services, but also engage stakeholders in various undertakings. One may identify with them and take active part in the life of their communities (Cohen, 2017), for instance, through their online profiles. They seem to be fully interested in the customers/Internet users, their observations, comments, views, and even feelings. Contemporary brands (Dahlen et al., 2010) have an impact on the activities taken by the stakeholders, they create diverse values, and the marketing activities carried out for them generate experience and provide an opportunity to participate in their various undertakings. Social marketing campaigns (Lee and Kotler, 2016) carried out by brands, in turn, involve integrated marketing activities within a determined time period which are audience-oriented and take into consideration precisely set objectives, usually under a certain slogan/centred around a specific topic, implemented in collaboration with partners and with the use of comprehensive marketing communication activities. Campaigns of this type are a manifestation of the organiser's, e.g. brand's, social engagement and are aimed at solving a certain social issue, promoting values or a change in attitude, with conceptual, financial, material or service support.

The essence of a social marketing campaign carried out by a brand is to trigger change in social attitudes towards a certain idea or problem. In general, undertakings of this type are all about achieving an educational effect through informing, explaining, persuading to take action, raising difficult or embarrassing topics taking public interest into consideration. From the point of view of the area of engagement, the following campaign scopes can be distinguished (Kampaniespoleczne.pl, 2018): activation and civic society, road traffic safety, education, ecology and environment, communication within the family, consumerism and consumers, culture, regional marketing, defence and security, development aid, social security, work and employment policy, human rights, prevention – health and addictions, promotion of health, institution transparency and the issue of corruption, social reporting, equal rights and tolerance, other forms of corporate social responsibility, fight against violence, fight against social exclusion, various forms of volunteer work. Their systemic organisation is of particular importance.

2 Developing and implementing social marketing campaigns

The forms of application of social marketing result from the use of the philosophy of marketing, its tools, methods, and procedures, but also taking into consideration the social objectives. In principle, the spectrum of tools or forms of application is unlimited and depends on the creativity

of the authors, although it is also certainly determined by the available resources. The basic form of social marketing is the so-called campaign, i.e. more narrowly, a project or undertaking. The essence is to trigger change in the behaviour and social attitudes towards a certain idea or problem.

The selection of activities depends on the scale of the campaign, its audience and acquired stakeholders, the budget, and the adopted communication strategy corresponding to the current trends (e.g. when organising campaign events, online activities are usually carried out, along with picnics, rallies, meetings, events, information leaflets and brochures, noticeboards, billboards, press and radio ads, and others depending on the available resources and inventiveness) – in general, integrated marketing activities are undertaken.

In accordance with the marketing approach, the process of building a social marketing campaign should include (Donovan and Henley, 2010): preliminary analysis, market segmentation and selection of the target market, target audience studies, setting objectives, social marketing mix planning, formulating the creative strategy and campaign elements, and the communication policy. Social marketing mix (4Ps) can be interpreted as (Lee and Kotler, 2016): the social product, i.e. the object of activity (e.g. a civic activity or not smoking), the price, i.e. behavioural (energy put into the supported activity) and psychological (sense of discomfort when changing the given behaviour) costs, the equivalent of place is the availability of resources thanks to which the audience may behave in accordance with the supported idea (e.g. the proximity of recycling bins), and promotion, meaning integrated marketing communication propagating the campaign.

Through informing, raising difficult or embarrassing topics, educating, spreading awareness, explaining, engaging, and publicising, the designed marketing activity programme for the campaign contributes to the change in the behaviour of individuals, groups, and entire society. Projects of this type are carried out by brands and/or groups of co-organisers, which also impacts the image of the engaged entities.

The specific manner of approaching the process of preparing a social marketing campaign requires extensive and methodical activities. It is worth listing their stages (Lee and Kotler, 2016):

1. The idea (all the activities should concern a socially significant problem, it is worth specifying the idea for which the activities are undertaken, e.g. changing the behaviours of a local community, raising the level of safety, spreading awareness of the effects of irresponsible behaviour);
2. A group of potential allies, the so-called stakeholders (the more partners, the greater the possibilities, e.g. public administration bodies, market entities whose business activity is related to

the issues raised by the campaign, famous people, non-profit organisations, media representatives, PR agencies, socially responsible commercial companies, local communities, volunteers, etc.); 3. Convincing partners to cooperate (in a specific problem situation, partnering with the right stakeholders, e.g. in local matters – the local media, companies active in the given market); 4. The message (the thought or idea around which all the activities will be centred, which needs to be communicated verbally and graphically); 5. Specifying the objectives of the campaign in more detail (depending on the scale of the undertaking, dividing the general objective into partial objectives); 6. Facts (data, evidence, study results supporting the idea should be collected); 7. Determining the scope of activities (the selection of activities depends on the scale of the campaign, its audience, and acquired stakeholders, the budget, and the adopted communication strategy corresponding to the current trends; integrated marketing activities are usually undertaken); 8. Implementation and measuring results (implementation schedule and ways of measuring results, checking whether the set objectives have been achieved, plans for further activities, as such campaigns are often cyclical in nature).

Taking the above discussion into consideration, it may be stated that the scope of social marketing forms or its tools is very extensive conceptually. It should be stressed that the effectiveness of social marketing undertakings, including campaigns, is determined not only by the spectrum of activities, but also the methodical approach to their design and implementation. The marketing approach described herein seems to be the optimal one. In order to present the way in which a specific market object deals with that, a case study was carried out. Its results will be discussed below.

3 Research methods

The selection of the object for the author's own studies – the Ikea brand – was determined by its international character, as well as the marketing activities undertaken for it and their effectiveness, including the Gold Effie Award in the 19th edition of the competition in 2018 (Effie.org, 2018) and the discussion on Ikea España's Christmas ad, "Familiarised". A question came up about whether and what social marketing activities are carried out under the brand.

According to the obtained information, the owner of the Ikea Ingka Group has a sustainability strategy, "People and Planet Positive" (Inter Ikea Systems, 2018), which was developed in 2012, assuming implementation by 2020. However, current corporate information

includes descriptions of activities aimed, among others, at sustainable development for a time period up to 2030. The analysis of the relevant document confirmed that the choice of the object of study was right. Various activities, projects, and undertakings are carried out for the global Ikea brand within the framework of its long-term sustainability strategy, which includes social marketing and related campaigns as an important element. Ikea's key challenges include: healthy and sustainable life, fair and equal treatment, circular economy, and preventing climate change.

The case study includes the following scopes: the subjective scope: Ikea; the temporal scope: from October to December 2018; the objective scope: social marketing campaigns as the selected element of the brand owner's sustainability-oriented activities; the spatial scope: online information resources. The information search focused in particular on the following problem areas: What social marketing campaigns are carried out under the Ikea brand? What phenomena/issues do they concern? Who is responsible for and who supports their initiation and execution? With what partners are they carried out? What do they consist in (what activities do they involve)? How are they popularised/publicised? Do Internet users engage in Ikea's social marketing campaigns? What results do they bring?

As a result of the research carried out, extensive information materials were obtained. The most important results will be presented herein.

4 Social marketing campaigns of the Ikea brand in the light of research

Within the period under study, various social marketing campaigns were carried out under the brand. They will be presented in Table 1.

Tab. 1: Ikea’s social marketing campaigns in the light of the conducted research

| Name of the campaign | Basic characteristics |
|--|--|
| “Familiarised” (Do we know each other?) | Ikea’s Christmas video commercial shows the sad truth about interpersonal relations. It raises the issues of the relationships of our times, weakening family ties, and the impact of social media on our lives. In a pleasing Christmas setting, it reveals the bitter truth about ourselves. Are we familiar with each other? The question accompanies the characters in the video. But it also applies to us, our approach to family. It shows how social media influence our daily lives. It turns out we often know more about public figures than our loved ones. Ikea’s video encourages reflection, not only during Christmas. Let us take care of and pay more attention to our loved ones, allow others get to know us better, and show interest. It is important not to lose ourselves in the world of filtered photos, artificial smiles, and the rush of life. |
| “The Room” | In Italy, every third woman has experienced domestic violence. In order to raise awareness of this problem, on 25 November, the International Day for the Elimination of Violence against Women, in one of Italy’s Ikea stores, one of the rooms was closed with a green wall, with a special amplifier placed inside, playing the sound of actual stories of domestic violence. The green wall was provided with a caption: “Violence is closer than you think, sometimes there’s just a wall between you and it”. Ikea’s campaign brought attention to the problem of violence against women and started a debate in Italy on preventing the dramatic situation and the tragedies that occur in many homes on a daily basis. In Poland, a woman experiences violence every 40 seconds. The phenomenon is a global problem. The campaign met with considerable response on the Internet and in traditional media. |
| Ikea’s “Next-Door Neighbours” | This is the first and the only initiative of this type in Poland, as of yet. It is a unique space, a meeting place which encourages the residents of Lublin to spend their free time together. It gives them the opportunity to take part in numerous creative workshops and film nights, taste Swedish delicacies and have a good coffee, and all that in a special, Scandinavian atmosphere. People’s interest in the place went beyond all expectations. Interpersonal relationships and the values, style, and openness to others promoted by the personified brand form the basis of the campaign. |
| “Playing is serious business” | In November 2018, the third edition of the “Playing is serious business” campaign was organised, becoming part of the celebrations of the Global Month of Play. Ikea joined forces with the Lego Foundation, Unilever’s Persil and OMO brands, and the National Geographic. The campaign’s partners included: Handicap International, Room to Read, Save the Children, Special Olympics, War Child, and UNICEF. Ikea has been working for years for providing children from all over the world with the right to develop, knowing that playing educates, lets them grow, and brings a sense of happiness. The “Playing is serious business” campaign concentrates of promoting and ensuring the right to develop for the little ones, engaging Ikea’s customers. The brand invited children from across the world (about 87,000 in 2018) to draw a soft toy of their dreams. Based on their drawings, actual toys were made, comprising the limited SAGOSKATT 2018 collection. The awarded illustrations include a soft toy drawn by Natalia from Poland. Apart from the work of the young designer from Warsaw, the jury also selected those proposed by children from China, South Korea, Iceland, and Sweden. Their drawings are the perfect reflection of the limitless imagination children have. The latest collection of toys includes a pink unicorn living in the clouds and a rainbow shark travelling the oceans and seas. SAGOSKATT is not just a series of funny and cute soft toys, but also a symbol of social and environmental involvement from a very young age. The total revenues from their sale are donated to local grantees. |
| “Ikea at COP24” | As an official partner of the UN (UNFCCC) and the Ministry of Environment, Ikea took active part in the UN Climate Change Conference COP24 in Katowice. Ikea’s representatives spoke during various discussion panels, conference sessions, and meetings. The company prepared and co-organised many educational and social initiatives, presenting the issue of climate change to hundreds of Katowice residents and encouraging them to take action for the protection of the environment. They included the Ikea Climate Film Festival, the “Climate Action Starts at Schools” competition for primary schools, the “Eco-Experimentarium” exhibition, zero waste food workshops, and workshops on using solar energy. Talks were also held concerning the future of renewable energy sources in Poland and the significance both Ikea and the Ministry attach to clean energy from wind farms and photovoltaics. |

Source: Prepared based on the research conducted with the use of: Dróżka, 2018, Gugniewicz, 2018, Case study Ikea 2018, Polska Reklama i Poligrafia, 2018, Złote Effie: Kampania Ikea po sąsiedzku, 2018, Ikea Prowly, 2018, PropertyDesign.pl, 2018.

The analysed social marketing campaigns conducted by Ikea concern important issues: social issues, such as interpersonal relationships in the era of digitalisation, the problem of domestic violence, creating opportunities for spending time in a constructive way, caring about children's right to develop, also through playing which educates, lets them grow, and brings happiness, plus environmental issues and those related to sustainable management and activities. Qualitative study results show that contemporary personified brands should be sustainable. Branded social marketing campaigns move the audience and provoke reflection, stir up emotions and motivate to take action, and bring multiple benefits to all stakeholders. They provide grounds for saying that with consumer insight (Kubicka, 2017, pp. 33–40), a personified brand should notice and engage in various projects related to social problems, environmental protection, and sustainable conduct in various areas of activity in general.

An important trend in contemporary brand management is the phenomenon of being sustainable and this is the case with Ikea. The initial results of the case study have shown that social marketing campaigns bring multiple effects: building a community around the brand, strengthening relationships with the stakeholders (cooperators, Internet users, customers, media representatives, etc.), spreading awareness of important issues, supporting significant business-related practices, publicity, education, contributing to doing good, etc.

Conclusion

Considering the research carried out, a conclusion comes to mind that branded social marketing campaigns enjoy increasing popularity worldwide and are appreciated by the managers of both commercial and non-commercial market objects. Undertakings from the analysed area match the current market conditions very well. Research confirms that contemporary brands should engage in campaigns of this type for the good of the participants and society in general. There are numerous social marketing projects and campaigns organised in various areas – safety, health, education, ecology.

Brands' social marketing campaigns contribute to the promotion of activities in line with the principles of sustainable development (the essence of which seem to be people, the planet, and profits), and in the conditions of sustainable development, participants of the market game should strive for social, environmental, and economic responsibility.

As a result of the implementation of the analysed campaigns, it is possible to achieve multiple benefits: reducing the scope of the social problem, improving the environment, supporting those in need, engaging the employees of the partner companies in helping the needy, enhancing the relationship with the environment, brand image improvement, personal and professional development of those involved, particular industry benefits (social security and social services, healthcare, education, culture, sport and leisure, environmental protection), and many others.

Certainly, engaging in problems and in their solving requires the application of methodical tools, methods, and procedures. Creativity, engaging prosumers, the ability to perceive difficult situations and phenomena, courage in taking up challenges, the element of surprise, stirring up emotions, and creating brand-related experiences are all important elements, as well. What also matters is: setting priorities, determining values, defining and consistently following rules and principles, setting objectives, specifying the target audience, the set of activities, and the manner of implementing them, and drawing conclusions. In the brand's social marketing campaigns, a holistic approach including activities addressed to the heart, the mind, and the spirit seems to be the optimal one. The presented examples seem to prove that in specific problem situations, the right social marketing campaigns and their accompanying programmes of activities significantly contribute to their constructive elimination or resolution.

The discussed social marketing campaigns carried out by the Ikea brand activated numerous stakeholders (employees, customers, media representatives, Internet users) and encouraged them to get involved in the campaign and promote it, receiving a lot of publicity across the world. They concern important social issues, they move the audience and provoke reflection, they stir up emotions and motivate to take action. Branded social marketing campaigns, e.g. by Ikea, serve many purposes: they inform and educate, raise difficult issues, engage and encourage action, and contribute to changes in the behaviour of individuals, groups, and entire society. They generate social, environmental, and economic effects. They increase the effectiveness of personified brand management, provided that they are methodically designed and implemented. The need to use them is determined by current market conditions and new management paradigms. The discussed examples may constitute a model for other marketers.

To sum up, it is worth referring to the concept of sustainable organisation, in the light of which, achieving a competitive advantage in the current market conditions depends, among others, on the strategic adaptation and development of environmental and social processes supporting the

production of eco-friendly and socially conscious products and services, as well as innovative human resources management practices.

The conducted literature and empirical studies contribute to expanding knowledge and practical skills in the area of sustainability. Further research is planned, aimed at verifying how social campaigns and their outcomes influenced the image of the Ikea brand. It is also important to check what long-term social, environmental, and even financial benefits may result from this type of undertakings carried out by brands.

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INNOVATION AND FLEXIBILITY IN SERVICES PROVIDED BY MANUFACTURING COMPANIES

Eva Tomašková – Lucie Kaňovská

Abstract

Purpose: Manufacturing companies are positioning themselves increasingly as providers of services and solutions to their products in order to satisfy the customers' various needs and wishes. The paper presents the results of a research investigating the items related to innovation and flexibility of services among electrical engineering companies in the Czech Republic. The aim of the paper is to find out if innovation and flexibility in services provided by manufacturing companies have a positive impact on the customers.

Design/methodology/approach: To address the research objective, the questionnaire in the form of the Likert scale was prepared to gather information about services. A total of 60 SMEs from the South Moravian region of the Czech Republic participated in the survey during 2014. This is a first empirical research focused on this area held among the electric engineering companies in the Czech Republic.

Findings: The main findings show that there is no direct impact of flexibility and innovation in services on customers, but it can be said that flexibility and innovation perceived by customers are still affecting, although less than we expected.

Research/practical implications: In some areas, innovation and flexibility had strong positive impact on customers and there was certainly no negative impact. Even if there is no direct impact of flexibility and innovation on customers here, it can be said that flexibility and innovation by customers are still affecting, although less than we expected. Managers will certainly not defraud themselves if they put emphasis on innovation and increasing flexibility for services offered by manufacturing companies.

Originality/value: There is still little information about understanding the service issue in manufacturing companies. Therefore, the paper is focused on innovation and flexibility in services provided by manufacturers in the Czech Republic.

Keywords: Services in Manufacturing Companies, Innovation, Flexibility, Electrical Engineering Companies, Czech Republic

JEL Codes: M31, L94, L25

Introduction

We live in the era of services (Vargo and Lusch, 2004), which means that the traditional product-based companies include services to their offerings. As a possible differentiation strategy, many manufacturers choose to add services to the offer of their tangible products. As Fang et al. (2008) stated the companies with greater reliance on the service part of their business reportedly reach better return on sales and improve their values. Manufacturers use more developed best practices or training practices, which help to achieve better business performance by using service quality, productivity, profitability and rate of innovation (Brewster et al., 2016). Nevertheless, an effective distribution of resources needs paying attention to the company's innovation strategy (Revilla et al., 2016). Innovation and flexibility are very principal not only for tangible products, but also for services, which are included in the manufacturer's offer. These two aspects could be also a main competitive advantage on today's fierce markets.

The aim of the paper is to find out if innovation and flexibility in services for manufacturing companies have a positive impact on the customers. This topic was not deeply investigated in manufacturing companies in our country, where the industrial tradition is still very strong.

The paper has the following structure: literature review, methodology, results, discussion and conclusion.

1 Literature Review

In recent years, many manufacturers have shifted from manufacturing tangible products to providing services. With this change they want to compete in very competitive markets and offer their customers something extra. The transformation toward integrated product-service solutions in manufacturing companies and the increase of level of industrial services have been fueled by the industrial development (Kohtamaki et al., 2015). Complementing services to spread the whole product offering by using services is possible way how to erode product margins and the loss of strategic differentiation through product innovation and technological superiority (Fischer et al., 2012). According to Lošťáková (2017), services may represent a substantial or even a relatively narrow part of the company's market offer, depending on the type of business that only provides services or is the production company where the services complement the product.

Instead of innovating the products only, the companies are investing in service differentiation. Subsequently, instead of services being add-ons to the product, services become

the center of the total offering, with products as add-ons to the services (Gebauer et al., 2011). Including services in manufacturing provide benefits of the strategic, financial and marketing opportunities. Services are less visible and more labor-dependent and these factors provide them a strategic opportunity and a sustainable source of competitive advantage (Heskett et al., 1997). The financial benefits of services can be acquired throughout the life cycle of a product, mainly after its sales (e.g. warranty and post-warranty repairs). Service offerings can also provide for a steady income and higher margin. Services also need less asset allocation than manufacturing. From the point of view of marketing benefits, it can be said that the offer of services to tangible products improves customer relations.

In order to manage services, a manufacturer must well consider the issues of individual service options, such as using its own resources (e.g. technician, technology), or an outsourced technician or the entire external service company. That is why it is necessary to know the customer and, of course, the possibilities of the company. The efforts of the manufacturing companies should be in keeping the customer even after the product has been sold, namely by offering after-sales services (e.g. warranty and post-warranty service or SW upgrade). Producers themselves know their products best. Moreover, they are able to provide fast and quality service to their customers in case of problems with using the product. The goal of most businesses is to keep the customer as long as possible.

There is still little information about understanding the service issue in manufacturing companies. The aim of the paper is to find out if innovation and flexibility in services provided by manufacturers producing electrical equipment and electronic components in the Czech Republic have a positive impact on their customers. Producers operating on this market, have an important role in today's industry. A lot of them are subcontractors for car industry and mechanical engineering. The importance of innovation and flexibility is crucial also in this field of services in manufacturing companies. The relationship between innovation and business performance was solved at different studies. Many studies showed positive impact of innovation on business performance e.g. Hult et al. (2004), Chattopadhyay and Shah (2014).

Contrariwise, McDermott and Prajogo (2011) have noticed that the findings from their research showed no direct relationship between service innovation orientation and business performance. According to Love et al. (2010), innovation itself is not sufficient to generate productivity improvements.

Not only is the impact of innovation and flexibility on enterprise performance ambiguous, but the literature is being analyzed either by manufacturing companies themselves or by service providers. Our paper is focused on innovation and flexibility in services in manufacturing businesses. Literature is not sufficient in this field; therefore, the following hypotheses were proposed:

Hypothesis H: Innovation and flexibility in the field of services have the positive impact on customers.

H1: Innovation and flexibility in the field of services have the positive impact on sales increase by existing customers.

H2: Innovation and flexibility in the field of services increase the interest of new customers about the company.

H3: Innovation and flexibility in the field of services have the positive impact on success of customers.

2 Methodology

The questionnaire with two parts focusing on services provided in manufacturing companies (1st part) and on IFC (2nd part) was prepared by authors. The questionnaire consisted of some questions used in previous research (Kanovska & Tomaskova, 2012; Bartosek & Tomaskova, 2013) and was extended by adding some new questions. The questionnaire has a Likert scale form; the range of the Likert scale was from 1 (No, I don't agree) to 5 (Yes, I agree). Both parts and their sections of the questionnaire were tested by using Cronbach alpha. The level of reliability was 0.716 (1st part – services, section service offering), 0.847 (1st part – services, section importance of services), 0.750 (1st part, section service delivery) and 0.863 (Tomaskova & Kanovska, 2016) (2nd part - IFC).

The part related to services provided in manufacturing companies contained 27 items and had three sections as follows: Service Offering with 12 items, Importance of Services with 6 items and Service Delivery with 9 items. Three items from Service Offering and two from Importance of Services were used in previous research in the sector of SMEs producers of saw and saw bands in the Czech Republic. Another two items from Importance of Services and two from Service Delivery were inspired by the mentioned research. The rest of items were mostly based on a) study literature, e.g. Gebauer et al. (2011) and Turunen & Toivonen (2011). b) the discussions with

manufacturers, c) current information about sale and service support in manufacturing companies and d) the information obtained from the magazines related to this sphere.

The questionnaire obtained also two sections related to Company Performance and General Questions about the respondents. They both described the total overview of the company situation.

Respondents, directors or managers of SMEs from the South Moravia Region producing electric equipment and electronic components in the Czech Republic, were contacted over the phone or by email and asked to fill out a questionnaire, which was web-based. Not complete questionnaires were discarded. The data were collected from February to November 2014. Manufacturers participating in the research comply with the Czech industry classification, namely CZ-NACE 26 (Manufacturer of computer, electronic and optical products) and CZ-NACE 27 (The production of Electrical Equipment), specifically, CZ-NACE 26.1, CZ-NACE 26.3, CZ-NACE 2651, CZ-NACE 266 and in CZ-NACE 27 (The production of Electrical Equipment), specifically CZ-NACE 27, CZ-NACE 271, CZ-NACE 273. The total number of these selected SMEs according to Czech Statistical Office is 109 and 60 full-filled questionnaires were received back. It means that representative sample is 55.1 % of existing companies.

For selection of respondents, the database of the Czech Statistical Office and the Kompas database were selected. The data analysis was done by software package Minitab, version 17. For the measurement of the correlation for two variables both Spearman's rank-order correlation coefficient and Pearson's chi square test are possible to use. We would have to merge classes, e.g. 1-3 and 4-5 for both analysed variables due to the number of respondents. Because of possible simplifications, Pearson's chi square test was not accepted. Other models based on Pearson's correlation and linear regression are not suitable because of discontinuous scale as well.

Every company wants to have successful customers, who are able innovate their products and services and respond to new developments flexibly. Therefore, only the items related to innovation and flexibility were chosen from the questionnaire. First two items show, if the company has qualified employees, who can be fully oriented to service provision, it means that they are able to work on innovations in the services and be flexible in the service offering.

The other two items are related to innovation from two stimulus, namely stimulus of company and stimulus of their customers. Last two items are connected to flexibility, namely the offering of maximal flexibility for customers and the offering of above standard services (also flexible) for important customers.

3 Results

The results from the research focused on flexibility and innovation in the field of services are placed in the Tab. 1 below.

Tab. 1: Results from the research focused on flexibility and innovation

| Item | We see the growth of sales by our existing customers. | The number of new customers increases interannually. | We enable growth and business success of our customers. |
|--|---|--|---|
| We have employees who care about services. | 0.380 0.004* | 0.349 0.009* | 0.518 0.000* |
| We prepare regular trainings about services. | 0.068 0.624 | 0.064 0.644 | 0.275 0.042* |
| We focus on service improvements. | 0.353 0.008* | 0.273 0.042* | 0.311 0.020* |
| New services are developed according to customers. | 0.164 0.227 | 0.142 0.291 | 0.209 0.118 |
| Services are provided 24/7. | 0.169 0.217 | 0.001 0.996 | 0.133 0.332 |
| We provide over standard services for VIP customers. | 0.367 0.005 | 0.264 0.049* | 0.072 0.598 |

*The first value is Spearman's rank correlation: Spearman's rho, the second value is p-value. If $p < 0,05$ then we reject the null hypothesis (H_0 : items are independent) indicated by *, i.e. accept that the sample gives reasonable evidence to support the alternative hypothesis (H_A : items are dependent).*

Source: Authors

The findings presented in the Table 1 show that the item „We have employees who care about services.“ has a positive correlation with all three items in the Table 1 ($p < 0.05$). Furthermore, the third item „We focus on service improvements.“ have also a positive correlation with all three items ($p < 0.05$). On the other hand, no positive correlations have been found by two items: „New services are developed according to customers“ and „Services are provided 24/7.“

($p > 0.05$). Last two items „We prepare regular training about services“ and „We provide over standard services for VIP customers.” Have some positive correlation with one or two items.

Positive correlation shows innovation-related items rather than flexibility-related items.

4 Discussion

The results show that the relationship between the selected items are very various and still need more work to be absolutely sure about the conclusions related to the problems of the importance of innovations and flexibility in manufacturing companies.

Some positive correlations were found by some items, but on the other hand there are no positive correlations by other items. To conclude, we cannot accept or reject any above-mentioned hypotheses H1 – H3. Therefore, we cannot accept or reject the main hypothesis H.

Results presented in this paper correspond to the conclusions of Love et al. (2010), who state that, innovation itself is not sufficient to generate productivity improvements.

On the other hand, technological innovations highlight the increasing importance of access to resources outside the enterprise (Gebauer et al., 2011), because the impressive expansion of digital technologies in business puts many businesses at risk and growth of uncertainty (Gimpel and Röglinger, 2015). More research is needed for concrete conclusions, since research has been carried out to date to explore the relationship between innovation and flexibility with business performance either in manufacturing companies or in companies provided services.

We will be looking at innovations and service flexibility and their relationship to corporate performance at the services of manufacturing companies. However, it is clear that in some areas, innovation and flexibility had strong positive impact on customers and there was certainly no negative impact. Providing services in manufacturing is usually configured as an innovation process, as well as part of an organization's business model that should lead to improved performance and customer satisfaction, as well as improving competitive advantage (Suarez et al., 2013). Even if there is no direct impact of flexibility and innovation on customers here, we can say that flexibility and innovation by customers are still affecting, although less than we expected. For this reason, managers will certainly not defraud themselves if they put emphasis on innovation and increasing flexibility for services offered by manufacturing companies.

However, this tendency is starting to be visible in some manufacturing companies which provide wide range of customized services for their customers. These kinds of services help to

increase customer satisfaction with the bought products. According to Brax and Visintin (2018), servitization of production is perceived as a process of change, where manufacturing companies deliberately or through rising fashion introduces service elements into their business models. Product customization is definitely a benefit to customers, but manufacturers also need to be able to identify its financial impact on the business. Financial performance indicators should always reflect what the customer and / or business want to achieve using the service. Companies with greater confidence in services clearly achieve better returns on revenue and improve their value (Fang et al., 2008) and use best practice or training, which contributes to better corporate performance through service quality, productivity, profitability and innovation rates (Brewster et al., 2016).

Conclusion

The topic of the paper describes an interesting issue that has its practical use. We would be delighted if other research institutions were involved in the research, and we could create a large research team that could identify the situation not only in the case of companies in the electricity sector but also in other manufacturing companies. We believe that the conclusions mentioned in our paper could help our companies in global competition as they would show whether manufacturing companies should focus on innovation and flexibility in product- only products or even focus on innovation and increased flexibility in services.

Implications for theory: Positive correlation shows innovation-related items rather than flexibility-related items. The results showed that in some areas, innovation and flexibility have strong positive impact on customers. Flexibility and innovation by customers are still affecting, although less than was expected. Deeper research in this field of innovation and flexibility is the next important step to understand this topic better. The research is planned during the second half of 2019 again in manufacturing companies in the Czech Republic.

Implications for practice: This is the first empirical research in this area carried out among the electronic components manufactures and the electric equipment manufacturers in the Czech Republic. Flexibility and innovation by customers are still affecting. Managers will certainly not defraud themselves if they put emphasis on innovation and increasing flexibility for services offered by manufacturing companies. With the rise of new orders requiring the flexibility of producers and suppliers, the growth of Czech exports is also related. It can be said that high

flexibility is one of the most important competitive advantages of many Czech industries (Mařík et al., 2016). Individualization of service offering is starting to be crucial for doing business.

Some possible limitations of this paper could be seen in the limited number of companies in the research. The findings achieved so far have to be confirmed by further investigations. Nevertheless, the authors believe that the research has a valuable potential impact both on theory and practice. Different views that firms have in the field of innovation and flexibility were highlighted in the paper.

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STRATEGY ORIENTATIONS AND THE PERFORMANCE EFFECT IN INTERNATIONAL NEW VENTURES

Rosalina Torres-Ortega

Abstract

Purpose: This paper examines how the strategy orientation for international new ventures (INV) affects business performance, measured by customer performance and financial performance, in the context of Spanish firms, and whether this effect varies between the strategies.

Design/methodology/approach: The study uses data collected by web survey in a sample survey of a data set of 92 INV. The technique of confirmatory factor analysis is used to test the measurement properties of the study constructs. Subsequently, a structural equation modeling procedure is used to test the research hypothesis developed on the basis of the literature review.

Findings: The results show that the strategy orientations have a positive and significant effect on performance in INV in customer and financial performance. The study findings indicate that the strategy that had higher effect in the performance is the MO.

Research/practical implications: From a business practice perspective, this research suggested that INV managers may adopt multiple strategies to attract and retain customers in different markets, and positive effect in performance.

Originality/value: Although strategies are well explored in management literature with positive effect for companies, this study advances the domain of international entrepreneurship into exploring the effect of multiple strategies to achievement of superior performance in the international new ventures

Keywords: International New Ventures, Market Orientation, Innovation, Networks, Performance

JEL Codes: L25, M13, M31

Introduction

The internationalization of the firms has received particular attention in the field of international entrepreneurship (IE) and international marketing, and one of the most promising areas of research is focused on international new ventures (INV) or firms that internationalize almost from the inception. The desire to expand is inherent in any firm's international plan, but the degree and pace differ considerably between firms for which it is a gradual process and for the other type of firms that follow the INV model.

Scholars have defined an INV as a firm that has become international within a few (most often three) years after its inception, across different continents and they also require that 25% of its total sales should come from foreign markets. INV exist in many industries, and tend to be created by entrepreneurs with wide international experience (Madsen et al., 2015).

Previous research on INV indicates that "this type of firms seeks superior performance from or near their founding" (Kocak & Abimbola, 2009, p. 439). A close examination of the existing literature reveals a general consensus that an increase in a firm's international operations will contribute positively to the performance of the firm. However, as Zhou and Wu (2014) recognize, there is still room for more research in the field of IE linking early internationalization and performance. The exploration of the relationship between strategies orientations and performance in the context of INV has been limited. The lack of consistency in the findings about the importance of the strategic orientations for firm performance in INV might be partly attributable to the fact that the literature provides varying perspectives on the role of particular strategy (Garcia-Lillo et al., 2017; Knight & Liesh, 2016).

The present study addresses recognized research gap by examine the influence of two strategic orientations: market orientation (MO) and innovation (INN), and the network (NW) as capability on company performance. The primary objective is to empirically examine how these strategies affect the performance of the INV. Therefore we address the following question: To what extent are INV firms' performances impacted by their strategic orientation and network capability?. To answer this question, we use structural equation modeling (SEM), and consider Spanish INV.

This paper is organized as follows. In the next section we review some of the relevant literature that provides the foundation for this study. The focus is on the discussion in the literature of the strategies of INV, and we derive a hypothesis for empirical examination. The next section introduces the methodology. The fourth section presents the findings of the data analysis and the

results of the hypothesis. The final section discusses the findings, their implications, and further research.

1 Literature review and hypothesis

Emerging from different field as marketing, management and entrepreneurship, the strategic orientations of business has attracted the attention in scholars, however yet there is limited exploration within the IE field (Odorici & Presutti, 2013; Torres-Ortega, 2015). The strategic orientations have been found that influence on the behavior of INV and are defined as “the guiding principles that influence a firm’ marketing and strategy-making activities” (Noble et al., 2002, p.25) Previous studies show that the business strategies employed by INV influenced them to succeed in the international markets (Knight & Cavusgil, 2004). Empirically, evaluation of the contribution of strategic orientations to firm performance of the INV is surprisingly scant. An extensive literature review conducted by Garcia-Lillo et al., (2017) based on 124 research papers that explored the main streams in the research of the INV and born global firms, found a cluster of six studies were related to the strategic orientation. Studies highlighted the importance of multiple strategic orientations in the INV context (e.g. Kockac & Ambibola, 2009; Odorici & Presutti, 2013; Ripolles et al., 2012) however the impact on performance has been unexplored among them. Firm performance and strategy orientation have been found positive in the managerial literature. The incorporation of the strategies in the companies’ increases the business performances strengthen competitiveness, and achieve continuous success in INV (Kirpalani & Gabrielsson, 2012).

In summary, strategic orientations are considered as an important source to the international performance of the firms. Earlier works (Knight & Liech, 2016;) have shown the importance of increase research of MO, INN and NW as key strategic of the INV, in response to this call in this study; we aim to explore the relationship of the strategies and their implications on business performance of INV. Following the recommendation of Cadogan (2012) that pointed that “strategic orientations do not exist in isolation: firms can and do have multiple strategic orientations” (p. 346).

Many scholars have demonstrated a link between a higher MO level and better performance. MO is conceptualized in terms of the values and attitudes of the organization in order to providing superior customer value. For them “MO is the organizational culture that most effectively and efficiently creates the necessary behaviors for the creation of superior value for buyers” (Narver &

Slater, 1990, p. 21). The MKTOR, which characterize MO as being more culturally embedded, demonstrating and orientation on customers, competitors and interfunctional cooperation. Therefore this study presents the following hypothesis: H1a. MO is positively related to customer performance; H1b. MO is positively related to financial performance.

Innovation orientation has previously been identified in the INV literature as one of the factors that has a strong influence on the internationalization process. According to Siguaw et al., (2006) innovation orientation refers to “the knowledge structure that permits the recognition of market dynamism and then provides a knowledge template to develop required process and to build a firm’s dynamic capability”. Previous research suggests that INV seek to develop new products, designs, services, or ideas for international markets though innovativeness capability (Efrat & Shoham, 2012). The strong customer intimacy of INV enhances the successful development of innovative product. Innovation orientation has a positive relationship with competitive advantage and performance (Hooley et al., 2005). It is therefore, hypothesized that: H2a. Innovation orientation is positively related to customer performance; H2b. Innovation orientation is positively related to financial performance

Previous studies show that networks in which companies operate as factors that heavily influence the internationalization process of INV (Kocak & Abimbola 2009). Scholars highlighted the role of networking in the internationalization process for INV (Sharma & Blomstermo, 2003). Networks can provide unique value and opportunities arising from the transmission of information and knowledge through connections with others. It is therefore, hypothesized that: H3a. Network capability is positively related to customer performance; H3b. Network capability is positively related to financial performance.

2 Methodology

A web-survey using a structured questionnaire was conducted among Spanish exporters. We collected the names and contact information for international firms in ICEX databased. The survey was distributed by email from March to April 2012 to companies that met the following criteria: 1) SMEs companies; 2) having international activity; 3) being active. A total of 1981, companies were identified and contacted. 955 complete questionnaires were collected. Of these valid answers, we identify as 92 as INV that meeting the criteria of the 25% or more of export activity, within the first three years and the operation in the international markets.

The majority of the sample is medium-sized firms (42%), that exporting within the first year (68%) and with an average of export sales between 25-55% (50%). Table 1 includes a detailed profile of the sample. The respondents (mostly CEO, marketing and export managers) were asked to refer to their international activities when they answering the survey.

Tab. 1: Inv characteristics (percentage)

| Size of the firms | | Industry/sector | | Export sales | |
|---------------------------------|----|-----------------|----|--------------|----|
| Micro | 22 | Agriculture | 28 | 25-55% | 50 |
| Small | 36 | Mining | 1 | 56-85% | 34 |
| Medium | 42 | Construction | 1 | 86-100% | 16 |
| | | Manufacturing | 47 | | |
| | | Transportation | 1 | | |
| | | Wholesale trade | 10 | | |
| | | Retail sale | 0 | | |
| | | Service | 12 | | |
| Speed of start exporting | | | | | |
| First year | 68 | | | | |
| Second year | 21 | | | | |
| Third year | 11 | | | | |

From a statistical point of view, we examined the possibility of CMV using Harman’s single-factor test (Podsakoff et al., 2003). We conducted the factor analysis to determine whether the majority of the variance was concentrated in one factor. The factor analysis for the BG firms resulted in 6 factors with eigenvalue greater than 1 (accounting for 68.36% of the total variance), and the first factor accounted for 36.29% of the variance. Therefore, CMV was not a significant concern in this study.

Measures of constructs: For the construct from MO, innovation orientation (INN) and network capability (NW) we measured all the items using 7-point scale. For measure the MO, we adopted the MKTOR scale due to the fact that all of the BG firms had a very high level of customer orientation (Kim et. Al., 2011; Knight et al., 2004). In fact, the Narver and Slater (1990) scale has been considered to be more accurate because it explicitly encapsulates concern with both customers and competitors (Wrenn, 1997). The three components of the MO are: customer orientation, competitor orientation and interfunctional coordination.

We adopted the measurement of innovation orientation from previous studies (Menguc & Auh, 2006; Han, et al., 1998). It consists of four items related to innovative ideas, leadership in product/process innovation and the engage in innovative, proactive and risk-seeking behavior.

We measured networks with three items which assess the use of financial support, for reach business in the international markets and the networks for market entry, of which one item was dropped during item purification due to a low factor loading.

We adopted multidimensional performance measures based on previous studies (Crick, 2009; Fomell, 1992; Cheng & Krumwiede, 2012). We measure financial performance: sale volume achieved compared to your competitors; sale growth compared to your competitors; market share compared to your competitors; general profit level achieved compared to your competitors; profit margin compared to your competitors; return on investment (ROI) compared to your competitors; return in asset (ROA) compared to your competitors. Customer performance captures: level of customer satisfaction compared to previous year and level of customer loyalty compared to previous year.

3 Analysis and results

We refined the measures and assessed the reliability and validity of the constructs by following Anderson and Gerbing (1988) a two-step approach. First, EFA was conducted to identify the underlying structure in each construct, and then CFA was carried out, to allow us “to test measurement scales for evidence of convergent and discriminant validity” (Froehle & Roth, 2004, p.11).

Four constructs compose the final model include performance, market orientation, innovation and network. Using CFA, the measurement model works satisfactory. The fit indices support the recommended, 0.90 benchmark with CFI=0.92; TLI=0.90. The chi-square is 5796.21 (329 d.f.), statistical significant. Additional test included a normed chi-square of 1.75 (less than the benchmark of 5). All support the construct validity.

We performed two tests for convergent validity. According to Fornell and Larcker (1981) convergent validity requires that the average variance extracted (AVE) for each constructs is greater than .50, which is met in the four constructs (table 2). Secondly, for all measurement items, the standardized loadings obtained from CFA analysis were large and significant, providing evidence of convergent validity (Table 2).

Tab. 2: Measurement scales, CFA results and reliabilities

| Constructs and measurement items | Standardized loadings |
|---|-----------------------|
| <i>Market orientation (Narver & Slater, 1990)(Seven-point scale, anchored by totally disagree and</i> | |
| <i>Customer orientation ($\alpha=.82$; AVE=.51; CR=.80)</i> | |
| Our business objectives are driven by customer satisfaction | .82 |
| We monitor our level of commitment and orientation to serving customer's needs | .81 |
| Our strategy for competitive advantage is based on our understanding of customer needs | .66 |
| Our business strategies are driven by our beliefs about how we can create greater value for customers | .53 |
| <i>Competitor orientation ($\alpha=.78$; AVE=.51; CR=.80)</i> | |
| Our salespeople share information within our business concerning competitors' strategies | .71 |
| We respond to competitive actions that threaten us | .72 |
| We target customer and customer groups where we have, or can develop, a competitive advantage | .60 |
| The top management team regularly discusses competitor's strengths and strategies | .79 |
| <i>Interfunctional coordination($\alpha=.78$; AVE=.63; CR=.83)</i> | |
| We communicate information about our successful and unsuccessful customer experience across all business functions | .67 |
| All of our business functions (eg. Marketing/sales, manufacturing, R&D) are integrated in serving the needs of our target markets | .82 |
| All of our manager understand how everyone in our company can contribute to creating customer value | .87 |
| <i>Innovativeness capability ($\alpha=.90$; AVE=.66; CR=.88)</i> | |
| We actively seek innovative ideas | .82 |
| We use knowledge-intensive technologies for improving existing offerings | .72 |
| We have excellent leadership in product/process innovation | .86 |
| We have an innovative, proactive and risk-seeking behaviors that crosses the national borders developed by our managers | .84 |
| <i>Network ($\alpha=.70$; AVE=.50; CR=.70)</i> | |
| We use network relationship on market entry and market development | .87 |
| Our use of channels such as system integrator, networks and the internet help us to reach new business space in international markets | .59 |
| <i>Customer performance ($\alpha=.77$; AVE=.60; CR=.82) (five-point scale, anchored by much worse and much better)</i> | |
| Level of customer satisfaction compared to previous year | .78 |
| Level of customer loyalty compared to the previous year | .85 |
| <i>Financial performance ($\alpha=.92$; AVE=.78; CR=.96) (five-point scale, anchored by much worse and much better)</i> | |
| Sale volume achieved compared to your competitors | .84 |
| Sale growth compared to your competitors | .81 |
| Market share compared to your competitors | .83 |
| General profit level achieved compared to your competitors | .93 |
| Profit margin compared to your competitors | .86 |
| Return on investment (ROI) compared to your competitors | .95 |
| Return in asset (ROA) compared to your competitors | .94 |

Discriminant validity represents the extent to which one construct is empirically distinct from other construct. The discriminant validity of the four dimensional scale was evaluated by comparing the squared correlation with the AVE value for each of the latent constructs (Fornell & Larcker, 1981). We found that all the squared correlations in the scale were below the AVE value for the respective construct (see Table 3).

Tab. 3: Discriminant analysis

| | CU | CO | IC | INN | NW | CPERF | FPER |
|-------|-----|-----|-----|-----|-----|-------|------|
| CU | .51 | | | | | | |
| CO | .49 | .51 | | | | | |
| IC | .26 | .49 | .78 | | | | |
| INN | .37 | .42 | .19 | .63 | | | |
| NW | .10 | .39 | .24 | .28 | .66 | | |
| CPERF | .20 | .33 | .22 | .15 | .10 | .55 | |
| FPER | .11 | .19 | .00 | .14 | .18 | .16 | .78 |

We tested our research hypothesis by estimating the structural model show in Fig 1. Using AMOS v21. The hypothesized model has a good fit to the data ($X^2=496.355$ (290 DF) CFI=92). Table 4 present the hypothesis testing results. The relationship between strategies and their impact on firm performance.

The results indicate great difference across the strategies, especially in relation to the effect of strategic orientations between customer and financial performance. The greatest difference between the two constructs of performances with the MO, followed by the effects on innovation orientation and network respectively. Looking at the direct effect of strategic orientation on customer performance, the results suggest that MO has a greater influence than financial performance. Moreover, the direct effect of network appears to be very close between the customer and financial performance, contrary to the MO and innovation orientation effect.

Tab. 4: Structural results: OIM impacted on performance

| Linkages in the model | Hypotheses Sign | Result | | | |
|-----------------------|-----------------|----------|------|------|------------|
| | | Estimate | S.E. | C.R. | Hypothesis |
| MO→ CUPerf | + | .909*** | .270 | 3.36 | Supported |
| MO→ FPerf | + | .354*** | .143 | 2.46 | Supported |
| INN→ CUPerf | + | .837*** | .335 | 2.50 | Supported |
| INN→ FPerf | + | .512*** | .197 | 2.64 | Supported |
| NW→ CUPerf | + | .593** | .347 | 1.70 | Supported |
| NW→ FPerf | + | .592*** | .224 | 2.64 | Supported |

Discussion and conclusion

This paper explores the effects of MO, network and innovation on performance. A significant criticism in the literature of research into international firms is that many studies lack justification for adopting the multiple strategies approach in the INV. Our results support the view that both innovation and MO and networks should be taken into account as suggested in a recent study Knight and Liesh (2016). The objective of this paper was to fill the research gap suggested by Cadogan (2012): “research into strategic orientations is less well developed within the international marketing literature stream, and many questions remain unanswered and in need of attention as a result.” (p. 341). The paper also addressed a research gap in terms of the impact of strategies on performance for INV firms (Knight, 2015).

Regarding our sample, this study incorporates a heterogeneous industry approach that allows us to generalize the results. In the field of IE, studies tend to focus on sector-specific data (Coviello & Jones, 2004). It is common for research on the INV to be carried out mainly in high-tech industries (Mainela et al., 2011) or in sector-specific areas such as manufacturing firms (e.g. Knight & Cavusgil, 2004). However the size of our sample is smaller, future research can also attempt to examine the relationship between strategic orientation and performance with bigger sample and firms from emerging markets.

Acknowledgment

This paper is based on my dissertation thesis titled “From market orientation to orientation towards international markets (OIM) of born global firms evaluating the impact of OIM on born global firms' performance” defended at Autonomous University of Barcelona in 2015.

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FACTORS AFFECTING THE TIMELINESS OF FINANCIAL STATEMENTS: EMPIRICAL RESEARCH IN VIETNAM

Hung Tang Tri – Phuong Thi Kim Tran – Ngan Le Vu Thanh

Abstract

Purpose: The timeliness of financial statements is a critical characteristic and a necessary component of relevant financial information that is receiving augmented attention by accounting standard setters and regulatory authorities worldwide. Thus, this research aims to validate what factors affecting the timeliness of financial statements of Vietnamese listed building material companies. Henceforward, it will significantly contribute to the quality of financial statements particularly and the development of Vietnamese capital market generally.

Design/methodology/approach: The data is collected from annual financial statements of 66 building material companies listed on Viet Nam Stock Exchange (including HOSE and HNX) from 2013 to 2017. Then, research data is handled and analyzed by a multiple regression with OLS, FEM and REM model to describe the reliability and validity of research result.

Findings: The result reveals that some factors such as board independence; board experience; and profitability have positive relationship with timeliness of financial statements, whereas the type of financial statements; the duality of CEO; the foreign ownership and the leverage have negative relationship with timeliness of financial statements. Furthermore, the findings illustrate that there were no relationships between board size; board diligence; company size and the audit report lag.

Research/practical implications: The paper identifies factors having the relationship with the timeliness of financial statements of building material companies listed in Vietnam. From then, these companies' managers and investors can consider these issues before making relevant decisions. Further, the consecutive board of Viet Nam Stock Exchange also focuses on this paper to enhance transparency of capital market as well as researchers can refer to it for their studies.

Originality/value: This research broadens the knowledge on financial information quality, the timeliness of financial statements particularly in Vietnamese capital market. Thence, the quality of financial statements is augmented and investors as well as users will get benefits from it.

Keywords: Timeliness of Financial Statements, Audit Report Lag, Financial Information Quality

JEL Codes: M41, M42, G14

Introduction

Viet Nam is a developing country with the impressed GDP growth in many years and a dynamic economic in the Southeast Asia area. And the development of capital market is contributing to the dramatic augmentation of this nation. Thus, to fulfill the permanent progress, the quality of information from financial statements affording to users for making their decisions must be faithfully represented, comparable, verifiable, timely and understandable (FASB, 2000).

The timeliness of information that is always available on time for users becomes one of the most crucial qualitative characteristics of financial statements (FS) (Puasa et al., 2014). Thus, the research of factors affecting the timeliness of Financial Statement is a topic that has been conducted around the world. And, the timeliness of FS was considered as a significant mechanism to minimize insider trading, leaks and rumors among emerging capital markets (Aktas and Kargin, 2011; Al Daoud et al., 2015). Furthermore, the release of annual financial report in a timely manner is not only a matter of satisfying legal requirements, but also a matter of responsibility (Abdelsalam and El-Masry, 2008). It helps to reduce the asymmetry of information and then helps investors in making decisions effectively (Abdelsalam and Street, 2007; Puasa et al., 2014). In addition, the timely disclosure of FS would also provide great benefits to the company (Ashton et al., 1987).

In Vietnam, the building materials industry has been growing rapidly in recent years. However, this industry faces with a series of challenges rooted in several internal and external factors such as lack of innovated technology, small or medium company size, the rising cost of raw materials or foreign competitors, etc. Thence, it requires the building material companies should take more chances from the investors and publishing FS timely is actually critical issue.

There were some gaps of previous studies in Vietnam such as: small sample size, sample data collected in short period, companies in sample data selected randomly, usage of little non-financial variables, having no concern on typical business industry or testifying the differences without regression estimations, etc. Hence, this study is conducted to identify association between factors such as The board size; The CEO duality; The board independence; The board meeting; The board experience; The proportion of foreign ownership; The profitability; The company size; The leverage; The type of annual FS and the timeliness of FS of the listed building material companies. Also, it suggests recommendations to these companies' managers and investors, the executive board of Viet Nam Stock Exchange and researchers on this issue.

1 Literature review

1.1 Theoretical Framework

The agency theory illustrates the relationship between the principal and the agent. In which, the principal and the agent are engaged in cooperative behavior, but they have different goals and attitudes towards risks. And the theory also assumes that principals cannot adequately observe actions from agents. The most critical of this theory is that managers usually focus on their personal gains than shareholders' interests and maximize their value (Jensen and Meckling, 1976).

Information asymmetry occurs when some economic agents have more information than others. As a result, uninformed investors negotiate with informed investors, generating problems related to adverse selection and/or moral hazard (Jensen and Meckling, 1976). In capital market, information asymmetry also occurs when the investors have less information than the companies have. Thence, the companies could postpone publishing report when there is disadvantage for them.

And, the signaling theory illustrates how information asymmetric problems can be reduced by the parties with more pieces of information signaling to others. Managers who expect a high level of future growth will signal to investors and also have an incentive to report positive news. Further, they are not suspected to have poor results and bad news even with poor performance.

1.2 Hypothesis Development

The appropriate board size would extend the board's governing role and function. Thence, it leads to a negative relation between board size and the timeliness of FS (AI Daoud et al., 2015; Ahmed and Che-Ahmad, 2016). However, according to the agency theory, larger boards are positively related with quality FS (Peasnell et al., 2005) and directors with more expertise and independence also increase monitoring capacity (Xie et al., 2003). Thus, this study proposes:

H₁: The board size positively associates with the timeliness of FS

CEO duality occurs when the CEO plays the role as the chairman of the director board (Abdelsalam and Street, 2007). And separation of the positions of the CEO and chairperson will eliminate conflicts of interests between them (Jensen and Meckling, 1976). Moreover, the company without CEO duality would release their FS timelier than the others (Carslaw

and Kaplan, 1991; Ahmed and Che-Ahmad, 2016; Al Daoud et al., 2015). Therefore, the hypothesis:

H₂: The CEO duality negatively associates with the timeliness of FS

Prior studies supported for the link between the board independence and the timeliness of the FS. The board independence is measured based on the proportion of non-executive directors to the total directors (Abdelsalam and Street, 2007). And it relates positively to the timeliness of FS (Abdelsalam and El-Masry, 2008; Al Daoud et al., 2015). Therefore, we posit:

H₃: The board independence positively associates with the timeliness of FS

The frequency of board meetings is relevant to the effectiveness of a board. It could be accepted that when the board members meet together more often, they could discuss and give solutions for various issues that the company are facing (Abdelsalam and El-Masry, 2008). In addition, frequency meetings would facilitate reliance of auditors on a firm's strong internal controls and thus will decrease the audit report lag (Ahmed and Che-Ahmad, 2016). Hence, we hypothesize that:

H₄: The board meeting positively associates with the timeliness of FS

Executives with different ages show variety in risk tendency and behaviors, which will affect firm strategy and performance. And an older Chairman tends to choose conservative strategy and becomes risk-averse tendency. Furthermore, they have higher reputation and experience compared with youngers, hence they would take more attention to risk management and promotes the control activity effectively (Abdelsalam and Street, 2007). Thence, we propose:

H₅: The board experience positively associates with the timeliness of FS

Companies with the higher proportion of foreign ownership would disclose more information in the FS. And the ownership type also plays an important role between financial disclosures and timeliness and create a positive relationship of them (Peasnell et al., 2005; Abdelsalam and El-Masry, 2008; Xie et al., 2003). As a result, the authors consider:

H₆: The proportion of foreign ownership positively associates with the timeliness of FS

The sign of income (profitability) affects to the timeliness of FS. Therefore, if the companies have bad information such as loss, they would delay the publication of the FS (Carslaw and Kaplan; 1991). Besides that, the earning per share (EPS) is generally considered as one critical factor to determine the firm's value. Thus, investors are likely to fund the firms with higher EPS. Hence, companies with higher EPS will publish their FS timelier. Thus, we hypothesize that:

H₇: The profitability positively associates with the timeliness of FS

Agency theory argues that large companies have more information asymmetry and higher agency cost. So, the company size significantly affects the audit delay (Carslaw and Kaplan; 1991) and had Ahmed and there was a positive relationship between the company size and the timeliness of the FS (Dyer and McHugh, 1975; Aktas and Kargin, 2011; Ahmed and Che-Ahmad, 2016). Thenceforward, this study develops hypothesis:

H₈: The company size positively associates with the timeliness of FS

The high leverage means that company is poor in performance and faces the ability to be bankrupt. Hence, auditors usually take more time on their audit work and make the audit report lag longer. Thus, there is a negative relationship between financial leverage of company and the timeliness of FS (Owusu-Ansah, 2000; Ahmed and Che-Ahmad, 2016). Hence, the hypothesis is:

H₉: The leverage negatively associates with the timeliness of FS

There is the explicitness of operating activities and the quality of internal control (Ashton et al., 1987) and the complexity of FS also impacts on the timeliness of FS (Aktas and Kargin, 2011). It means that the companies which set up consolidated FS usually publish their FS later than others. Therefore, the last hypothesis is developed as below:

H₁₀: The type of annual FS negatively associates with the timeliness of FS.

1.3 The Concept of Timeliness

Timeliness means having information available to decision makers on time to be capable of influencing their decisions (FASB, 2010). Audited financial statements are the main official and reliable information source for investors (Puasa et al., 2014). The timelier audited FS are announced, the more useful and less asymmetric information to users. However, there is a gap existing between the end of the financial year and the audited FS publication. This audit report lag is reason for delaying of FS and lower quality of FS (Carslaw and Kaplan, 1991; Ahmed and Che-Ahmad, 2016). Hence, this study defines the timeliness is as audit report lag (ARL), measured by the period of days it took the auditor to sign the report after the financial year-end.

2 Research methodology

2.1 Research Model

Based on the research overview and the hypotheses, a regression model is designed to investigate the influence of the selected factors on the timeliness of FS as follows:

$$\text{ARL} = \beta_1 * \text{BOARDSZ} + \beta_2 * \text{DUAL} + \beta_3 * \text{IND} + \beta_4 * \text{MEET} + \beta_5 * \text{EXP} + \beta_6 * \text{FOREIGN} \\ + \beta_7 * \text{PROFIT} + \beta_8 * \text{SIZE} + \beta_9 * \text{LEV} + \beta_{10} * \text{REPORT}$$

Where: *ARL* is Audit report lag: number of days between the end of the fiscal year to the day the audit report signed; *BOARDSZ* is Size of the board: The total number of directors on the board at the year-end; *DUAL* is Duality of CEO: *DUAL* = '1' if CEO was the chairman and '0' otherwise; *IND* is Boards independence: Non-executive directors on the board divided by the total number of directors on the board at the year-end; *MEET* is Board meeting: Number of board meeting for the financial year; *EXP* is Board expertise: The age of the Chairman of the board; *FOREIGN* is Foreign Ownership: Percentage of shares owned by foreign shareholders to total number of shares issued; *PROFIT* is Profitability: Earning per share taken from year-end financial reporting of the company; *SIZE* is Company Size: Natural log of year-end total assets; *LEV* is Leverage: The ratio of debt/equity; and *REPORT* is Consolidated financial statement: Consolidated Financial Statements value 1 and value 0 otherwise.

2.2 Research Data and Methods

Only 66 listed building material companies on the Ho Chi Minh (HOSE) and the Ha Noi Stock Exchange that disclosed the annual audited FS and annual reports from 2013 to 2017 fully are chosen to conduct this study. And because of the panel data, a multiple regression analysis method is used to test the hypotheses, including OLS, FEM and REM.

3 Results and discussions

The data, after collecting, is handled and analyzed. Main results are illustrated as follows.

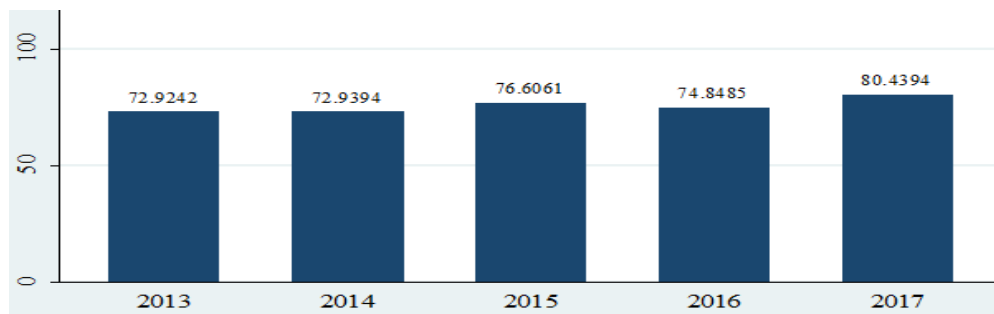
Tab. 1: Descriptive statistic among variables in the model

| Variable | Observation | Mean | Standard Deviation | Minimum | Maximum |
|----------|-------------|-----------|--------------------|-----------|----------|
| ARL | 330 | 75.55152 | 17.33889 | 21 | 176 |
| BOARDSZ | 330 | 5.369697 | 1.032742 | 3 | 10 |
| DUAL | 330 | 0.366667 | 0.4826262 | 0 | 1 |
| IND | 330 | 59.62097 | 18.23949 | 20 | 100 |
| MEET | 330 | 9.945455 | 13.70832 | 1 | 141 |
| EXP | 330 | 50.97576 | 6.751293 | 24 | 70 |
| FOREIGN | 330 | 7.105996 | 12.749 | 0 | 77.17 |
| PROFIT | 330 | 1,819.8 | 2,834.104 | -10,609 | 13,461 |
| SIZE | 330 | 27.08 | 1.538513 | 24.03 | 31.6 |
| LEV | 330 | 1.928081 | 2.386642 | 0.0019827 | 26.92383 |
| REPORT | 330 | 0.3727273 | 0.4842647 | 0 | 1 |

Source: Owns' Analysis from collected data

The figures of table 1 shows that the medium time of ARL is about 75 days, in which the earliest is 21 days and the latest is after 176 days. The medium BOARDSZ is 5 members, the medium MEET is 9 meetings and the average EXP is 50 ages. Furthermore, the percentage of IND on average is 59.6% whereas the maximum of FOREIGN is 77.17% and 13,461 billion VND for EPS. The results also show LEV of average companies is 1.92.

Fig.1: Average number of audit report lag from 2013 to 2017



Source: Owns' Analysis from collected data

In the period 2013-2017, the audit report lag of the companies is about 75 days. In particular, the year 2017 has the latest audit report lag with 80.43 days whereas the fastest year of audit report lag is 2013 with the average days of 72.92. However, from 2014 to 2016, the days of the audit report lag is as the same with average time to publish audited financial

statement is about 1 day less or more than 73 days. In general, the building material companies tend to take more time to publish their FS.

Tab. 2: Correlation matrix

| | ARL | REPORT | BOARDSZ | DUAL | IND | MEET | EXP | FOREIGN | PROFIT | SIZE | LEV |
|---------|--------|--------|---------|--------|--------|-------|--------|---------|--------|-------|-------|
| ARL | 1.00 | | | | | | | | | | |
| REPORT | 0.153 | 1.00 | | | | | | | | | |
| BOARDSZ | 0.005 | 0.209 | 1.000 | | | | | | | | |
| DUAL | 0.194 | -0.040 | -0.077 | 1.000 | | | | | | | |
| IND | -0.127 | 0.154 | 0.105 | -0.390 | 1.000 | | | | | | |
| MEET | -0.095 | 0.221 | 0.016 | 0.106 | 0.055 | 1.000 | | | | | |
| EXP | -0.246 | 0.040 | -0.001 | -0.098 | 0.091 | 0.049 | 1.000 | | | | |
| FOREIGN | 0.017 | 0.237 | 0.185 | 0.012 | 0.181 | 0.186 | 0.315 | 1.000 | | | |
| PROFIT | -0.254 | 0.108 | 0.005 | 0.033 | 0.107 | 0.273 | 0.094 | 0.222 | 1.000 | | |
| SIZE | 0.081 | 0.493 | 0.447 | -0.043 | -0.002 | 0.336 | 0.104 | 0.233 | 0.148 | 1.000 | |
| LEV | 0.167 | 0.191 | 0.156 | 0.028 | -0.121 | 0.093 | -0.006 | -0.088 | -0.340 | 0.334 | 1.000 |

Source: Owns' Analysis from collected data

According to table 2, the correlation coefficients of all variables are less than 0.60. This implies that multicollinearity is not a problem in the regression model. The figures show positive correlations between the ARL and REPORT; BOARD_SIZE; DUAL; FOREIGN; SIZE; LEV and negative correlations between the ARL and IND; MEET; EXP; PROFIT.

Tab. 3: Multivariate regression results

| Independent variable | OLS | | REM | | FEM | |
|---|------------------------|-----------------------------------|------------------------|--------------------------------|------------------------|--------------------------------|
| | Regression coefficient | Statistical significance level | Regression coefficient | Statistical significance level | Regression coefficient | Statistical significance level |
| BOARDSZ | -1.51846 | 0.115 | -1.250763 | 0.333 | -0.4805729 | 0.785 |
| DUAL | 6.448141 | 0.001 | 5.278575 | 0.012 | 4.558556 | 0.062 |
| IND | -0.03224 | 0.550 | -0.0965916 | 0.065 | 0.103833 | 0.089 |
| MEET | -0.1702087 | 0.016 | -0.0827967 | 0.380 | 0.0531256 | 0.680 |
| EXP | -0.6622658 | 0.000 | -0.398512 | 0.004 | -0.2681821 | 0.085 |
| FOREIGN | 0.1891526 | 0.015 | 0.2335218 | 0.016 | 0.3279874 | 0.011 |
| PROFIT | -0.0014947 | 0.000 | -0.0010503 | 0.001 | -0.0007961 | 0.025 |
| SIZE | 1.294581 | 0.101 | 1.100568 | 0.346 | 5.430096 | 0.019 |
| LEV | 0.3201514 | 0.454 | 1.04396 | 0.013 | 1.489978 | 0.001 |
| REPORT | 5.500863 | 0.009 | 6.261237 | 0.008 | 5.9677 | 0.029 |
| CONS | 75.90783 | 0.000 | 68.04352 | 0.029 | -62.04019 | 0.334 |
| Observation | | 330 | | 330 | | 330 |
| R-squared within | | 22% | | 18.22% | | 20.66% |
| Breusch and Pagan Lagrangian multiplier test | | Chibar2(01) = 217.15 | | | | |
| | | Prob > chibar2 = 0.0000 | | | | |
| Hausman test | | | | Chi2(9) = 14.29 | | |
| | | | | Prob>chi2: 0.1125 | | |

Source: Owns' Analysis from collected data

The table 3 demonstrates that this model is capable of explaining 18.22% of the variability of the audit report lag in the sample. And the relationship between **CEO duality** and ARL is positive and significant at 5% level ($p = 0.012$). It means that the companies which separate the role of the Chairman and the CEO publish their FS earlier than the others. This result supports the hypothesis H_2 and is consistent with studies of Al Daoud et al. (2015).

As for the relationship between **board independence** and timeliness of FS, the results interpret that board independence has a significant and negative effect on audit report lag at 10% ($p = 0.065$), so hypothesis H_3 is accepted. This means that the greater the percentage of non-executive directors in the board would increase the timeliness of FS. This finding is clearly consistent with Abdelsalam and El-Masry (2008), Al Daoud et al. (2015).

In consistence with expectations, the study reveals that the **board experience** significantly and negatively affects the audit report lag at level of 5%, so hypothesis H_5 is accepted. The study clearly illustrates that the older the chairman of company is, the earlier the issuing of FS is because they have more valuable experiences and attention in corporate governance (Abdelsalam and Street, 2007). Thus, they could solve variety of problems the company facing.

In addition, the research also displays a significant and positive relationship between the ARL and the **foreign ownership** at 5% level, this accepts hypothesis H_6 . It means companies with a higher proportion of foreign shareholders disclose their FS later than others. Therefore, results are contrast with research of Abdelsalam and El-Masry (2008) and Xie et al. (2003).

Finally, the result also presents that **profitability, leverage and the type of financial report** are significantly associated with audit report lag at 5% level, the hypothesis H_7 , H_9 , H_{10} are approved. This is in line with the results of most prior studies as Carslaw and Kaplan (1991); Owusu-Ansah (2000) and Aktas and Kargin (2011).

Conclusions

The purpose of research is to investigate what factors impact on the timeliness of FS of 66 listed building material companies in Viet Nam from year 2013 to 2017. And the result fully demonstrates that the REM was the most appropriate model. Further, the research finds out seven factors have significant relationships with the timeliness of FS comprising CEO duality; board independence; board experience; foreign ownership; profitability; leverage; and type of financial reporting. In contrast, there are no associations between the audit report lag with variables including board size; board meeting and company size.

The study only covers a five-year period from 2013 to 2017 and the findings would be more beneficial if a ten-year period data is collected and taken into account. Moreover, it is also important to examine on the other announcements such as interim and quarterly reports because these reports are important in assessing company performance. In addition, this study does not consider all relevant factors that might affect timeliness as prior studies. Hence, future studies will be considered with these above mentioned issues to create more useful and accurate researches.

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WHAT ARE THE CHARACTERISTICS OF SYRIAN REFUGEE ENTREPRENEURS IN TURKEY?

Neslihan Gokce Uygur

Abstract

Purpose: The aim of this study is to examine the characteristics of Syrian refugee entrepreneurs. When the literature is examined it is seen that there is not efficient studies. The issue of Syrian refugee entrepreneurs is a very young field for this reason Turkish economy, individuals, stakeholders, society and new researchers might have benefit from this study.

Design/methodology/approach: The participants of the study were Syrian entrepreneurs SMEs owners in Turkey. Data were collected from 15 participants by snowball technique in 2018. The interview was undertaken by demographic questions and a closed ended format by face to face interview in their business places. During the interviews, the answers were coded and categorized. The research has been made in 4 months. Interviews took approximately 30 minutes. The data transcribed to the papers by hand writing. While entrepreneurship has been taken ex post, it bases "risking thing" and seeing it ex ante.

Findings: It has been determined that the Syrian refugee entrepreneurs have initiated the formation of business with risk. From the results the authors elaborate Syrian refugee entrepreneurs faced obstacles in the formation of jobs, but they don't give up on their desire to start a business.

Research/practical implications: This study reveals several practical applications worthy of future study. The findings enhance the understanding how Syrian refugee entrepreneurs contributes in their new hosting environment. It might be valuable to further examine what characters of Syrian refugee entrepreneurs have. The study will contribute to local literature.

Originality/value: The paper provides evidence of the performance of Syrian refugee entrepreneurs. The study examines to determine which characteristics of refugees have increased entrepreneurial spirit.

Keywords: Syrian, Refugee, Turkey, Characters, Entrepreneurs

JEL Codes: L26; R23; C83

Introduction

Syrian people continued to bear the brunt of the civil war, and Syria remained the main country of origin of refugees at the end of 2011. More than 6.3 million people have been forced to flee the country (UNHCR, 2018). In October 2011, Syrians registered in Turkey get “temporary protection status.” In the past, refugee status was considered as a short-term outcome of the conflict. But it is understood that likely to be a medium- to long-term situation. And It is requiring plans of the long-term economic, social and political responsibilities to support these refugees. Refugees are hosted both in camps and within host communities, mostly in the southeastern Anatolia region adjacent to bordering Syria. Turkey hosts 3,6 million Syrian refugees it represents 3.6 percent of the population and these numbers are not surprising (Refugees Community Centre, 2018).

When the literature on the Syrian refugee entrepreneurship is examined, it is seen that the academic perspective highly focuses on the concept of social entrepreneurship. Austin et al., (2006) defined social entrepreneurship as a creative, social value- creating activity that can be seen in private, public, or non-profit public interest (Mollaogulları, 2017). Entrepreneurship is the ability to discover the existing market opportunities, to choose the right one for them, to evaluate and then to produce innovation in an uncertain environment. There are a number of factors affecting this ability (Ferrante, 2005). These factors; the need for success, the control center, the tendency to assume risk, flexibility against uncertainty, self-confidence and innovation (Bozkurt and Erdurur, 2013, p. 59; Abdullah, 2017). Entrepreneurship and entrepreneurial culture are the most important issues in recent years. The concept of entrepreneurs, who gained importance due to its effect on economic growth, is defined as the person who can make the resources available to him by evaluating the relationship between supply and demand for himself (Demirel & Tikici, 2004).

Establishment of new enterprises and consequently the creation of jobs will reduce the country's unemployment rate. With the establishment of new enterprises, different productions and services are formed according to the needs of the society. The formation of production and services in different areas leads to competition (Ozservet, 2017, p. 1). Ensuring the emergence of new entrepreneurs or the development of existing entrepreneurs and to know the entrepreneur has become a very important issue (Erdem, 2015).

Since entrepreneurs have extremely heterogeneous structures, the relationship between entrepreneurship and culture has gained importance in this respect. In researching on the relationship of entrepreneurship with culture, it is observed that the effects of the cultures on

the entrepreneurial characteristics of the individuals are high (Dogan, 2016). Syrian refugee entrepreneurship characteristics is the focus of the study. “A refugee is someone who has been forced to flee his or her country because of persecution, war or violence. A refugee has a well-founded fear of persecution for reasons of race, religion, nationality, political opinion or membership in a particular social group. Most likely, they cannot return home or are afraid to do so” (UNHCR, 2018).

Refugee entrepreneurs can contribute to the host country economically in this context. The attitudes of different cultures towards entrepreneurship are shaped according to the behavior of that culture, and according to their cultural structure, their entrepreneurial characteristics can be superior to other societies (Dubina & Ramos, 2013).

Opportunities for entrepreneurs in capitalist societies are intrinsically linked to markets (Kloosterman and Rath, 2001). Opportunities occur in markets: there has to be a sufficient (perhaps as yet still latent) demand for a certain bundle of products otherwise no entrepreneur can make a living. Markets are, thus, in our perspective, the crucial components of the opportunity structure. Openings for new businesses occur or are created in specific, identifiable product markets (Kloosterman, 2010).

The opportunity structure is not just important for the number and the sort of openings with respect to the necessary human capital it offers for new businesses. An essential characteristic of the opportunity structure and its openings also involves the chances present for expansion of the fledgling businesses (Kloosterman, 2010). Openings for immigrant entrepreneurs, as Waldinger (1986; 1996) has shown, do not only occur in markets that structurally expand, but also in markets that shrink on a long-term base (Kloosterman, 2010).

To assess economic concerns or opportunities (Wauters and Lambrecht, 2008: 897), immigrants who migrate to different countries can convert their existing physical capital into investment in the country they migrate to, and have already established social networks, ethnic structures and resources (Waldinger, 1984), social capital (Lyon et al., 2007, p. 364). In this sense, migrants pursue opportunities (Bizri, 2017, p. 848); Refugees can also attempt to survive (Deniz & Reyhanoglu, 2018).

1 Syrian Refugee Entrepreneurs

Refugees have several reasons to choose entrepreneurship. Refugees have to work in order to survive in the host country and face some difficulties and constraints in integrating with the community at this stage. Some of the reasons that lead them to entrepreneurship may be the

legacy of family members. In addition, lack of social networking, or lack of local language can be among the factors that push refugees into entrepreneurship. (Sommers, 2001) on the other hand, argues that some refugees have a risk-taking characteristic. In addition to past experience in entrepreneurship, being able to decide to be an entrepreneur may also be one of the factors affecting entrepreneurship. The persecution of refugees and the fact that they have to leave the country for humanitarian reasons can be seen as the reason for the lack of such resources.

1.1 Objective of the study

The main purpose of this study is to determine the characteristics of Syrian entrepreneurs who have been forced to move to Turkey since 2011. What are the characteristics that lead Syrian refugees to entrepreneurship? The clear answer to the question was tried to be explained through this study. The results of this research can be a contribution to the general framework to be formed by combining such studies to be carried out at different local scales.

The assumptions of the research can be grouped under the following headings:

- Entrepreneurs have realistic, risk-taking and social personality type.
- Entrepreneurs seek the most appropriate environment in which they can use their skills and abilities and be able to play roles that are compatible with their personality.
- The behaviors exhibited by entrepreneurs are the result of the interaction between the environment and personality.
- Survival effort and the level of professional experience of the refugee are effective in being an entrepreneur.

1.2 Research questions

When a literature review is done in this area, not enough studies have been found. The aim of this study is to examine the characteristics of Syrian refugee entrepreneurs in Turkey. In this concept we have asked 15 questions whereby open ended and closed ended with multiple-choice type. The main research problems as follow; “What are the characteristics of Syrian refugee entrepreneurs in Turkey?” and “What does affect entrepreneurial characteristics of Syrian refugees?”

1.3 Research Methodology

The study is based on a field research, participant observation, behavioral interview technique and qualitative research. It is possible to define qualitative data collection techniques such as observation, interview and document analysis. In the research, 15 entrepreneurs were reached by using the snowball technique from the methods used in qualitative research techniques. After the interview with the first entrepreneur, in accordance with the information obtained from the owner, another entrepreneur was reached and the interviews were completed. Each interview lasted approximately 30 minutes in accordance with the stated purpose and in a mutual chat environment. The questions have been asked as closed-ended, fixed response questions. The interview consists two parts. In the first part, there are questions to determine the entrepreneurial personality characteristics and the entrepreneurial potential of the participants. The participants were asked to state their answers to the propositions about the subject on the five point Likert scale. In the second section, questions were taken to determine the demographic and social characteristics of the participant profile in which the data were collected. The questions to be asked and the subject boundaries of the interview were determined and the interviews were made within this framework. Interviews were held in Turkish and English language.

The researcher's real identity and purpose are known from the group being studied. The research has started in lately in September 2018. Each Syrian entrepreneur was interviewed only once. Past performance is the best indicator of future behavior in behavioral interview technique. Therefore, the interview questions are asked to understand how the person might behave in similar situations in the future. In order to test the hypotheses developed, the data collected from the field were analyzed with the interview technique and the results were tried to be interpreted.

The most important criteria for determining the sample of the study in this context Syrian refugee entrepreneurs who constitute ownership in SMEs in Turkey. In a way, the universe is Syrian registered and resident refugee entrepreneurs. The research unit of the study is Syrian Refugee Entrepreneurs in Istanbul, Ankara and Adana. The social level and the individual level are handled together in the measurement and analysis the question. The data obtained from the interviews with the Syrian refugee entrepreneurs were interpreted by the content analysis method. In the content analysis, the idea is to bring together similar data in the context of specific concepts and to interpret it by organizing it in a way that it can be easily understood. The main purpose of content analysis is to reach the concepts and relations that can explain the collected data. In the first stage, data were analyzed. Then the data is read and the

data are categorized into categories, the frequencies of the answers given by the entrepreneurs are presented in tables.

The main constraint for limiting the research to 15 Syrian refugee entrepreneurs in Istanbul, Ankara and Adana is cost and time factors. The limitations of the study were determined as the adaptation of Syrian refugee entrepreneurs to social life and their struggle against problems.

It was not preferred to make an appointment before the interviews. Before the interviews, Owners had biases for this reason audio recording and image recording were not taken but only hand writing was taken.

2 Research Results and Findings

Demographic findings of Syrian entrepreneurs participating in the study are presented in Table 2. As shown in the table 2 below, most of the interview participants are middle age (30-45) people. Considering the educational situation, the fact that university graduates constitute the majority of them shows that entrepreneurship is more related to the higher level of education. In addition, the fact that all of the participants are men is explained by the fact that women are recessive for entrepreneurship.

Tab. 2: Syrian Entrepreneurs Demographic Properties

| Properties | | Frequency (n) | Percentage (%) |
|------------|------------------|---------------|----------------|
| Age | 20-30 | 4 | 27 |
| | 30-45 | 8 | 53 |
| | 45-65 | 3 | 20 |
| | Total | 15 | 100 |
| Education | Primary School | 0 | 0 |
| | Secondary School | 1 | 7 |
| | High School | 4 | 27 |
| | Bachelor | 8 | 53 |
| | Master and PhD | 2 | 13 |
| | Total | 15 | 100 |
| Gender | woman | 0 | 0 |
| | man | 15 | 100 |
| | Total | 15 | 100 |

Source: Authors elaboration

In Table 3 shows the interview dates, job in Syria, the situation of the workplace in Syria, job in Turkey and activity time. Some refugees have protect their original job in Syria and Turkey. According to the findings 46 % participants have kept their previous jobs. The workplaces opened by Syrians are in the form of grocery stores, supermarkets, cafes, restaurants, telephone sales, textiles, doner shops and clothing stores.

Tab. 3: The Situation of Syrian refugees in Syria and Turkey

| Participant | Interview Dates | Job in Syria | The situation of the workplace in Syria. | Job in Turkey | Activity Time |
|-------------|-----------------|---------------|--|---------------------------|-----------------|
| Refugee 1 | 19.09.2018 | Restaurant | Closed | Restaurant | 2 years |
| Refugee 2 | 19.09.2018 | Bookshop | Closed | Translator | 6 months |
| Refugee 3 | 24.09.2018 | Coffee Shop | Bombed | Coffee and water pipe | 1,5 year |
| Refugee 4 | 5.10.2018 | Spice Seller | Closed | Spice Seller | 8 months |
| Refugee 5 | 6.10.2018 | Restaurant | Closed | Syrian Restaurant | 2,5 years |
| Refugee 6 | 8.10.2018 | Trade | Closed | Trade | 1 year |
| Refugee 7 | 16.11.2018 | Sweet Shop | Open | Sweet Shop and cofee shop | 1 year 3 month |
| Refugee 8 | 17.11.2018 | Textile | 90% closed | Textile | 5 months |
| Refugee 9 | 18.11.2018 | Police | Bombed | Restaurant | 10 months |
| Refugee 10 | 20.12.2018 | Trade | Closed | Coffee shop | 7 months |
| Refugee 11 | 20.12.2018 | Phone seller | Closed | Textile | 1 year |
| Refugee 12 | 20.12.2018 | Textile | Bombed | Market | 1 year 8 months |
| Refugee 13 | 22.12.2018 | Supermarket | Rented to someone | Market | 6 months |
| Refugee 14 | 22.12.2018 | Automotive | Closed | Coffee shop | 6 months |
| Refugee 15 | 22.12.2018 | Factory owner | 50 % bombed | Trade | 2 years |

Source: Authors elaboration

During the face to face interview with Syrian refugees, the question asked is in which field the business operates to understand whether they turned cultural differences into opportunities. Fifteen Syrian entrepreneurs interviewed, seven of them continue to work on the Syrian culture. Two of Syrian entrepreneurs in the given answers had never worked in Turkey for a while in the hope of ending the war in Syria and return back there. More than 50 % of entrepreneurs' business places has been closed. Four entrepreneurs' business place has been bombed. Only one refugee' business place is still open in Syria. It's observed that entrepreneurs started their business between 6 months and 3 years.

When Syrian entrepreneurs were asked whether they had any difficulties in their working life, 87 % of entrepreneurs stated that they had difficulty mostly with language, residence permit and work permit and two entrepreneurs said that they did not have big problems. As it can be understood from the answers, the factors that are generally experienced and which push the refugees to entrepreneurship; there were problems such as materialism, cultural difference, lack of Turkish language, difficulty in working conditions as workers, difficulty in taking work permit.

Tab 4: Findings to determine the entrepreneurial potential of the participants

| Expressions | Frequency | Median | Mode | Arithmetic Mean | Arithmetic Mean Ranking |
|---|-----------|--------|------|-----------------|-------------------------|
| I like to catch up with new opportunities / ideas, create innovations from them, and grow a business. | 15 | 4 | 5 | 3.7526 | 1 |
| I'll be motivated and constantly strive to do better. | 15 | 4 | 4 | 3.6979 | 2 |
| I'm not afraid to try again and again on a subject that I've failed. | 15 | 4 | 4 | 3.6186 | 3 |
| I create my own luck | 15 | 4 | 4 | 3.5979 | 4 |
| If someone hasn't tried something before, I'll try. | 15 | 4 | 4 | 3.5689 | 5 |
| In the last six months, I've taken some risks that could cause me to lose what I have. | 15 | 3 | 5 | 3.3501 | 6 |
| I will find and learn any new information that might help me in my work, no matter where and in whom. | 15 | 4 | 4 | 3.274 | 7 |

Scale Values: 0 = No idea, 1 = Strongly Disagree, 2 = Disagree, 3 = Don't know 4 = Agree

5 = Strongly Agree

Source: Authors elaboration

When Tab 4 examined; participants respectively placed “I like to catch up with new opportunities / ideas, create innovations from them, and grow a business”, “I'll be motivated and constantly strive to do better”, “I'm not afraid to try again and again on a subject that I've failed” in the first three rows. The reason for this is that people have the tendency to act together with other people in the direction of their own ideals and goals, and that they have the ability to adapt to change more quickly and have the ability to find a way out in difficult situations.

In the question of whether obstacles were experienced during the interview, it was observed that the reaction of the entrepreneurs was abstaining. They responded “we had problems, in the beginning but after everything was encountered in the form of a good way”. For example refugee 9 stated that “I was police officer in Syria, When I move to Turkey I opened mobile phone shop but it didn't work after a few months I opened a restaurant” he had tried new jobs without hesitation. For instance, Refugee 3 listed the problems he faced “not knowing anybody, not knowing the legal procedures, asking for high rent fees, not wanting the

local community to take Syrians inside” but continued to struggle and work. Looking at the answers of the interviewees, it is seen that they had to struggle to maintain their lives after the war. Entrepreneurs' ability to cope with difficulties and their efforts to stop the struggle have created an entrepreneurial personality trait.

15 out of 15 Syrian entrepreneurs stated that they wanted to be the boss of their own business. Refugee 4 stated that “I don't want to work for someone else here in Turkey”, Refugee 7; “It's family business, it will continue for generations”, Refugee 12; “I worked independently in Syria so why I work under someone else in Turkey?”. It is seen that 100 % of participants want to be the owner of their jobs.

When the interviewees were asked about the main purpose of opening the workplace, the answer given in general was “to survive”. Twelve of the fifteen Syrian entrepreneurs used the statement to survive. Other three entrepreneurs have stated that they want the same life in Syria. Most of the entrepreneurs interviewed have made a business venture by spending all their capital. The fact that they started from zero might increased their tendency to take risks. As an Example Refugee 3, Refugee 9, Refugee 12, Refugee15 stated that “we lost everything in the war”. The desire of survive and create a new life have increased their tendency to take risks.

Tab 5: Codes and Categories regarding to interview

| Codes | Categories |
|--------------------------|-----------------|
| we did not give up | Fighting Spirit |
| we did not stop | |
| we are not afraid | Courage |
| nothing is risk-free | |
| starting from zero | |
| I have done by myself | Self confidence |
| I do not need anyone | |
| I like new opportunities | Innovative |

Source: Authors elaboration

Tab 5 shows that in the data taken into the computer environment, the words that are said too much by participants in the research area are determined for coding. Similar words have been caught and these similar words have been tried to be reduced to the common word. It is observed that they have fighting spirit, courage, self confidence, innovative characteristic.

Conclusion

It has been aimed to understand characteristics of Syrian Refugee Entrepreneurs who live in Turkey. Since 2011, Turkey has undergone an intensive influx of refugees. When Syrian refugees who are trying to survive are examined, it has been pointed out that they opened small-scale workplaces as well as working as a workers. The problem statement of the thesis "What are the characteristics of the Syrian refugee entrepreneurs?" field work has been formed. In this study, it is aimed to determine the characteristics of Syrian refugees.

The factors that push refugees to entrepreneurship; working conditions and wages as workers in Turkey are looking at factors such as exclusion and family responsibilities. The factors that attract the Syrians to entrepreneurship are the desire to work independently, the entrepreneurial experience of the family, the desire to be the boss of their own business, the desire to win more and the desire to help the Syrians (Deniz, 2017).

As a result of the interviews, it was observed that most of the Syrian entrepreneurs engaged in trade. These findings show how effective the experience of the Syrian refugee entrepreneurs' business initiative. All interviewed Syrian refugee entrepreneurs are male. It can be said that in patriarchal societies, entrepreneurship, courage and self-confidence are in the foreground. The findings of the characteristics of Syrian refugee entrepreneurs through interviews are age factors. The age of being an entrepreneur is usually in the 30-45 age range. Interview questions provided codes for the personality and entrepreneurial characteristics of Syrian refugee entrepreneurs. These categories are fighting spirit, courage, self-confidence, innovative. The transfer of experiences has been shaped by the perceptions of the entrepreneur. Different results can be obtained in different regions. As a matter of fact, in this study, it has been observed that entrepreneurs in Istanbul are doing their jobs more professionally and more professionally. In this field study, due to time and cost, some scope, work area and evaluation limits were made. The study focused solely on Syrian refugee entrepreneurs. Due to time constraints, some subjects with deficiency during the study could not be mentioned.

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REGULATORY CONDITIONS FOR PEER-TO-PEER LENDING FOR SMALL AND MEDIUM BUSINESSES

Augustinus van der Krogt – Cecilia López

Abstract

Purpose: This research analyses the importance of the collective financing model known as Peer-to-Peer Lending for Business (PPL-B) for small and medium-sized companies (SMEs). In particular it evaluates the impact of the national regulatory framework and the use of alternative credit risk assessment models applied by PPL-B on the credit access for SMEs.

Design/Methodology: This research is based on a multiple case-study and the analysis of secondary information resources including 11 academics articles and 7 international research reports on the topic. The research scope is limited to a 5-year period (2013-2018) and looks at four referential countries in this sector including the United States, United Kingdom, China and Germany.

Findings: PPL-B has become an important alternative source of financing for SMEs in the USA, UK and China. It furthermore suggests that the country-specific regulatory framework applied to PPL-B has an important impact on its growth and access to it for SMEs in these countries. Also, that the use of alternative data sources as applied by PPL-B platforms has a positive effect on the credit approval rates in the USA and China.

Research/practical implications: The paper has direct implications for policymakers who can learn that SMEs can benefit from PPL-B if governments set up regulatory frameworks catered specifically for this sector. The paper informs investors and SMEs that the use of alternative data sources contributes to higher credit approval rates for SMEs. This research has several limitations due to the lack of data on the PPL-B sector and its impact on SMEs. To address these challenges, future research is to focus on in-depth country-specific studies that compare SMEs' credit access through traditional banking institutions and PPL-B platforms.

Originality/value: This research responds to current lack of multiple-country studies that analyse the key factors to effective credit access for SMEs through PPL-B.

Keywords: Peer-to-Peer Lending, Crowdfunding, Marketplace Lending, Fintech, Small and Medium Business

JEL Codes: G21, G23, G32

Introduction

Although SMEs represent more than 90% of companies in developed and developing countries, many SMEs do not have access to bank loans, thus limiting their chances of growth (IES, 2016). Small and Medium Enterprises (SMEs) find themselves in a disadvantage when applying for bank loans through the traditional banking system. Even though there are multiple financing methods available for SMEs, they cannot comply with the standard loan requirements.

The Fintech (Financial Technology) sector currently offers an alternative financing mechanism through Peer-to-Peer Lending platforms for Business (PPL-B). These allow to respond to the unmet credit need of small and medium enterprises (SMEs) without major impediments such as collateral assets and standardized credit rating schemes. For smaller and medium-sized investors, small-sized peer-to-peer loans to SMEs represents an interesting opportunity to diversify their investment portfolio.

Current studies on PPL-B focus on one country (Belleflame, 2014; Hornhuf 2014). Therefore, we have opted to conduct a multiple-country study China, USA, UK and Germany, leading countries in terms of PPL-B. Other studies focus their research on very specific aspects of PPL-B (Duknitsky, 2014). Few studies analyse the factors explaining the growth of PPL-B and access to it for SMEs. The regulatory framework for the protection of PPL-B investors and applicants is an essential factor to the access of PPL-B for SMEs (Belleflame, 2014). Since the start of PPL-B offerings, governments have introduced very different regulatory frameworks (Patwardhan, 2017). Therefore, this research analyses the impact of these regulatory frameworks on the access to loans for SMEs.

Next to the regulatory framework, Patwardhan (2017) indicates that PPL-B platforms differ from traditional banking as they make use of alternative sources of information for applicants' credit checks and subsequent rating. It is supposed that the use of alternative data and its analysis will improve the accuracy of risk assessments of applicants and thereby increase the chances for SMEs to improve their access to PPL-B. This research will analyze if and how the use of alternative data affects the access to PPL-B for SMEs.

1 Literature Review

A comparative study by the Institute for Employment Studies of the United Kingdom, the United States, Germany indicates that SMEs can apply to loans through the traditional banking system at relatively low cost, with interest rates varying between 3% and 6% (IES, 2016). However, elevated concentration of bank providers often limits the loan options of SMEs at

local level. Access is furthermore restricted by loan requirements including sufficient collateral assets, minimum levels of sales volume and years of operation. As a result, credit rejection levels are around 40% in the USA and between 25% and 30% in the United Kingdom and Germany (IES, 2016).

In this context, crowdfunding is an alternative financing method connecting applicants seeking funding with many investors via an online platform (Belleflame, 2014). Crowdfunding models include funding of projects, individual and companies based on donations or rewards, loans and equity-based funding. As part of crowdfunding, this study focuses on Peer-to-Peer Lending for Business (PPL-B). This is a relatively new type of alternative financing that emerged with the aim of democratizing the financial system by connecting investors and borrowers, without the need for a financial institution to intervene (Patwardhan, 2017).

The regulatory framework is one key factor determining whether the PPL-B sector can be an effective financing vehicle for SMEs. To be able to function effectively PPL-B platforms require in the first place a clear regulatory framework that protects investors and loan applicants. In China, a lack of regulation has allowed irregular platforms to enter and operate in the market putting at risk both investors and loan applicants (Wang, Shen, & Huang, 2018). With trust being a fundamental factor for peer-to-peer model to function a clear set of rules and regulations is essential to effective PPL-B. At the same time, the innovative approach of PPL-B calls for limited detailed restrictions and control of the sector. To support this inherent contradiction, 16% of the actors in the PPL-B sector in the UK and the USA indicate that an effective regulatory framework is lacking and 29% of actors consider the current regulation to be excessive (Cambridge Centre for Alternative Finance, 2018).

To assess the impact of the regulatory framework on access by SMEs to financing, we have identified four possible regulatory frameworks. One can opt for Self-Regulation, a model which is currently widely adopted by the Crowdfunding segment of donations and rewards and also applied to the PPL-B sector (Cambridge Centre for Alternative Finance, 2018). In other countries, PPL-B is subject to the set of Banking Regulations of the national banking authority or follows the rules of the Securities Regulation as regulated by the national securities authority (Claessens, 2018). Finally, some countries have chosen to develop Specific Regulations that consider the particular characteristics of PPL-B. Actors in PPL-B also consider as essential the exchange of information between the investor and the applicant about the market and to promote their products. It is also important to consider that the PPL-B operates in a purely

online environment and operates as a multi-sided platform (Belleflame, 2014). This implies that for it to grow, the PPL-B should not be simply integrated into a standard regulatory framework.

Table 1. Regulatory frameworks for Peer-to-Peer Lending for Business

| | |
|-----------------------|---|
| Self Regulation | Self-regulation rules set by platform providers |
| Banking Regulation | Application of regulations set by the national banking authority |
| Securities Regulation | Application of regulations set by the national securities authority |
| Specific Regulation | Specific set of regulations for Peer-to-Peer Lending |

Source: Authors

For SMEs to be able to access to PPL-B it is furthermore essential to know the way in which PPL-B defines the credit risk as applied to SME financing. Each platform defines the interests of the loans in a different way. Some define them according to risk, amount of capital and terms defined, not very different from traditional banking. Other platforms allow borrowers to define the interest limit that they are willing to pay. In some countries, the platforms have direct access to the credit information agencies and thus obtain the data and information necessary to carry out their risk assessment. In other places they do not have direct access, so they must associate with a financial institution that can provide the necessary information to make decisions regarding the loans.

This is one of the reasons why PPL-B platforms have implemented the use of alternative sources of information to their risk measurement models (Patwardhan, 2017). Jagtiani and Lemieux (2018) observed the risk models used by the PPL platforms can be more precise and thus offer fairer interest ratings to borrowers.

2 Research Methodology and Research Questions

This research has established two research questions:

- Research Question 1: What is the impact of the national regulatory framework on the access by SMEs to Peer-to-Peer Lending?
- Research Question 2: What is the impact of alternative data use for credit assessment on the access by SMEs to Peer-to-Peer Lending?

The main sources of information for this research used are secondary sources including 11 scientific research articles and 6 international studies on crowdfunding, PPL and SMEs. This

research uses a multiple case study approach to PPL-B in four countries. Different from method using surveys, this approach allows for a more flexible analysis and comparison of the cases presented in a highly contextualized environment (Neubert, 2018).

China, the United States and the United Kingdom were chosen because they together they represent 98% of the total PPL-B capital and have known different regulatory frameworks. Germany was chosen because it is one of the examples largest economies where PPL-B has not taken off and its regulatory framework serves as a contrast for the other selected cases.

To answer the second research question, we use the research carried out by Jagtiani & Lemieux (2018), who compared loans granted by a PPL platform and similar loans granted by a bank, as well as reports about the use of alternative data by PPL-B platforms. This gives insight into how the implementation of alternative sources of information and Data Analysis technologies may impact credit underwriting and accessibility for SMEs.

3 Empirical evidence

3.1 Answer to Research Question 1:

What is the impact of the national regulatory framework on the access by SMEs to Peer-to-Peer Lending?

PPL-B platforms have been operational in China, USA, England and Germany for more than a decade. Figure 1 shows key indicators of PPL-B in these and other referential countries between 2013 and 2022. It can be concluded that markets have important variations in levels of growth and participation of PPL-B in GDP and per capita. For example, table 2 shows that the market has seen high annual growth and reaching an elevated volume and percentage of 0.9% GDP in China but much less so in Germany.

From table 2 we can also conclude that we find no standard regulatory approach in the listed countries (see Table 2). As for the four countries studied in this paper, each have a different regulatory framework which can serve as a reference for other countries.

China, the world's leading market for PPL-B, the sector started in 2005 on the basis of Self-Regulation. By 2016 more than 3,000 crowdfunding platforms had been developed in China (Hui, 2018). According to Hui, this is the result of a large group of small business people looking out for alternative investment opportunities with limited regulatory restrictions. This group of small-scale investors represents now more than 90% of investors compared to 60% in the United Kingdom and 40% in the United States (Claessens, 2018; Dushnitsky et al., 2016;

Cambridge Centre for Alternative Finance). The supply of financing is combined with a strong demand by SMEs who do not have access -estimated at 70%) to the traditional banking system (Hui, 2018; Wang, 2016). This has resulted in an exponential boom of PPL-B to US\$ 16,868 million in 2018, representing 90% of the total PPL-B capital in the world.

Table 2: Selected indicators of PPL-B 2013-2018 (in millions USD)

| | 2013 | 2016 | 2018 | Average annual growth 2016-2018 | 2022 | Average annual growth 2018-2022 | % PPL / GDP 2018 | Volume per capita in US\$ 2018 | Regulatory framework |
|------------------------|-------|--------|---------|---------------------------------|---------|---------------------------------|------------------|--------------------------------|---------------------------|
| Belgium | 1 | 5 | 6 | 10% | 6 | 2% | 0.001% | 0.5 | Specific Regulation |
| China | 1,335 | 70,387 | 126,828 | 40% | 256,000 | 34% | 0.900% | 89.6 | Self & Banking Regulation |
| Finland | 12 | 80 | 122 | 26% | 216 | 26% | 0.042% | 24.4 | Securities Regulation |
| France | 1 | 101 | 125 | 12% | 177 | 14% | 0.005% | 1.9 | Specific Regulation |
| Germany | 6 | 39 | 42 | 4% | 46 | 3% | 0.001% | 0.5 | Banking Regulation |
| Italy | 1 | 97 | 626 | 273% | 763 | 7% | 0.029% | 10.6 | Securities Regulation |
| Poland | 1 | 11 | 14 | 14% | 23 | 21% | 0.002% | 0.4 | Self Regulation |
| Spain | 3 | 86 | 199 | 66% | 470 | 45% | 0.013% | 4.3 | Banking Regulation |
| Switzerland | 3 | 185 | 620 | 118% | 1,464 | 45% | 0.084% | 68.9 | Banking Regulation |
| The Netherlands | 26 | 185 | 179 | -2% | 205 | 5% | 0.019% | 10.5 | Securities Regulation |
| United Kingdom | 906 | 1,949 | 2,242 | 8% | 2,849 | 9% | 0.080% | 33.5 | Specific Regulation |
| USA | 317 | 7,775 | 8,188 | 3% | 8,987 | 3% | 0.040% | 25.1 | Securities Regulation |
| World | 2,600 | 82,000 | 140,000 | 35% | 273,000 | 32% | 0.160% | 18.0 | - |

Source: Cambridge Centre for Alternative Finance 2018; Statista 2018, and authors' calculations

The dramatic growth of PPL-B combined with a lack of regulation also resulted in multiple cases of fraud and misinformation by PPL-B platforms in 2015 and 2016. As a result, the authorities designated the China Banking Regulatory Commission (CBRC) as the regulatory body for these platforms, and which determined that the platforms could only match investors

with borrowers and could not raise funds from investors. While the new regulations have slowed down growth it is still an essential investment for small investors and lending instrument for SMEs in China. Although data are limited, Deer (2015) estimates that between 20% and 40% of SMEs make use of this alternative form of financing.

In the United States, the world's second largest PPL-B, market has been regulated by the Securities and Exchange Commission since 2008. The platforms are required to register the loans offered as securities and must submit reports to the Security Exchange Council (Patwardhan, 2017). Thanks to clear and limited regulation the market has seen continued high growth from US\$ 317 million in 2013 to US\$ 8,188 million in 2018. The high volume of PPL-B in the United States can be partially explained by the active participation of institutional investors in this type of financing that reaches 60% of the total compared to 40% in the United Kingdom (Cambridge Centre for Alternative Finance, 2018).

The development of PPL-B is accompanied by a significant demand for alternative funding from SMEs in the United States. 85% of this group of companies depends on financing through the banking system which requires high levels of collateral assets and strict rules for credit scores and the cash flow structure. This results in credit approval levels of only 35% for medium and high-risk borrowers (Federal Reserve Banks, 2017).

In the UK, the third PPL-B market, PPL platforms were self-regulated by the Peer-to-Peer Finance Association until 2014. Since 2014 PPL-B platforms are supervised by the Financial Conduct Authority (FCA) which regulates both banking institutions and securities. However, different from other countries, the FCA has introduced a sector-specific regulatory regime. Specific rules for PPL-B platforms include capital requirements and other requirements to protect risks of investors and lenders (Patwardhan, 2017). A particular trait of the PPL-B market in the UK -and different from the USA- is that it retains the principle of peer-to-peer, 60% of PPL-B investors are individual investors versus 40% of institutional investors (Cambridge Centre for Alternative Finance, 2018).

This alternative form of financing has proven to be an essential source of funding for SMEs in the UK. An indicator of the effectiveness of this alternative source of financing for SMEs is that in 2017 that 9.5% of the new credit for SMEs and up to 29.2% of micro and small enterprises were funded through PPL-B, representing a duplication in the number of companies accessing alternative financing in the UK (Cambridge Centre for Alternative Finance, 2018).

As far as regulation in the German market is concerned, PPL-B platforms are regulated by the standard banking regulations under the tutelage of the Federal Financial Supervisory

Authority (BaFin) requiring platforms to have full banking licenses to grant credits (Claessens, Frost, Turner, & Zhu, 2018). As a result, platforms are directly associated or directly set up by traditional banks and compete with regular -low interest rate- bank credits. This has limited the development of PPL-B of only US\$ 0.5 per capita in 2018, way behind the other countries studied. Another important factor is German SMEs' greater self-financing capacity and find fewer obstacles to credit access at traditional banks. Only 9% of SMEs indicate problems in obtaining credit and credit approval rates for SMEs are 75% (IES, 2018). The combination of lower demand with a stricter regulatory framework may explain the low level of investment in PPL-B which reached only US\$ 42 million in 2018 representing a mere US\$ 0.5 per capital.

3.2 Answer to Research Question 2

What is the impact of alternative data use for credit assessment on the access by SMEs to Peer-to-Peer Lending?

An important factor that makes PPL-B an interesting alternative source of finance to SMEs is found in the use traditional and alternative sources of information for applicants' credit checks and subsequent rating (Patwardhan, 2017). Table 3 summarizes the main types of traditional and alternative data traditional banks and PPL-B platforms collect on the loan applicants. In most cases PPL-B applies a combination of traditional and alternative to assess loan applications, allowing to assess applicants that do not have collateral assets or an extensive credit history on the basis of alternative indicators.

As we have earlier indicated, PPL-B platforms in Germany do not apply alternative data sources to credit risk assessment. In the case of the USA, Jagtiani & Lemieux (2018) compared the traditional credit scoring levels (FICO) applied by traditional banks and the credit rating scores of the leading US-based PPL platform Lending Club. In their research, they reveal a drop of approximately 50% (from 2008 to 2015) in the correlation between the FICO Score and the credit rating defined by the platform. They believe this may be the result of the platforms growing use of alternative data. The use of alternative data contributes in the USA to a superior credit approval rate of 71% through online lenders among SMEs against 35% through banks (Federal Reserve Banks, 2017).

In China, PPL-B platforms develop their own credit scoring, as they are excluded from credit bureaus and cannot access to borrowers' credit information through these channels (Patwardhan, 2017). PPL-B platforms therefore use alternative data such as e-commerce transactions, telecommunications, public data and social media (Global Partnership for

Financial Inclusion, 2017). The use of alternative data results in a credit approval rate for SMEs around 57% (Cambridge Centre for Alternative Finance, 2018).

Table 3: Data used for loan assessment and approval

| Banks | PPL-B Platforms |
|---|--|
| Traditional Data | |
| Financial Statements Tax Returns Collateral | Deposit account balances Business Cash Flow Personal Cash Flow Collateral |
| Alternative Data | |
| | Real-Time Cash Flow Online Reviews (Yelp, eBay) Owner's engagement with markets Psychometrics |

Source: Global Partnership for Financial Inclusion, 2017

In the UK, PPL-B platforms use multiple data entries, traditional and alternative data and make use of Big Data Analytics and Machine Learning algorithms to process the data. This not only allows PPL-B platforms to have a clearer picture of the potential borrowers' credit-worthiness but also reduces cost and time needed for credit underwriting. The accurate, easy and quick application and decision-making process is an important factor that influences the investors and borrowers' choice of PPL-B over traditional banking.

Conclusion

This study shows that Peer-to-Peer Lending has become an important alternative financing method for SMEs in China, USA and the UK. The success of PPL-B in China, USA and the UK can be explained by multiple factors but in the first place by a strong need by SMEs who cannot access regular bank loans. In China and the UK, growth in PPL-B is further enabled by a strong interest of smaller individual investors who seek medium level risks and returns on investment as offered by this financing mechanism.

The answer to the research question 1 is that the country specific regulatory framework has a strong impact on the access of SMEs to PPL-B. In China and the UK Self-Regulation has led to a fast growth of smaller investors and SME applicants during the early years of PPL-B. A Specific Regulatory framework as developed since 2014 in the UK is showing to support a stable growth pattern for PPL-B and allows smaller investors and SMEs to participate in

a secure way. In the USA, a model based on securities regulations has limited participation of smaller peer-to-peer investors but has attracted large volumes of lending in the USA by institutional investors. Finally, a model based on the Banking Regulations as applied in Germany has shown to limit overall growth of PPL-B. In response to research question 2, the use of alternative data for credit assessment by PPL-B platforms improves the accuracy of credit assessment and indicates to improve loan approval rates of SMEs in the USA and China, yet is not confirmed for the case of the UK.

These findings are relevant for researchers, policy makers, investors and SMEs as they confirm not only the fast-growing importance of PPL-B but also the need to choose for an adequate regulatory framework and data set for risk assessment to secure and sustain access to PPL-B by SMEs. For researchers in particular, this research has several limitations due to the lack of primary and secondary data on the PPL-B sector and actors and its impact on SMEs. To better understand and substantiate findings we recommend that future research focuses on in-depth country-specific studies that compare SMEs access to traditional and PPL-B and the underlying regulatory framework and data requirements for credit risk assessment.

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DATA STEWARDSHIP LEADERSHIP IMPACT ON VERTICAL INTEGRATION IN GOVERNANCE PROGRAM

Milomir Vojvodic – Christian Hitz

Abstract

Purpose: The study examines the impact of data stewardship leadership on vertical integration in data governance programs. There is an ongoing challenge of insufficient involvement of business users in data governance workflows and vertically integrate stakeholders from a systems level and functions level. This impacts the success of the program.

Design/methodology/approach: To test the hypotheses, a quantitative method with Structural Equation Modelling and Partial Least Squares (PLS) in SmartPLS is used. The empirical data are collected from 56 data management professionals involved in recent General Data Protection Regulation projects associated with customers' data in larger organizations across Europe. The data collection took place during December 2018.

Findings: Research findings show that there is an effect of Data Stewardship Leadership on Vertical Integration.

Research/practical implications: Effective data governance provides a means to obtain utility from controlled data use, which is crucial in the data economy underway. In order to provide values to traditional information management, governance demands success with its mechanisms for involvement and alignment with business stakeholders.

Originality/value: This work attempts to contribute to filling the gap in the scientific body of knowledge on data governance with empirical evidence of organizational practice needed for successful implementation of the program.

Keywords: Data Economy, Data Stewardship, Leadership, Data Governance

JEL Codes: M15, M21

Introduction

The best practices from strategic management, business process management, risk management, and IT governance are combined in information governance concept (Niemi & Laine, 2016). It moves the data management profession from low-level operations towards managerial functions.

Resistance against organizational change is the dominant reasons for the inefficiency of operations while leading the rational implementation of organizational change. The challenges or larger IT projects and programs are that IS changes are not coordinated with organizational changes (Vrhovec, Hovelja, Vavpotič, & Krisper, 2015). As many researchers have demonstrated leaders and influencers play a major role in information technology (IT) implementation success or failure, there is a need for specifications of program leader behaviors and suggestions to management by integrating information governance with change management and leadership theories.

Data stewards do not have enough authority that will ensure them power. Hence, they need to be leaders and influencers.

The research gap exists in this area as well as lack of practice-oriented publications, validated by Alhassan et al. (2018)

1 Theoretical background

1.1 Data governance

Data governance is a companywide framework for assigning decision-related rights and duties in order to be able to adequately handle data as a company asset (Otto, 2011). Effective data governance has been suggested as critical in obtaining utility from centralized data use and data governance has been an emerging trend in enterprise information management (Cheong & Chang, 2007).

1.2 Data stewardship

As a concept that derives from data governance, data stewardship is the willingness to be accountable for a domain of business information for the welfare of the enterprise (Kooper, Maes, & Lindgreen, 2011). This comes from the fact that enterprises have the practice to assign individuals that communicate changes to data policy, regulations, and rules to their units/area and that develop rules for handling of the data (Otto 2011a). They are often called data stewards. Similarly, those that have some level of responsibility, though not necessarily authority, over

data they define, produce and use – are sometimes called operational data stakeholders. They can be involved in any of the efforts of data entry, a data integration, a data analysis. Data stewards operate with participants from business (operational data stakeholders) and are normally appointed per business unit or department (Wende, 2007).

1.3 Vertical integration with business stakeholders

Governance is a highly interactive social process (Vilminko-Heikkinen & Pekkola, 2017).

Data governance and data stewardship depend on line-of-business users of information systems, as a very vital source of much necessary information, due to their knowledge of the nature of the work that the system is supposed to support (Hendry, 2008).

The information management initiative will not deliver results if business owners didn't support the identification of data capture, maintenance, and usage process flows that need to be mitigated (Karel, 2007). Lack of their support causes undocumented and unstandardized requirements for data standards, quality, and strategic alignment.

1.4 Change management, resistance and leadership

Data stewardship is connected with leadership, as well as their success in recruiting line-of-business stakeholders as information system users. Together with leadership, managing change and resistance plays also a vital role. There are several theoretical tracks when it comes to organization and change management: In strategic choosing theory, leadership and leaders (managers) are the real actors of change process (Child, 1997). McNulty (1962) indicated the significance of communication structure and managerial change in the change process. On the basis of the work of (Kimberly & Nielsen, 1975), by actively changing employees behavior are means for proceeding with organizational change.

Cause of resistance is often the fact that governance is seen as the set of decisions that define expectations, grant power, or verify performance, a quality control discipline (Berson & Dubov, 2011).

In addition to that, many organizations still operate in silos and fear that the switch to cross line-of-business perspective comes with pain, conflicts, political battles, differences of opinion and additional workload (Seiner, 2014), regardless of their recognition that silo-operations are the root of their data problems.

Superordinate identity and initiation of structure can be elements of data stewardship leadership in change and resistance management efforts.

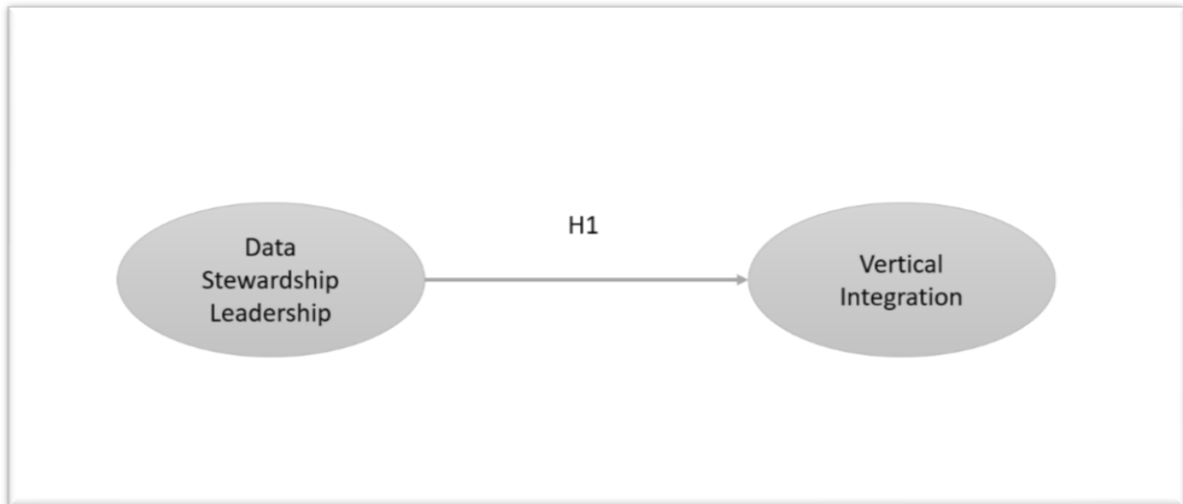
Superordinate identity is the degree to which members identify themselves with the data stewardship team and success of the team (Miller & Brewer, 1984). In such a need for better cooperation between culturally different groups, utilization of super-ordinate goals evidenced boost of it (Sherif, 1988). Successful cross-functional teams in order to be successful engross in valuable communication, cooperation and coordination team processes (Pinto, Pinto, & Prescott, 1993). There is self-concept driven motivation for members to share information, to carefully pay attention to each other's perspectives during decision-making, and to be constructive in dialogs (Maltz & Kohli, 2000). If team leaders foster positive relationships with other teams and their leaders the CFT team is perceived positively outside the team, and this adds to the identity for the team (Simsarian & Webber, 2002).

People normally act in ways that enhance (or make them feel good about) their self-concept and that's why they incline to make descending comparisons of their functional area with others (Ashforth & Mael, 1989). Therefore, leadership in managing the relationships with functional managers and mediate between the functional managers brings stewards success (Ford & Randolph, 2016).

Initiation of the structure is defined as the degree to which the team leader assigns tasks and prescribes behaviors to the team members in order to achieve the desired results (Wofford & Liska, 1993). Structure facilitates the creation of recurring communication patterns. Structure clearly and explicitly stating goals and task descriptions (Magpili & Pazos, 2018). Influencing team member behavior via structuring the environment surrounding the task (Porter & Lilly, 1996). It reduces cases of dysfunctional communication and enhances conflict resolution in teams. Using structure initiation, team leaders are able to communicate the individual and collective accountability as it improves communication and understanding among team members. The more complex and ambiguous tasks, the more important structure initiation is. (Sarin & McDermott, 2003).

2 Theoretical framework and hypothesis

Fig. 1: Research model (based on theoretical review)



Different business units protect by inertia their own distinct data management practices and processes developed over the years. Only leadership driven changes in the organizational practices may interrupt this rigid structure. Data steward are leaders as there are high requirements are on collaborating skills and ability to influence, both business and technology teams across business units (Villar, 2009). Luckily, means of data governance provide a process and structure that leadership can bank on (Vilminko-Heikkinen & Pekkola, 2017).

When it comes to challenge of adding business users, there is evidence that organizational culture, user motivation, and complexity of the project are elements that impact the selection of appropriate user involvement strategy (Bano, Zowghi, & da Rimini, 2017).

Change agent leadership based on application of both change management and project management scientific fields' bodies of knowledge (Pádár et al., 2017) records effectiveness if: it is based on organization culture measurement and adjustment of cultural profile prior to the change (Paro & Gerolamo, 2017), there are authentic leaders generating followers readiness for change, leading to their commitment to change and behavioral cooperation (Bakari et al., 2017), employee perceptions of leadership as a mediator for perceptions of change and work engagement (Caulfield & Senger, 2017).

Several studies have reported the advantages of creating a solid sense of superordinate identity. This method impacts individuals' previous group identities and enriches team effectiveness (Sethi, 2000). With their identification and commitment members rarely to

advance above their functional areas as held by evaluation and reward influence of their source teams (Ford & Randolph, 2016).

Initiation of structure adopts the use of rules, directives, and routines, exactly as mechanisms in integrating tacit knowledge embedded in individuals form the theory of (Grant, 1996). The absence of task structure ruins the process where team members clearly understand their roles and responsibilities, which is the main obstacle to the success of cross-functional teams (Thamhain, 2007).

Therefore, we hypothesize: *business participation in governance program is positively impacted by data stewardship leadership (H1)*.

3 Research method

To establish awareness and relevance of the research problem, a literature search was conducted.

Therefore, based on (Webster & Watson, 2002) a literature review has been conducted in order to identify relevant literature, discussing data governance and leadership.

With 5 points Likert scale the empirical data were collected in an online survey from data governance leaders involved in recent GDPR projects associated with the processing of customer data in larger organizations across Europe. Leaders are senior members associated with data management, governance or compliance teams (internal leaders or external partners/consultants). SurveyMonkey online platform was used.

The group of 56 respondents is recruited from LinkedIn and from a personal network of authors, engaged in a wide range of data governance projects. This work is part of a larger study on multiple hypotheses. The ongoing data collection was snapshotted on 16.12.2018.

In order to represent better the target population, sampling is stratified to provide sampling diversity (industry and location). The response rate has to remain confidential, as this might indicate a level of vendor-partner relationship in authors professional affiliates.

Respondents had to confirm at the beginning of the survey that observed firms process data about customers and has data governance teams. This data collection instrument is completely anonymous - there is no request for data that can identify the firm or respondent. An IP address is not tracked, neither whether or not you participated in the study

The quantitative questionnaire is developed for variables where none is found, after a rigorous literature review. New measurements are adapted and added from certain studies that have operationalized similar dimensions. Scale from (Vanlommel & Brabander, 1975) was

adapted for Governance Business Participation and scales from (Sarin & McDermott, 2003) and (Sethi, 2000) were integrated and adapted for Data Stewardship Leadership.

The pilot test evaluated Cronbach Alpha and Exploratory Factor Analysis.

Reliability and validity check is conducted for the converted data. At a high level, validity refers to the capability to measure the right concept. Reliability is the accuracy in measurements when the measurements are repeated.

Tests for validity are convergent validity and discriminant validity. Tests for reliability are internal consistency and composite reliability. Reliability is tested using Cronbach's α for each factor (as internal consistency test) and with composite reliability. The CR estimates the extent to which a set of latent construct indicators share in their measurement of a construct, whilst the average variance extracted is the amount of common variance among latent construct indicator (Hair, 1998). CR is a measure of the overall reliability of a collection of heterogeneous but similar items. The results in Table 3 confirmed that CRs for the constructs were higher than the desirable value of 0.6 (Bagozzi & Yi, 1988) (Fornell & Larcker, 1981). Construct validity is tested by using discriminant validity and convergent validity. Convergent validity is measured with checking Average Variance Extracted (AVE) >0.5 and results are positive with which is evidenced with values of 0.89 and 0.91. As for discriminant validity, the shared variance between each construct is to be compared with their AVE, and as the former needs to be smaller than the latter, which is confirmed in Table 4.

To test the hypotheses, partial least squares (PLS) in SmartPLS is used where a standardized regression coefficient gives us a mixture of a (causal) effect and the distribution of a variable.

As shown in Table 3, the results for Cronbach's α are 0.89 and 0.93.

4 Results and limitations

Research findings show that there is the effect of Data Stewardship Leadership on Governance Business Participation and hypothesis H1 is accepted: Data Stewardship Leadership positively impacts Governance Business Participation, with significant standardized path coefficient ($\beta=0.43$, $p\leq 0.01$).

Tab. 1: Responses Distribution

| Industry | Number of responses | Region | Number of responses |
|----------------------------------|---------------------|--|---------------------|
| Aerospace or Transportation | 3 | Central Europe (Germany, Austria, Czechia, Slovakia, Poland, Hungary, Romania) | 9 |
| Consulting | 4 | North Europe (Norway, Sweden, Finland, Denmark, Estonia, Latvia, Lithuania) | 4 |
| E-Commerce or Retail | 4 | Outside of European Union | 1 |
| Financial Services | 25 | South Europe (Italy, Spain, Portugal, Adriatics and Balkan countries, Greece) | 16 |
| Other | 9 | West Europe (Benelux, France, United Kingdom) | 25 |
| Technology, Software or Internet | 7 | Central Europe (Germany, Austria, Czechia, Slovakia, Poland, Hungary, Romania) | 9 |
| Telecommunications | 3 | | |

Source: Authors

Tab. 2: Constructs and Survey Questions

| Construct | Operational Definition and Question |
|-------------------------------------|---|
| Business Stakeholders Participation | <p>Business stakeholders participating in the governance program provide necessary process expertise, data meaning and context, existing knowledge of the data that lies within line-of-business, apply business judgments.</p> <p>Compared to other similar companies, in the data governance framework of the observed firm:</p> <ol style="list-style-type: none"> 1- business stakeholder involvement is higher in the formal engagement which assumes their responsibility (identify data to be governed, rules, policies, follow-up) 2- business stakeholder involvement is higher in the formulation of objectives, evaluation of results and use of outputs |
| Data Stewardship Leadership | <p>Enterprises have the practice to assign individuals that communicate changes to data policy, regulations, and rules to their units/area (Seiner 2014) and that develop rules for handling of the data (Otto 2011a). They are often called (domain) data governance stewards.</p> <p>Similarly, those that have some level of responsibility, though not necessarily authority, over data they define, produces and use – are sometimes called ‘operational data stakeholders’. They can be involved in any of the efforts of data entry, a data integration, a data analysis.</p> <p>In the observed firm:</p> <ol style="list-style-type: none"> 1- Data governance stewards schedule work to be done, organize, clarify and defines the activities of operational data stakeholders and maintain definite standards of performance. 2 - Data governance stewards behave like a unified team. |

Source: Authors

Tab. 3: Scale Items, Reliability and Item Loadings

| Construct | Data Stewardship Leadership | | Governance Business Participation | |
|----------------|---|------|--|------|
| | Cronbach's $\alpha=0.89$, CR= 0.95 AVE=0.95 | | Cronbach's $\alpha=0.93$, CR=0.89 , AVE=0.91 | |
| Item | DS-1 | DS-2 | BS-1 | BS-2 |
| Factor loading | 0.95 | 0.94 | 0.95 | 0.96 |

Source: Authors

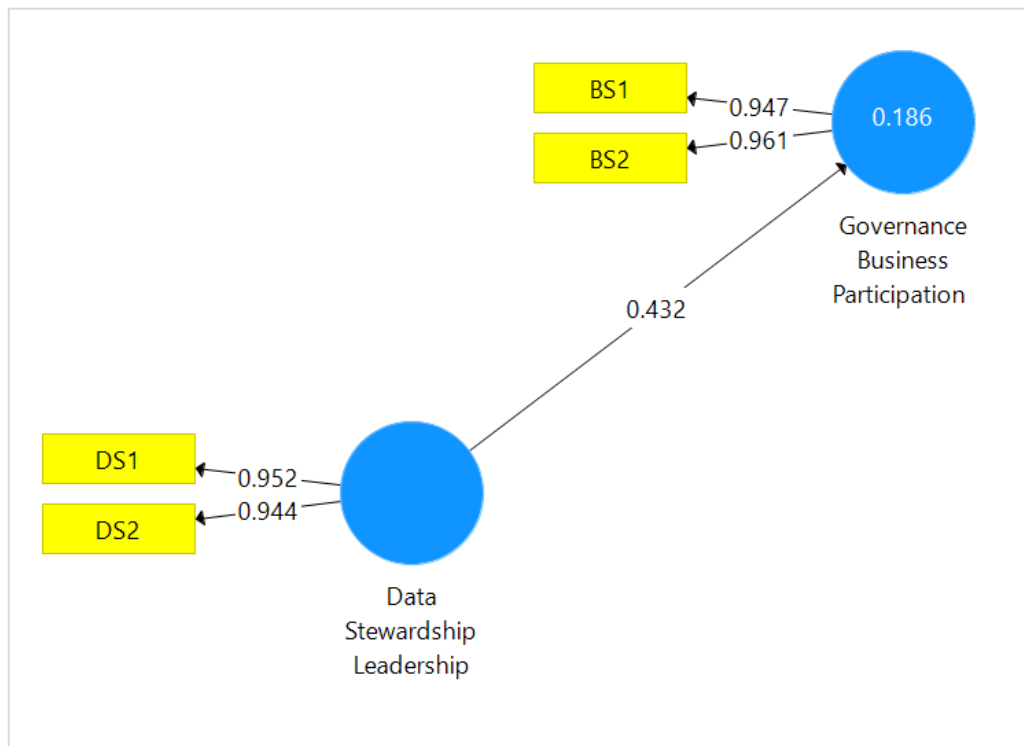
Tab. 4: Discriminant Validity

| Correlations square for constructs | | |
|------------------------------------|-----------------------------|-----------------------------------|
| | Data Stewardship Leadership | Governance Business Participation |
| Data Stewardship Leadership | 0.95 | |
| Governance Business Participation | 0.43 | 0.95 |

*the AVE's are on the diagonal, and the R2(Shared variance) are below the diagonal

Source: Authors

Fig. 2: Impact Results



($\beta=0.43$, $p \leq 0.01$)

Source: Authors

Conclusion

Data has become embedded within nearly every department and business unit, and proper data governance, as an example of such initiative, requires organizational change, much more rigorous alignment with business users and model maintenance with forming one cross-functional unit – data stewardship team.

Transformations triggered by technology innovations that bring to the business their undoubted and proved value still need to be prioritized in research from the perspective if they are easily adopted or if the organization is experiencing difficulties in such process.

As many researchers have demonstrated that change agents play a major role in IT implementation success or failure and the need for strong leadership is a managerial practice, there are yet not many specifications of such leadership behaviors. As providing empirical evidence of organizational practice needed for successful implementation of the program, this work contributes to the gap in the scientific body of knowledge on data governance.

To prepare for the upcoming data revolution, companies need strategies for achieving competitive advantage, where their associated benefits exceed their costs to maintain data and comply. As a potential managerial tool, it was shown a role of data governance with proactive resistance-aware data stewardship.

The limitation of the research is the number of items in operationalizations of the constructs. The measure was deliberately short in order to minimize response biases (Schriesheim & Eisenbach, 1995) and to avoid that scale lengths affect response rate (Roznowski, 1989). Targeted roles serve as high profiles and managers, with the intention to spend time in online surveys. Constructs are accurately described and made clear when measured with a two-item measure (Sackett & Larson, 1990).

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ANALYSIS OF COMPANIES OPERATING IN THE CONSTRUCTION INDUSTRY IN THE CZECH REPUBLIC BASED ON KOHONEN NETWORKS – IDENTIFICATION OF LEADERS IN THE FIELD

Jaromír Vrbka – Petr Šuleř – Jakub Horák

Abstract

Purpose: Construction industry is a very important part of a national economy. Naturally, in such a field a large number of business entities operate. Each of these entities has to measure its financial stability and to predict the future development.

Design/methodology/approach: Within analysis, leaders in the field of construction industry are identified. For the purpose of the analysis, data entries of the financial statements obtained from 12,584 companies operating in Czech construction industry in 2016. Using Kohonen networks, cluster analysis is carried out.

Findings: It can be stated that a relatively small group of companies strongly influences the construction industry development and thus the development of the entire national economy. The identified group of leaders of the construction industry consists of 59 companies out of a total of 12,584. This represents 0.47% of all companies that were active in the sector during the 2016.

Research/practical implications: A relatively small group of companies has a very high impact on the development of the construction industry, we can say that this group has a major impact on the development of the entire national economy. Based on the result, we can deduce that the future development of the construction industry can be predicted based on the results of 59 enterprises. We should, for example, verify whether the representation of companies in individual clusters will change over time.

Originality/value: This contribution aims to analyse the entire construction industry in the Czech Republic using a modern innovative method, artificial intelligence – Kohonen networks. Leaders of the industry were identified. As a predictive tool, the analysis of 59 enterprises is very positive. What is negative, however, is that the fluctuations in outputs (caused by whichever reason) may result in a fluctuation in the entire branch of the national economy.

Keywords: Kohonen Network, Construction Industry, Cluster Analysis, Leaders in the Field, National Economy

JEL Codes: C38, C45, C53

Introduction

Construction industry is an important part of a national economy. In Czech Republic, construction industry employs about 38% of economically active population of the Czech Republic. It is often referred to as an indicator of the national economy development, as it enables to predict the development of macroeconomic situation – construction industry is the sector which reflects a recession (decline in demand) or boom (increase in demand) first (Linkeschová, 2005). This fact is also mentioned in the foreign literature, e.g. McGeorge, Zou and Palmer (2013) state that construction industry is the main economic driving force both in developing and developed countries. According to Attalah (2006), business in construction industry is a complex and risky activity which requires coping with changing conditions and requirements as well as possible risk at every step. There are a large number of business entities operating in construction industry, which differ in the focus of their activities (Částek, 2018). These entities compete among one another, thus creating a competitive environment influencing success and profitability of companies (Lunáček, 2015).

Therefore, it is very necessary to conduct firm-level analyses. Blažková and Dvouletý (2019), for example, investigated the influence of firm-specific determinants on the entrepreneurial success of the Czech food processing companies with the focus on capital structure and productivity. Blažková and Dvouletý (2019) found that high leverage of companies led to the decrease of profitability, because there were the high financial distress costs and worsened market position of companies in the competitive environment. One of the methods for comprehensive business evaluation is artificial neural networks. Nowadays, the application of neural networks in economic applications is a real possibility. They are used to support taking investment decisions or in other decision-making processes where the aim is to achieve the minimum, and in optimization problems, such as drawdown of loans or processing raw material in the production process (Nechaeva, 2006). Currently, the application of neural networks is mostly in the prediction, classification and optimization. By proper deploying of neural networks, e.g. for predicting financial indicators and on the basis of the data obtained on an appropriate management decision, the company can gain that important strategic advantage (Konečný, Trenz and Svobodová, 2010).

Nowadays, the basic and the most popular neural networks include the so-called SOM = Self-Organizing Maps, more commonly known as Kohonen maps (named after their “author”) (Hřebík and Kukul, 2017). They are included in the group of self-learning neural network, i.e. networks learning without a teacher, which do not require ideal patterns for their

set-up (Vochozka, 2017). This means that for learning, only a larger set of real signals, some of which have a certain common property or significant differences, are necessary, and no ideal teaching signals or information (target values) have to be assigned to them (Šuleř, 2017). In the case of learning using a teacher show the final target state the network is supposed to achieve. What is a big problem is to gain such networks (Weinlichová and Fejfar, 2010). On the contrary, SOM (Kohonen maps) require only a set of recorded speech signals, and in the learning process, the network itself finds the common features and differences, according to which the network will act, which is the advantage that during their 20-year existence of Kohonen maps made them a widely used and very popular neural network (Rowland and Vrbka, 2016).

The research question is formulated as follows: Can the industry leaders be identified by artificial intelligence and identify their position and impact on the whole industry? The aim of the paper is to analyse the construction industry in the Czech Republic using the Kohonen Networks. Leaders of the industry will be identified within the analysis. Namely, the leaders (fastest growing and most profitable companies) generate the most of the added value of the industry, and thus they highly contribute to the growth of the economy. The question is how these leaders influence the development of the construction industry in the Czech Republic. This paper will be followed by further research on how to analyse in detail identified leaders in relation to the field and to predict its further development.

1 Data and methods

For the purpose of this paper, a data set will be created, which will include the complete data of the financial statements of 12,584 companies that were active in the Czech Republic in 2016. They are therefore entities whose predominant activity is classified in Section F of CZ-NACE Branch Classification of Economic Activities. The set of companies will be generated from the Albertina database of Bisnode. The data will be written to a table in Excel. Each line will contain data entries of the financial statements of a particular company that will be identified by name and identification number. Data entries of companies that did not perform their core business activity throughout the reporting period will be removed. Columns of data that do not show any spread were also excluded.

The file will then be subjected to cluster analysis using Kohonen networks. Kohonen networks are a great way to distinguish, recognize and sort unknown signals and data. They themselves recognize the same elements or, conversely, the differences between the signals. During learning, the network itself finds common features and differences in which it decides.

It is a very popular neural network. A number of authors consider it more effective than traditional cluster analyses, etc. It is also very useful for identifying industry leaders. For cluster analysis, Dell's Statistica software will be used in version 12. Data Mining module will be used as a specific Neural Network tool. Here we select neural networks without a teacher – Kohonen's networks. We then specify data for analysis – select a table with the data set from Excel. In all cases, these are continuous predictors. The file will be divided into three parts: 1. Training Data Set: Represents 70% of companies in the set. Kohonen's network will be created on this dataset. 2. Testing Data Set: This is 15% of the companies from the original set. Using this data set, we verify the parameters of the Kohonen network. 3. Validation dataset: This will also be 15% of companies from the original file. Using this dataset, we will also test the Kohonen network to see whether it is usable or not.

We determine the topological length and the topological width of the Kohonen map at 10. The number of iterations of the calculation, will be set at 10,000. However, let us recall that the level of error is decisive. If there is no further iteration to improve the Kohonen network parameters, the training will be terminated before the 10,000th iteration is performed. If the network parameters are improved even at 10,000 iterations, we need to repeat the process and set the higher value of the iterations needed to make sure the result is the best possible. The learning speed will initially be set to 0.1, at the end to 0.02.

The results, i.e. the division of individual companies into clusters of 100, will be imported into the Excel spreadsheet again. Subsequently, the individual clusters will be subjected to an analysis of the absolute indicators. At this point, it is necessary to answer the question of how we should define the leader of the field. We can select a variety of variables. We include these variables: 1. Volume of assets, 2. Volume of fixed assets, 3. Amount of operating profit or loss, 4. Amount of profit before tax. Then we have to determine whether we are going to look for clusters that show significantly high absolute values of selected variables or, on the contrary, we will look for clusters that have the highest values on average. In the framework of the analysis we will examine both the average values of the individual clusters and the absolute variables. This will determine: 1. the most successful clusters of companies in the construction industry, 2. the most successful companies in the construction industry.

In the case of the analysis of absolute indicators, we will also include an evaluation of the return on assets and return on equity. Return on assets expresses an appreciation of the funds contributed to the companies, or clusters of companies. Return on equity, among other things, demonstrates a certain attraction of individual company clusters for potential investors.

2 Results

Based on the applied methodology, clusters were generated. The breakdown of frequency of companies in each cluster of Kohonen maps is shown in Table 1.

Tab. 1: Frequency of companies in individual clusters of Kohonen maps

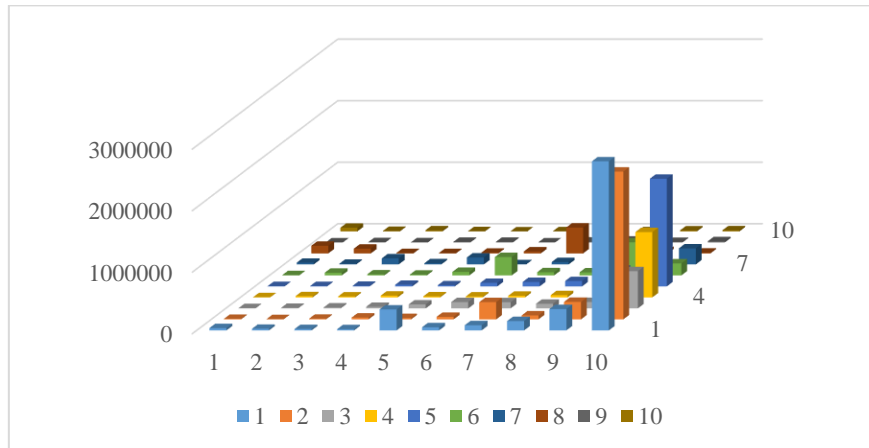
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----|------|-----|-----|-----|-----|-----|-----|----|----|----|
| 1 | 15 | 8 | 23 | 27 | 3 | 19 | 17 | 12 | 3 | 8 |
| 2 | 32 | 41 | 52 | 24 | 39 | 16 | 8 | 7 | 9 | 4 |
| 3 | 54 | 24 | 10 | 20 | 19 | 20 | 18 | 18 | 5 | 7 |
| 4 | 107 | 23 | 9 | 44 | 7 | 4 | 13 | 4 | 4 | 4 |
| 5 | 127 | 122 | 12 | 10 | 9 | 10 | 3 | 9 | 9 | 2 |
| 6 | 959 | 29 | 19 | 34 | 25 | 15 | 10 | 6 | 11 | 6 |
| 7 | 149 | 13 | 17 | 50 | 36 | 7 | 7 | 6 | 15 | 1 |
| 8 | 5 | 5 | 10 | 76 | 13 | 12 | 2 | 57 | 5 | 1 |
| 9 | 7245 | 9 | 259 | 52 | 57 | 323 | 42 | 21 | 37 | 14 |
| 10 | 24 | 97 | 48 | 351 | 898 | 167 | 124 | 86 | 25 | 10 |

Source: Authors.

The table shows that the largest number of companies is in the cluster number (9, 1). In other clusters, the representation of companies is significantly lower. At the same time, it is worth noting that none of the clusters of the Kohonen map are vacant. We can observe a further analysis of companies operating in the construction industry, or analysis of the construction industry as a whole, from two points of view: 1. By taking the average values of the companies represented in individual clusters: this determines how the clusters are characterized and to what extent they are on average successful in their activities. 2. By looking at absolute values for individual clusters: this will give us information on how clusters affect the future development and success of the construction industry in the Czech Republic.

2.1 Analysis of average values

The first characteristic we have used is the average value of fixed assets of enterprises in the same cluster (Figure 1).

Fig. 1: Average value of fixed assets of companies in individual clusters


Source: Authors.

In practice, there is a marginal rate of substitution of capital for work, i.e. fixed assets for workers. We can say that enterprises with a large volume of fixed assets realize a large volume of orders with a lower number of employees. To some extent, the volume of fixed assets can predict the volume of realized revenue from own business activity. However, we assume that these are assets necessary for operation. In the case of construction companies, we identify 3 clusters that have a very high volume of fixed assets³⁸. These are clusters (1, 10), (2, 10) and (5, 10). They are followed by three clusters with a lower, but still above average, volume of used fixed assets – (4, 10), (6, 9) and (3, 10).

Total assets of the average company in individual clusters, average operating profit or loss and average profit before tax of individual clusters were also used.

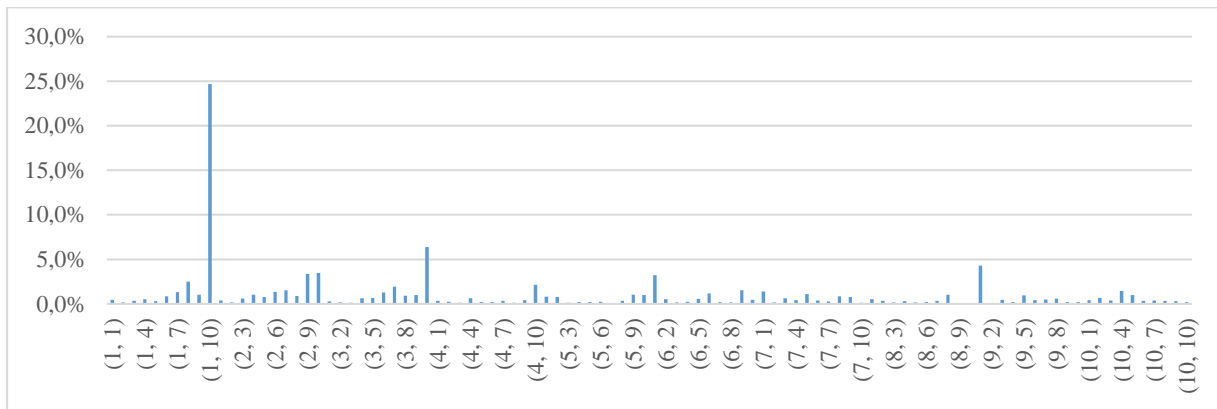
2.2 Analysis of absolute indicators

As stated above, the analysis of absolute indicators reveals to what extent are individual clusters of companies important for the whole building industry sector in the Czech Republic. We analysed the same quantities as in the case of average values. The absolute amount of long-term assets owned by companies belonging to the same cluster was presented.

The largest volume of assets is owned by companies in cluster (1, 10). Then there are clusters (3, 10), (2, 10), (2, 9), (6, 1) and (9, 1). It is interesting to add information on the share of individual clusters on the volume of owned assets (Figure 2).

³⁸ All financial data entries in this contribution are stated in thousands of CZK.

Fig. 2: Share of the individual clusters on the volume of the owned assets

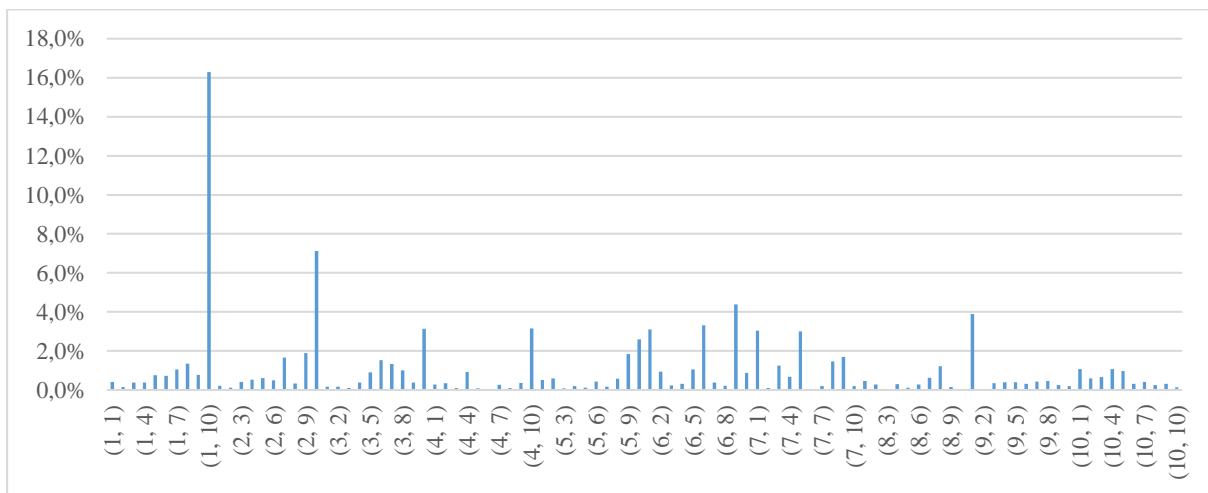


Source: Authors.

The figure shows that the companies in cluster (1, 10) own almost 25% of the assets in the construction industry. The companies of cluster (3, 10) own approximately 7% of the property of the construction industry. Finally, we will also list the cluster (9, 1), which owns almost 5% of all assets of the construction industry in the Czech Republic.

The second examined variable was fixed assets. Relative comparisons of companies – a share in the total owned volume of fixed assets in the construction industry (Figure 3).

Fig. 3: Share of individual clusters on ownership of fixed assets in the construction industry

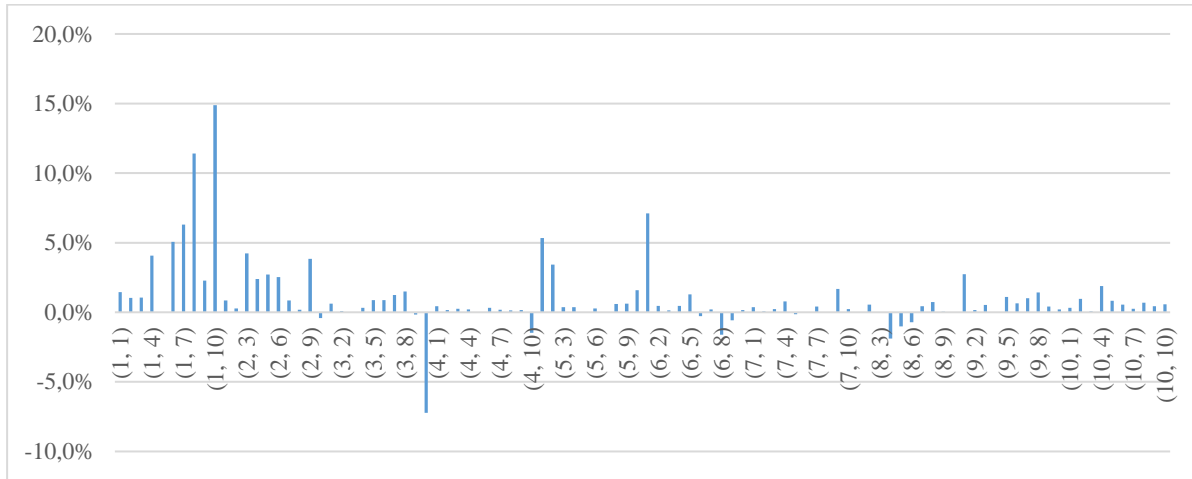


Source: Authors.

The graph in Figure 3 tells us that the cluster (1, 10) owns more than 16% of the fixed assets used in the construction industry. The next 7% is owned by companies of the cluster (2, 10). The value of about 4% is also achieved by clusters (6, 9) and (9, 1).

Figure 4 shows a comparison of absolute operating results.

Fig. 4: Share of the individual clusters on the volume of the realized operating result

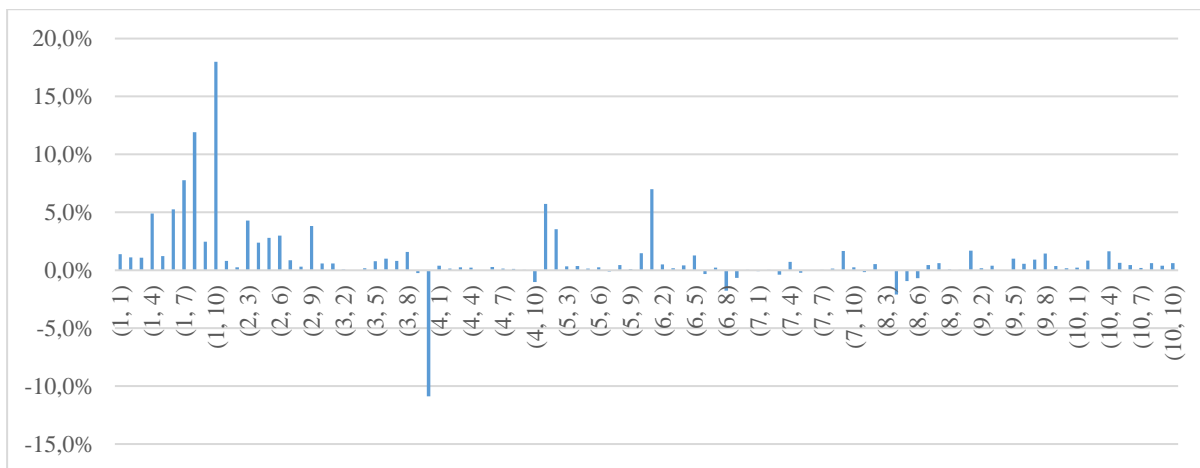


Source: Authors.

Figure 4 confirms the dominance of clusters (1, 10) and (1, 8). At the same time, it declares the very poor results of the cluster (3, 10), which accounts for even less than – 7% of the operating profit of the construction industry.

The graph in Figure 5 provides information on the volume of the realized profit before tax for individual clusters.

Fig. 5: The share of individual clusters in the volume of the realized profit before tax



Source: Authors.

The cluster (1, 10) accounts for approximately 18% of the profit before tax of the entire construction industry. Very much above-average is also the cluster (1, 8). The other three clusters range from 5 to 10%, namely (1, 7), (5, 1) and (6, 1).

3 Discussion

Analyses made clearly indicate that the most important cluster in the construction industry is cluster (1, 10). This cluster is made up of only eight companies. Nevertheless, it displays the highest volume of assets, long-term assets and generates high profit margins and profit before tax. Considering that only 8 companies are included in the cluster, the cluster (1, 10) shows a perfectly excellent average value. Thus we can summarize – the most successful building industry companies belong to the cluster (1, 10) and the cluster (1, 10) is the most significant cluster of the whole building industry in the Czech Republic.

Let's recall that in the construction industry, a total of 12,584 companies were active in 2016. If we take into account all the analyses performed, we can say that industry leaders are representatives of clusters (1, 10), (1, 9), (1, 8), (1, 7) and (1, 6). We ranked the cluster (1, 9) in terms of its results, which is based on the number of companies it contains, i.e. only 3. Table number 2 contains an overall summary of the most successful clusters.

Tab. 2: Leaders of the Czech Construction Industry in 2016

| Line description | No. of companies in cluster | Fixed assets | Total assets | Operating profit or loss | Operating profit before tax |
|------------------|-----------------------------|-----------------|------------------|--------------------------|-----------------------------|
| (1, 6) | 19 | 970687 | 3501155 | 899343 | 873639 |
| (1, 7) | 17 | 1411794 | 5515120 | 1119410 | 1293406 |
| (1, 8) | 12 | 1820242 | 10507121 | 2025302 | 1986324 |
| (1, 9) | 3 | 1040814 | 4310659 | 404757 | 411301 |
| (1, 10) | 8 | 21984086 | 103586832 | 2639167 | 2999611 |
| Overall | 59 | 27227623 | 127420887 | 7087979 | 7564281 |
| % of overall | 0.47% | 20.19% | 30.37% | 39.96% | 45.40% |

Source: Authors.

The identified group of leaders of the construction industry consists of 59 companies out of a total of 12,584. This represents 0.47% of all companies that were active in the sector during the period under review. These 59 companies own 20.19% of all fixed assets allocated to the construction industry. At the same time, they own 30.37% of all assets that are concentrated in the industry. 59 enterprises generate a total of 39.96% of the operating result of

the whole industry, which results in 45.4% of the profit before tax of the entire construction industry in the Czech Republic

Conclusion

The aim of the paper was to analyse the construction industry in the Czech Republic using the Kohonen Networks. In the analysis, the leaders of the field were supposed to be identified. The leaders generate the most of the added value of the industry, and thus they highly contribute to the growth of the economy. The aim of the paper was fulfilled. A cluster analysis was performed using Kohonen networks. 12,854 companies active in the construction industry in 2016 were included in 100 clusters (Kohonen's map was predefined by a 10 x 10 topology grid). All clusters were analysed. The most crowded cluster was cluster (9, 1). Nevertheless, this cluster can't be considered essential for the development of the construction industry in the Czech Republic. Conversely, the construction industry is largely impacted by companies in cluster (1, 10). Only 8 companies are included in this cluster. Nevertheless, their average values significantly outstrip all the other companies operating in the sector. Also, the absolute figures exceed all other clusters. Still, there are other clusters that have a considerable impact on the development of the construction industry in the Czech Republic. These are clusters (1, 9), (1, 8), (1, 7) and (1, 6). Overall, we can label 59 companies as leaders in the construction industry.

We can say that a relatively small group of companies has a very high impact on the development of the construction industry. If we consider further, we can say that this group has a major impact on the development of the entire national economy. This is due to the nature of the construction industry. First it identifies a change in the economic cycle of the national economy. It relatively reliably indicates the coming of a crisis, or an economic boom. Based on the result, we can deduce that the future development of the construction industry can be predicted based on the results of 59 enterprises. Other enterprises, due to their number and due to their partial minor influence on the development of the sector, create some underlying phenomena that will not change in cluster form. As a predictive tool, the analysis of 59 enterprises is very positive. What is negative, however, is that the fluctuations in outputs (caused by whichever reason) may result in a fluctuation in the entire branch of the national economy.

Identified field leaders influence the development of the construction industry in the Czech Republic. Entrepreneurship in this area is therefore dependent on these companies. The answer to the research question is yes - by means of artificial intelligence, it is possible to identify industry leaders and identify their position and impact on the whole industry. However, there is a need for further lead-oriented research. Their global impact on the construction industry in the Czech Republic will be of great importance. Therefore, further research should be directed in several ways:

1. We should verify whether the representation of companies in individual clusters will change over time, especially in the clusters of the building industry leaders (both in numbers and in the form of specific companies - especially in the case of cluster (1, 10)).
2. We should verify the ability to predict the development of the construction industry based on the analysis of the leaders of the construction industry.
3. We should verify how the possible fluctuations in leaders' results influenced the development of the construction industry (especially with emphasis on the cluster (1, 10)).

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CSR OF THE CITY-FORMING ENTERPRISES OF NUCLEAR INDUSTRY IN RUSSIAN MONOCITIES

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Abstract

Purpose: The purpose of this article is to analyze the influence of the atomic industry enterprises of the Russian Federation on the development of single-industry towns as part of the implementation of corporate social responsibility.

Design/methodology/approach: In this article, the authors rely on the provisions of the concept of corporate social responsibility and the concept of "single-industry cities". The study involves the use of methods for the thematic analysis of theoretical and regulatory documents, as well as a method for analyzing statistical data on the implementation of certain areas of corporate social responsibility of the city-forming enterprises of the Rosatom state corporation. The article uses data on 20 mono-cities in which the city-forming enterprises of the nuclear industry of the Russian Federation are located.

Findings: The authors conclude that the construction of atomic industry enterprises in the territory of the Russian Federation was often associated with the formation. A specific feature of these single-industry towns is their closed nature due to the strategic or defensive nature of these enterprises, for example, nuclear power plants. These enterprises remain for single-industry towns the only large business and, accordingly, a source of local budget revenues, as well as jobs. Rosatom has a single CSR policy for all enterprises. At the same time, each city-forming enterprise takes part in the life of single-industry towns in accordance with local needs.

Research/practical implications: We have considered how a social infrastructure is being created, the development of the territory and its human potential is taking place thanks to the activities of the town-forming enterprises of the nuclear industry.

Originality/value: The article makes a scientific contribution to the study of the role of city-forming enterprises in the single-industry towns of the Russian Federation.

Keywords: Single-Industry City, Corporate Social Responsibility, City-Forming Enterprise, Nuclear Industry

JEL Codes: M14, L25, Q56

Introduction

Social functions of business are the most important element of the development of the modern state and society. Attention to the issues of social responsibility of business is actively attracted due to the high degree of economic development of the leading countries of the world (creating comfortable conditions and ensuring social standards for citizens), enhancing the role of intangible factors of economic growth (investment in human, intellectual capital), revising traditional views on the concept of social policy in the direction of expanding the range of its subjects and a significant reduction in state intervention (in Russia). In the Russian Federation, the platform for the formation of corporate policy and practice for the purpose of business development on the basis of effective stakeholder engagement, is the Social Charter of Russian Business adopted in 2007. As noted by a number of authors, large enterprises, corporations, organizations with state participation take the most active part in CSR (Li & Belal, 2018; Sánchez et al, 2017). Many Russian corporations have already begun to introduce the principles of social responsibility in production and business activities. However, they use them exclusively for personal purposes, and not in the public interest. But there are quite a few companies that have realized the effectiveness of a systemic social policy. The largest of them spend up to 17% on social purposes (Zudin, 2005). A significant role in the development of the municipal territory, in ensuring the reproduction of human capital, in maintaining a sustainable quality of life is played by the so-called city-forming enterprises in single-industry towns. Single-industry cities (monocity) are one of the most important areas of social policy and business responsibility policy in Russia after 1991, which could only be tackled in the first decade of the new century. The monocity, as is known, is understood to be the municipality, in the development of which the decisive role is played by enterprises of the city-forming complex (Maslova, 2011). In turn, the enterprise provides the population with all necessary social benefits, housing, utilities, etc. In the Russian Federation, a significant part of the population (about 16 million people, which exceeds 10% of the country's population) lives in single-industry towns, which are significantly dependent on the functioning and development of city-forming enterprises. In this regard, the problem of conducting a socially oriented business by city-forming enterprises becomes relevant and most significant for modern society, as their activities directly affect the comfort of living in a single-industry city. In municipalities, whose economy is single-industry, there is a shortage of its own budgetary funds, which impedes the sustainable development of the territory (Trifanov & Lobanov, 2007). The need for interaction between the city and the city-forming enterprise is unambiguous. The problem of interaction

is included in the priority directions of the state policy, as in the Concept of the long-term socio-economic development of the Russian Federation until 2020, one of the strategic guidelines for the long-term socio-economic development is the interaction of the state, private business and society as subjects of innovative development.

1 Theoretical and methodological foundations of the study of CSR in single-industry cities

Despite the urgency of the phenomenon of corporate social responsibility, not only in Russia, but also in countries around the world, there is still no clear interpretation of it. The Russian standard GOST R ISO 26000-2012 “Guide to Social Responsibility” means CSR “the responsibility of organizations for the impact of its decisions and activities on society and the environment through transparent and ethical behavior that promotes sustainable development, including the health and well-being of society; takes into account the expectations of interested parties; complies with applicable law and is consistent with international standards of conduct; integrated into the activities of the entire organization and applied in its relationships” (GOST R ISO, 2012).

Pershina and Gogoleva believe that CSR is a concept whereby a company takes into account the interests of society and takes responsibility for the impact of its activities on customers, consumers, workers, suppliers, shareholders, local communities and other stakeholders, as well as on the environment (Pershina & Gogoleva, 2016).

As Perekrestov, Povarich, & Shabashev (2011) note, representatives of Russian business include socially responsible behavior in making profits, paying taxes and providing jobs, supporting social programs, acting within the law, establishing higher (compared to legislation) standards of behavior, support for the development of society as a whole (Perekrestov, Povarich & Shabashev, 2011). In the most complete form, information on corporate responsibility issues is disclosed by corporate non-financial reports reflecting economic, social, and environmental performance in their unity (Charumathi & Padmaja, 2018).

Social responsibility programs largely depend on the size and nature of the organization’s activities. Some authors indicate that companies operating in the most dynamically developing industries are more involved in CSR (Pan, Chen & Ning, 2018). In large Russian companies, there is a practice of supporting territories of presence, which, among other things, implies interaction with regional and local authorities. For each company,

the forms of business participation in the socio-economic development of the territories may be different depending on the tasks of the companies to support the territories and on the amount of funds allocated. Of particular importance is the support of the territories of presence for single-industry territories. Other authors (Borges, 2018) believe that in areas where large companies have a great influence on the economy, politics and the environment, they should be held accountable for their actions.

In the Russian Federation, historically, the development of cities took place after the creation of large enterprises, since it was the need for workers to settle nearby that determined this trend. Drugova and Tikhonova (2017) believe that the distribution of productive forces contributed to the emergence of such “monocities”. The government of the Russian Federation has identified a set of formal characteristics of single-industry municipalities (single-industry cities): the status of a city district or city settlement with a population of more than 3 thousand people; the share of the economically active population employed in one of the organizations (or several interrelated organizations) must be at least 20%; The profile of these organizations should be associated with the extraction of minerals (except oil and gas), the production or processing of industrial products.

The peculiarity of one-industry cities is that their economic and social activities are directly dependent on the city-forming enterprises. The Federal Law of the Russian Federation No. 127-FL dated October 26, 2002 “On Insolvency (Bankruptcy)” provides the concept of a “city-forming organization”, which means a legal entity whose number of employees is at least twenty-five percent of the working population of the city. According to various estimates, their contribution to GDP is at the level of 20-40%. Single-industry enterprises account for 64% of oil production and 83% of gas production (Zaretskaya & Udovichenko, 2016).

A single-industry city is a complex system in which two actors interact: the city and the city-forming enterprise. In connection with this dependence, the authors consider the town-forming enterprise in conjunction with the settlement in which it is located, taking into account the welfare of the population living in it. Often, the yield of these single-industry cities is extremely low, especially if the local economy is represented by one or several industries (Trifonov & Loyko & others, 2017).

A city-forming enterprise can be defined as the core of an economic system of a territory, whose unique position not only ensures the dynamics of its development, but also acts as a source of some abuses, as well as a source of risks (Matyugina & Yarushkina, 2015). In the current economic situation, city-forming enterprises can stimulate the economic activity

of a territory or citizens, be an important economic subject of the city, and influence the well-being of the population. These enterprises are the basis for the formation of local and regional budgets; they account for about 40% of the total RF GRP (Drugova & Tikhonova, 2017).

We observe that a crisis phenomenon at a city-forming enterprise primarily entails a reduction in tax payments to the budget, a reduction in the number of employees and, consequently, an increase in unemployment and social tension, a decrease in the standard of living of the enterprise's employees and, accordingly, their solvency. Reduced purchasing power, in turn, has a negative impact on the development of small businesses. Not only owners and workers are interested in the effective functioning of large enterprises, but also municipal authorities, since this is more a condition for the development of the socio-economic sphere of the municipality. City-forming enterprises include a hidden threat to the population and municipal authorities, since they have leverage in the form of tax payments to the municipal budget, make significant financial investments in the development of the social sphere of this territory, and the leaders of city-forming enterprises have the opportunity to lobby their interests, which are unprofitable. An analysis of the situation in single-industry settlements allows us to twist a number of regularities: the prevalence of actual unemployment over official unemployment; excessive number of personnel at city-forming enterprises; limited employment opportunities; youth unemployment. The influence of city-forming enterprises on the development of the city to a large extent depends on their participation in the functioning of socially oriented municipal institutions. The regulatory function of local authorities is to ensure the effectiveness of the organization through the use of tools for the operational development of large city-forming enterprises.

In line with this, CSR of city-forming enterprises can be understood as a concept of an organization, within which an enterprise takes responsibility for the influence of its activities not only on suppliers and shareholders, but also on the entire population of the city as a whole, and on the competitiveness of the city based on competitiveness. the enterprise itself (Pershina & Gogoleva, 2016).

2 Analysis of CSR in Rosatom single-industry cities

To date, in Russia, according to the order of the Government of the Russian Federation, 319 single-industry towns are included in the list of single-industry municipalities. They have 14 million people, almost a tenth of the country's population (Berdnikov & Vakhtina, 2017). Single-industry towns are divided into three groups: with the most difficult socio-economic

situation (100 municipalities), with the risk of deterioration of the socio-economic situation (148) and with a stable socio-economic situation (71). The problem of single-industry towns is also related to the fact that they often have a special administrative status – closed administrative-territorial units (CATU). This complicates the access to the territory of the CATU of labor resources, as well as investment, which generally affects the sustainable development of the economy of these cities.

In 20 single-industry towns of the Russian Federation, an atomic complex enterprise, the state-owned company Rosatom, acts as the city-forming one. 10 cities of them have the status of CATU. These are mainly small and medium-sized cities (only in two of them the population exceeds 100 thousand people).

The Russian State Atomic Energy Corporation “Rosatom” was established on December 18, 2007 on the basis of enterprises of the Ministry of Atomic Energy of the Russian Federation. The state corporation unites about 400 enterprises and organizations, including the world's only atomic icebreaking fleet. They employ a total of about 250 thousand people. Rosatom is one of the global technological leaders, possessing the resources and competencies for successful activity in all parts of the industrial chain of nuclear energy. The state corporation in 2017 provided 18.9% of the total electricity generation in the country; ranks 1st in the world in the largest portfolio of foreign projects (33 units in 12 countries); 2 place in the world in terms of uranium reserves and 4 place in terms of its production. The state corporation provides 16% of the nuclear fuel market.

There are two main areas of Rosatom activity in the areas of presence within the framework of CSR. The first is associated with the socio-economic development of company towns. First of all, this is the deduction of taxes in the revenue parts of the budgets of municipalities. So, if in 2014, 0.9 billion rubles was paid to local budgets. taxes, then in 2016 only 0.6 billion rubles, and in 2017 - 0.7 billion rubles. A priority for Rosatom is the creation of new jobs, the modernization of urban infrastructure, and the improvement of urban views. The events were aimed at: the construction and repair of residential buildings and social facilities, such as children's institutions of educational, sports, cultural areas, improvement of household areas and streets, roads; support of small and medium enterprises.

A priority for Rosatom is the creation of new jobs, the modernization of urban infrastructure, and the improvement of urban views. The construction and commissioning of nuclear facilities creates new jobs from local residents living 100 km from the construction site.

In addition, each job at the NPP construction actually contributes to the emergence of another 10–12 jobs in related industries (metallurgy, mechanical engineering, etc.).

Within the framework of this direction, it is important to implement measures for the socio-economic development of the areas of presence within the framework of the agreements of Rosatom State Corporation with the subjects of the Russian Federation. The amount of funding from the budgets of the constituent entities of the Russian Federation for activities implemented under the agreements in 2016 amounted to over 2 billion rubles. The events were aimed, inter alia, at the construction and repair of residential buildings and social facilities (preschool educational institutions, a sports center, a house of culture with a library and a cinema), improvement of home territories and streets, repair of roads and sidewalks, support for small and medium entrepreneurship.

A new opportunity for the socio-economic development of single-industry towns is the creation of advanced development territories (ADT) - economic zones in Russia with favorable tax conditions and simplified administrative procedures for business. 4 nuclear cities have already received such status and at least 7 more plan to do so in the near future. Due to the emergence of ADT, it is planned to create 14.6 thousand high-tech workplaces in the CATU, the volume of investments will be 86 billion rubles, the amount of taxes paid (2018-2026) – 251.8 billion rubles. In 2017, within the framework of the digital transformation of the Russian nuclear industry, the implementation of the Smart City project began. Rosatom State Corporation offers platform solutions for the digital infrastructure of a smart city, including the Digital Municipality management system, as well as individual modular solutions, such as the urban lighting control system and the modernization of the water supply system. In 2017, the city of Sarov became one of the pilot cities; in 2018, it is planned to include other CATUs and cities at nuclear power plants in the project. The eighth year is implemented in 20 cities of the Rosatom School of Rosatom, which oversees a child from kindergarten to admission to the university. The project stimulates the development of human resources. All this allows us to form and retain in the atomic cities a unique cultural and educational environment.

A joint project with the Ministry of Health "Lean Polyclinic" increases the efficiency of health facilities and the general availability of medical care with minimal expenditure of available resources (in 2017, 43 projects were implemented). The implementation of the project made it possible to reduce the waiting time in the queue up to 18 times, to increase the capacity of the clinics by almost 2 times with the same amount of resources (Public, 2017). The program "Rosatom Culture Territory" allows residents of single-industry towns to keep abreast of the

latest culture news, bringing the best examples of modern art to the cities. During the 10 years of the project's existence, 1,200 events were held in 18 cities.

The State Atomic Energy Corporation ROSATOM holds an annual competition of socially useful initiatives by non-profit organizations and combining the applicant company's own funds in the amount of at least 25% of the total project cost. In 2017, 83 projects worth 48 million rubles were implemented. In 2016, Rosatom spent 1078 million rubles on charity, in 2017-1097 million rubles. in areas such as: the preservation of the historical and cultural heritage of Russia; emergency medical care; educational initiatives and support of project activities of educational institutions; initiatives to develop children's and mass amateur sports, promoting a healthy lifestyle; competitions of social and charitable projects; patriotic education and donations for celebrations dedicated to memorable dates; assistance to veterans, disabled people, orphans and people in difficult life situations.

The second important direction of CSR for residents of single-industry towns is their own internal projects of the city-forming enterprises of Rosatom, aimed at developing human potential. The specifics of these enterprises are also manifested in the characteristics of the staff - most of them are men (67%), more than half of the employees have a higher education, more than a third are young people under the age of 35 years. In 2017, the average monthly salary at Rosatom enterprises amounted to 73.6, thousand rubles. per month, which is almost 2 times higher than the average in Russia.

Rosatom is implementing several sectoral programs aimed at developing human potential. For example, a sectoral program for the development of leaders and participants of globalization is being implemented, which is aimed at developing the skills necessary for successful business of a state corporation abroad. The sectoral development program "New Products" is aimed at the formation of market competencies and product launches in the state corporation "Rosatom". The program consists of two areas - "Economics of Design" and "Business Workshop". The purpose of the direction of "Economics of Design" is the development and protection of projects on reducing the cost and improving the quality characteristics of products at the expert council. The purpose of the Business Workshop direction is to prepare participants for the development of new businesses, to initiate and implement projects to bring civilian products to the market. The State Corporation also implements a sectoral program of targeted training for work in international organizations, under which a mechanism for selecting and training Rosatom State Corporation employees and

its organizations to work at the IAEA and the OECD IAE has been created. Rosatom participates in the WorldSkills International movement.

Conclusion

The historically established territorial distribution of industrial enterprises of the nuclear industry on the territory of the Russian Federation led to the emergence of single-industry cities and closed territories. In the changed economic and legal conditions for a single-industry company, the city-forming enterprise continues to constitute a “life support system”. In this regard, mainly city-forming enterprises are trying to support local communities through the implementation of CSR.

Rosatom enterprises are city-forming for 20 single-industry cities. The main areas of CSR atomic industry enterprises are tax deductions to the local budget, the creation of new jobs and the modernization of urban infrastructure, the development of municipal management systems (“smart city” and “digital municipality”), a competition of public initiatives and charitable activities in a wide range of areas. Special attention is paid to the development of the human potential of single-industry cities – these are the projects “Rosatom School”, “Lean Polyclinic”, “Rosatom Culture Territory”. In these territories, in addition to the general CSR policy for the corporation, city-forming enterprises implement additional measures within the framework of CSR. In this regard, the normal functioning of the city-forming enterprises is the key to the development of single-industry towns and the well-being of their people.

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PROSPECTS OF DEVELOPMENT OF INNOVATION CLUSTERS. A CASE OF RUSSIA

Ekaterina Zaitseva – Galina Bannykh – Svetlana Kostina

Abstract

Purpose: The main research objective is the analysis of the features and prospects of the development of innovation clusters in Russia with the participation of universities.

Design/methodology/approach: Case study is the main method to allow the authors to analyse development of innovation clusters in Russia from the role of universities in it point of view (concept of triple helix). Analysis of regulatory documents allowed to determine the legal model of interaction between participants of innovative clusters, analysis of statistical data – to reveal the effectiveness of their functioning.

Findings: The creation of innovation clusters is not a universal mechanism for raising the level of a country's global competitiveness and should occur only with strict control by the state and the mandatory participation of universities, only in those industries and regions where the creation of a cluster may be appropriate. However, only tough measures of state support for the development of clusters are not enough; a transition to a catalytic model of cluster policy is necessary.

Research/practical implications: Most of the innovation clusters in Russia are formed „from above“, they lack the “need from below” and real regionalization and municipalization. For triple helix model it is necessary to solve problems related to increasing the possibilities of civic interaction, enhancing potential through new formats. Communication of the university with the business should be real and expressed in specific orders, common projects and even goals.

Originality/value: Non-participation of the population, spontaneous formation of human potential and the use of universities as a continuation of the vertical of power are features of the situation in the Russian Federation. Understanding and assessing the role of universities in modern cluster and innovation policy of Russia is one of the ways to solve the existing problems of its innovative development.

Keywords: Innovation Cluster, Innovation, University, Triple Helix, Territory Development, Four-Link Helix, New Industrialization

JEL Codes: O52, O3, I25

Introduction

Socio-economic transformations taking place in the modern world and affecting Russia, such as the transition to a new technological order, service and processing economics, significantly transform the roles of the main actors of social space and redistribute their functionality. Innovative development, speaking as a priority of state policy, stimulates both business and society to take action in the modern conditions of new industrialization, in order not to be in the state of the deepest shocks and contradictions. Under these conditions, institutions of higher education should have the leading actors in innovative development, having both tools for educating, educating and encouraging entrepreneurial and innovative activity, and the willingness to carry out this activity. For a long time, it was believed that universities have two key areas of activity - two "missions": education and research. In recent decades, it has become obvious that universities should become "active participants in the processes of economic and cultural development; transform themselves into organizations closely associated with industry and society as a whole" (Andryushkevich & Denisova, 2014). It is important to understand that to implement an innovation model of any type on the territory is, on the one hand, a partnership of science, education, government and business, and on the other, a certain level of development of regional institutions (this partnership is called the triple helix model (Etzkowitz & Leydesdorff, 1998).

1 Theoretical and methodological foundations of the analysis of the role of universities in the prospects for the development of innovative clusters

The main research question, the answer to which is given in this article – what are the features (regional, economic, cultural, political, etc.) of innovation clusters in Russia and how their development is possible with the help of universities. To do this, the authors use the methodology of cluster theory, the concept of "triple helix", the concept of a four-link helix, the theory of innovative development, the concept of "new industrialization". Innovations are considered as a fundamental condition in theories explaining the modern development of society and the economy as a whole. According to the EU definition, innovation is a commercially successful operation of new technologies, ideas and methods through the introduction of new products and technologies or the improvement of old (Report, 1996).

As practice shows, the most important structural element of an innovative economy and innovation system is science (source of innovative ideas), which implies close cooperation with the state and business. A cluster can be recognized as one of the most effective forms of innovation processes. The definition of cluster essence can be found in the works of Porter and Kittels. The classic definition of the cluster concept was given by Porter – this is a geographically concentrated group of interrelated companies, specialized suppliers, service providers, firms in relevant industries, as well as organizations related to their activities (for example, universities, standardization agencies, and trade associations) in certain areas of competing, but at the same time leading collaboration (Porter, 1998). The generic features of clusters are a certain commonality, proximity of cluster members and a certain model of interaction of participants leading to a new qualitative state of this community.

In general, a cluster is a group of organizations that is localized, isolated in one or related industries, operating in conditions of mutual cooperation and internal competition, with a single center and a system of related services. The main goal of the cluster is the most effective realization of the main opportunities in the territory where it is located, by using synergistic effects from the activities of interconnected enterprises. An innovation cluster always acts as a complex community, a network that represents not only an association of enterprises, mainly geographically, but also a large aggregate of various organizations involved in it, as well as external actors that have a significant impact on the cluster as a whole. The innovative potential of the cluster is determined mainly by the network of such organizations and institutions as: universities, academic and industry research institutes, research, design, technological and consulting organizations, educational organizations providing training, retraining and advanced training of personnel, innovative engineering centers (Guzev & Mishura, 2015).

Some authors are actively exploring the phenomenon of the formation and “disintegration” of innovation clusters in Russia (Bek & Bek & Sheresheva & Johnston, 2013), some are wondering about the reality of the created clusters (Esposito, 2012.), others are building a model of their sustainable development (Kutsenko, 2015). In this article, the authors focused on the specifics of the participation and influence of universities on the functioning and development prospects of such clusters in Russia.

Given the above, it is necessary to identify the role of universities in innovation clusters. The study of the role of higher education institutions in the development of clusters began in the late twentieth century and was partially reflected in the works of Itszowitz, Burton and Clark. Based on these studies, the concept of a "triple helix" was formulated. It considers phased

innovative development as a result of the constructive interaction of the scientific and educational complex, business and government (at the national and regional levels). Regional space is considered as a set of state bodies and organizations, private enterprises and scientific institutions (research, entrepreneurial universities) that work together to form an effective innovation structure that ensures the development of innovation activities in the region (Mikhailov, 2016).

The concept of a quadruple helix extends the concept of the triple helix. According to it, along with science, industry and the state, the key role in the innovation process is played by society, which is often the end user of innovations and therefore significantly influences the creation of knowledge and technology through the demand and realization of the user function (Carayannis & Grigoroudis, 2016).

It should be noted that the interest of researchers in the topic of university participation in innovation clusters is increasing. Today, the behavioral approach and the network theory of innovations are used more and more often to analyze, with the help of which it becomes possible to determine the mutual influence of cluster members on each other (Scott, 2019). In the modern conditions of new industrialization, universities and innovations are interconnected, acting as factors of economic development of the territory. Today, open innovation is considered as a necessary condition for the development of universities themselves (Janiunaite, 2016). In the context of growing competition between universities, both for consumers of educational services and financial resources, there is a need to constantly search for additional sources of funding. There is a change in the socio-economic functions of the university. Next to its traditional – educational and scientific – missions, there is a fast-growing sphere of economic activity.

2 Evaluation of the prospects for the development of innovation clusters in Russia

To begin with, let's briefly review the results of the implementation of cluster policy in Russia. The basic basis for the implementation of the cluster policy was established by the Concept of long-term socio-economic development of the Russian Federation for the period up to 2020. In it, clusters are called the key condition for the modernization of the economy.

Currently, the cluster policy in the country is implemented by the efforts of two national departments: the Ministry of Economic Development of the Russian Federation and the Ministry of Industry and Trade of the Russian Federation. Starting from 2010, the Ministry of

Economic Development of Russia, within the framework of the program of support for small and medium-sized ones, has been implementing the practice of providing subsidies to regions for the establishment and operation of cluster development centers (CDCs). CDCs are structures with the participation of government, business, and the public, the purpose of which was to stimulate innovation and cluster activity and initiatives [13]. In the first period of intensification of such activities, 34 CDCs were created, as of 2018, 31 centers of cluster development were functioning.

In 2012, the Ministry of Economic Development of the Russian Federation launched a program to support pilot innovative regional clusters (CTI), which became the first and largest in Russia among similar initiatives. In 2012, 25 innovation territorial clusters were created, the list was later expanded. Today, the list of selected innovation clusters includes 27 regional systems. In 2016, the Ministry launched a priority project “Development of innovative clusters – leaders of world-class investment attractiveness”. Such clusters were formed 11.

After the adoption of the Federal Law “On Industrial Policy in the Russian Federation” in 2014, the creation of industrial clusters began. In 2018, there were 22 industrial clusters, 3 of which are organized on an interregional basis with 531 participants, providing employment for 150,000 people, in which 63% of industrial organizations in Russia are from 20 regions.

As a result, according to the data of the Russian Cluster Observatory, currently 133 innovative clusters are officially registered in Russia, 29 of which are pilot, 9 are included in the list of industrial clusters, 89 clusters are in a state of development (Markov, Kurmashev & Nizkovsky, 2017). On average, there are 1.56 clusters in each region of the Russian Federation. At the same time, the distribution of clusters by region is uneven: the largest number of clusters is present in the Rostov region and St. Petersburg (9 clusters), the Republic of Tatarstan (6 clusters), Moscow, Altai Krai, the Vologda and Voronezh regions (5 clusters), Arkhangelsk, Lipetsk, Novgorod, Penza region (4 clusters).

According to the Ministry of Economic Development of Russia, for the period 2013-2016. regional innovation clusters achieved the following indicators: the volume of output, works and services amounted to 7.39 trillion. rub.; the number of new / upgraded high-performance jobs – 137.4 thousand; the number of those who underwent professional retraining and advanced training as employees of organizations participating in clusters – 55.9 thousand people; the average annual output per employee of the organization participating in the cluster was 2,848.5 thousand rubles; the volume of investments from extra-budgetary sources – 551.64 billion rubles (Abashkin et al., 2017).

Let us turn to the analysis of public policy aimed at attracting universities to participate in clusters. The state program of the Russian Federation “Development of Science and Technology” for 2013–2020 outlines priorities for the development of economic sectors, among which, first and foremost, are scientific and technological issues of innovative development, including the implementation of the triple helix model. The next document was the concept of “National Technology Initiative” in 2015, which also presents the issues of integrating researchers and scientists into the processes of innovative development of the country.

Despite the abundance of legal documents regulating this area, it is necessary to note the differentiation of requirements for cluster members. Pilot CTIs may include enterprises, universities, and scientific organizations, but their mandatory participation is not regulated. Requirements for innovative clusters – leaders of investment attractiveness imply a minimum of 40 participants (export-oriented enterprises, universities, scientific organizations); they also do not stipulate mandatory membership of universities. Industrial clusters must include at least 13 participants, including at least one educational organization.

If we conduct a detailed analysis of the specific features of the implementation of cluster policy in our state, we can single out the following: a rigid organizational structure with a management company (due to the need for financial and tax government support, the structure should be formalized), the minimum participation of small and medium enterprises (due to the impossibility of participation in cluster management), the preferred location of clusters in single-industry towns and regions, the unstable and differentiated role of universities in clusters.

Despite the abundance of regulatory documents governing this area, it is necessary to note the differentiation of requirements for cluster members: as mandatory participants, universities should be included only in industrial clusters, in the rest of them their participation is advisory.

In connection with the fact that universities are an element variable for the structural and functional structure of a cluster, let us try to determine the actual share of university organizations in the composition of innovation clusters (Table 1). As can be seen from the data of Table 2, the number of educational organizations in the cluster participants varies from 1 to 5. At the same time, the share of universities among all participants is very small – from 0.008 to 0.068.

The largest number of universities is represented in the Tomsk Innovation Cluster (5), which, as mentioned above, today belongs to the leaders of innovation and cluster development. In terms of university participation, the leader was the Yenisei Innovation Cluster with

the participation of the Siberian Federal University (participant in the 5-100 project), the Support Regional Engineering and Technical University, the Federal Research Center and the Siberian Fire and Rescue Academy of the State Fire Service of the Emergencies Ministry of Russia, that is, half of the participants have a special status, government support and opportunities for the development of the cluster.

Tab. 1: Analysis of the composition of participants in innovation clusters – leaders of world-class investment attractiveness

| | Cluster name | Number of participants | Number of educational organizations – participants | Share of educational organizations in the number of participants |
|-----|--|------------------------|--|--|
| 1. | Innovative cluster "Pharmaceutics, biotechnology and biomedicine" of the Kaluga region | 63 | 1 | 0.016 |
| 2. | Innovative cluster of the Krasnoyarsk Territory Technopolis "Yenisei" | 59 | 4 | 0.068 |
| 3. | Innovative territorial cluster of mechanical engineering and metalworking of the Lipetsk region "Valley of Mechanical Engineering" | 118 | 1 | 0.008 |
| 4. | Consortium of Innovation Clusters of the Moscow Region | 238 | 2 | 0.008 |
| 5. | Research-and-production cluster "Siberian science of politics" | 246 | 2 | 0.008 |
| 6. | Petrochemical territorial cluster of the Republic of Bashkortostan | 200 | 3 | 0.015 |
| 7. | Innovative cluster of the Republic of Mordovia "Lighting and optoelectronic instrument making" (BRIGHT CITY) | 50 | 2 | 0.04 |
| 8. | Kamsky innovation territorial production cluster of the Republic of Tatarstan | 282 | 3 | 0.01 |
| 9. | Innovative territorial aerospace cluster of the Samara region | 67 | 3 | 0.044 |
| 10. | Innovative territorial cluster "Smart Technologies Tomsk" | 183 | 5 | 0.027 |
| 11. | Innovative cluster of the Ulyanovsk region | 125 | 3 | 0.024 |
| 12. | United Innovation Cluster "Innograd of Science and Technology" | 260 | 4 | 0.015 |

Source: The table is based on the materials of the Russian Cluster Observatory of the Higher School of Economics

A modern efficient university is a university-entrepreneur, not only producing personnel for the economy, but also creating an innovative product that can be implemented. This model was named University 3.0 (Endovitsky & Komendenko, 2016). There are no such universities in the Russian higher education system today.

The reason for the weak participation of universities in innovation clusters is the state of the higher education system of the Russian Federation as a whole. Currently, most of the educational structures do not meet the challenges of our time, are not ready to participate in three-sector interaction, do not meet the needs of the economy as a whole and the labor market in particular, etc. To improve the efficiency of the higher education system, the Russian state in the past decade has taken a number of measures, which, among other things, were aimed at increasing the innovative activity of universities. These include the creation of universities with a special status on a competitive basis, which received additional state financial support.

First, this is the emergence in 2007 of federal universities, one of whose tasks is to ensure the integration of educational and research activities (currently, 10 universities have this status). Secondly, the creation of research universities, which should conduct a wide range of basic and applied research (29 universities for 2018). Thirdly, the formation, starting in 2015, of supporting universities, which should become centers for the regional development of education and science. In 2018, 51 universities in Russia acquired the status of innovation and technology centers in the region. This status implies that universities should become a driver of innovative growth and socio-economic development in their respective regions. However, it has not yet been established how this will be coordinated with the implementation of the cluster policy, what the real mechanisms of interaction between these universities and business will be, that is, it is virtually unknown whether the “triple helix” model will function due to this.

Most Russian universities traditionally interact with commercial enterprises in two directions: training of personnel in relevant specialties and profiles, as well as the implementation of research and development based on contractual activities. However, both in the first and in the second direction, the effectiveness of interaction is rather low: graduates do not meet the requirements of employers or are not ready to work in the specialty or profile for which they received an education; from university studies less than 5% come to implementation, limited to publications and discussions at conferences.

The innovation activity of universities is associated with the creation of small innovative enterprises and is evaluated according to the program for monitoring innovation activity. According to the results of 2016, it turned out that small innovative enterprises in 19 universities out of 40 participating in the 5-100 project do not bring any income to the organization; in the rest, the income does not exceed an average of 386,000 rubles a year, and most of this income formed by contracts with the university itself (Abashkin et al., 2017). 12 universities do not participate in cluster activity in general, without having the opportunity to influence socio-economic development as a whole.

Restrictions are the regulatory lack of preparedness to interact with business (at the level of taxation, forms of communication, etc.), an absolutely mismatched model of training (which leads to an imbalance in the labor market, training of specialists who are unclaimed there, and universities cannot even provide even themselves, not to mention the region), the financial capacity of universities and the economic policy of the state, the lack of a coherent overall integrated development strategy universities, territory and business.

Conclusion

The authors of the study agree that cluster theory, with all its advantages, is not a universal recipe for increasing the country's global competitiveness and should be used only with strict government control and only in those industries and regions where the creation of a cluster may be appropriate (Lindqvist, Ketels & Sölvell, 2013).

In developed countries, the main resource-forming sectors of the economy are covered by clustering and are covered "by all means" (up to 300 clusters per state), while the formation of clusters was caused by certain economic challenges to large business entities. Therefore, the emergence of clusters was due to the actions of commercial enterprises, which, realizing the impossibility of acting "blindly" and calculating the economic effect, consciously turned to educational and scientific institutions to solve common problems and move toward common goals. At the same time, it should be noted that, on a global scale, innovation clusters are not developing universally: there is no common model, template, standard. In one case, innovation clusters with the participation of universities become mega-efficient (Silicon Valley in the USA), in the other – they do not bring any effect in the development of business, government or society. (Engel, 2015). Many organizations and enterprises participating in innovative clusters strive for simple and applied research, which will bring profit in the short term and help

to understand and form the social and scientific capital of functioning, reducing the role of universities to less significant and commercially oriented.

Certainly, the participation of educational and scientific organizations in innovative economic activities depends on the system of financing research. Today, the catalytic financing model dominates in the field of technological research, in which the state actually only creates platforms for cluster members, without being actively involved in regulation or funding (Enright, 2000). In this regard, indicative is, for example, the experience of Sweden, where, as a result of interaction between government, business and academic organizations, research financing was reformed, which led to recognition of the commercial potential and social significance of research (Benner & Sandstrom, 2000).

Mechanisms to support the development of clusters in Russia envisage the use of most of the measures taken abroad, however, despite measures of state support for innovation, it should be noted that the mutual participation scheme, promoting the development of regions of the Russian Federation according to the triple helix model in the classical sense, does not work innovative relationships are carried out with great difficulty. According to this scheme, the university should be a think-tank, an engine of the innovation process, a business – customer of innovations, carry out their commercialization, and power – an auxiliary tool promoting the normal implementation of innovation processes. In practice, it turns out the other way around – power is the main tool that influences both universities and enterprises, and how effective the power is, how strong these interrelations are, it can be said that the conditions of the region promote innovation or, on the contrary, are anti-innovation. Russia maintains an approach in which state support plays a significant role in the development of innovative clusters, including the participation of universities in them. However, this model does not bring any significant effect. The transition to a supporting cluster policy (with the active participation of the private sector, the media and the public), and subsequently to the catalytic one, will be a strategic guideline in the development of innovation clusters with the participation of universities in Russia.

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EXPLORE ENTREPRENEUR'S PERSONAL VERY FIRST EXPORT DECISION BASED ON BOUNDED RATIONALITY

Yi Zhang – Utz Dornberger

Abstract

Purpose: This exploratory research first anatomizes entrepreneur's *personal very first* export decision processes. Major export decisions (MEDs) are treated as the basic components of the decision process. The second step is to find out possible differences between first export decisions and subsequent export decisions with respect to the sequence and frequency of MEDs.

Design/methodology/approach: We apply an in-depth case study approach. The data of decision processes of three entrepreneurs in different industries was collected through semi-structured interviews in 2017 and 2018. We applied a method to support interviewees' recall processes. Information related to MEDs was extracted to form the process data. We compared the sequence and frequency of MEDs in our cases with previous research conclusions.

Findings: First, in all cases, there is at least one MED, which was made more than once in the decision process. Second, none of the interviewed entrepreneurs had made the choice of local representative. Third, although the export-production decision was not treated as MEDs by the previous study, all interviewed entrepreneurs have expressed its importance. Without it the first exports could not have been done. Our findings complement previous research conclusions.

Research/practical implications: Entrepreneur's first export decision is unique. It influences subsequent internationalization behaviours. Future researches and policymakers should pay special attention to it. Instead of focusing on a single MED, future studies and export promotion programs should apply a holistic approach to study and practically support the complete decision process that contains many MEDs, so that decision-makers can carry the export process through to the end. Future scholarly works are needed to explore the cognitive process of reaching those MEDs in real-life to develop methods to support the decision-making process.

Originality/value: The unit of analysis of our study is entrepreneur's complete personal first export decision process. Based on bounded rationality, it is necessary to study export decisions on the individual level.

Keywords: Export Decision, Entrepreneur, Bounded Rationality, Entrepreneurship, Export Behaviour

JEL Codes: D03, E71, L26

Introduction

The internationalization decision-making literature has overlooked individuals' strategic decision-making (Andersson, 2000). Andersson and Florén (2008) even pointed out that there is no study, which concentrates on the behaviour of managers in SME internationalization. In addition, Calof (1993) and Liesch, et al, (2002) mentioned that little is known about the *real-life process* of how firm internationalize. Besides, Maitland and Sammartino (2015) mentioned that, although the literature has shown that individuals play an important role in strategic decisions and firm performance, those leading internationalization models have ignored the individual manager, which hinders the research in internationalization:

This (the ignorance of individual unit of analysis) contributes to IB (international business research) 's difficulties in delineating internationalization performance effects and the divergence between predicted and revealed internationalization choices. We contend these difficulties stem from the specification of knowledge and experience as firm-level drivers of heterogeneity in internationalization and performance, without explicit modelling of their micro-foundations in individual-level cognition. (p. 734)

In spite of the central role of rationality in decision-making (Francioni, et al, 2015:2228) as well as the necessity of studying individual-level cognition, Aharoni, et al., (2011) concluded in their forty-five-year retrospective of managerial decision-making in international business that, existing research models either are dominated by the assumptions of rational decision or omit decision-maker:

Despite the rich findings of behavioural economics, researchers often overlooked these findings by assuming perfect rationality in their models. (P. 138)

To this end, our research focuses on the individual cognition, to be specific, entrepreneur's export decision process *per se*. This study is also based on Styles and Ambler (1994) 's definition of export decision. Styles and Ambler (1994) mentioned that an usual export decision process consists of seven MEDs, which are 1) decision (whether or not) to export, 2) choice of export market, 3) choice of export product, 4) product strategy, 5) choice of local representative, 6) product pricing, and 7) method of distribution. Styles and Ambler (1994) also found that those MEDs appeared *once* but in different sequences in the export decision processes of export decision-makers. Theoretically, it could be highly complicated even to make only one of those MEDs. For example, decision to export could be influenced by as many as 40 factors (Leonidou, et al, 2007). Our interest is not what could influence those MEDs and then define how the best decision should look like. Instead, we concentrate on

the anatomy of the first personal export decision processes of entrepreneurs. The purpose is to find out whether and how personal first export decision is different from subsequent export decision.

1 Literature review

Previous literature shows that the decision-makers play a critical role in the internationalization of firms. Bilkey (1978) concluded that, a firm's top management member, who is interested in and enthusiastic about exporting, contributes to the initiation of export positively. Andersson (2000) also mentioned that entrepreneurs' intentions and persistence in carrying out different strategies are decisive for the firms' early internationalization. Besides, Reid (1981) pointed out that the decision-maker is primary determinants in firms engaging in international activity. Similarly, Miesenbock (1988) regards decision-maker of the firm as the key variable in small business internationalization. In addition, Michael and Araujo (1985) concluded that policymaker's target should be those decision-makers in individual firms. Last but importantly, Abdul-Aziz and Wong (2010) found that entrepreneurs' decision plays an important role in their firms' internationalization.

On the other side, according to Simon (1997), human decisions are bounded-rational. An economic man has access to perfect information, and he will choose the rational solution. Simon rejected the idea of economic man. Instead, he contended the bounded rationality because it is impossible for an individual to be omniscient to make a perfect rational decision (Simon, 1997). Previous literature also shows that bounded rationality fit with empirical findings concerning export and internationalization processes very well (Madsen, 2005). For example, Cavusgil and Godiwalla (1982) mentioned that fully rational decision-making in the wake of all relevant information is not the typical mode of international decision-making process. Bilkey (1985) also found that the export decision-makers had extreme imperfect information. Meanwhile, empirical international decision-making process studies have provided only minimal support for a rational decision-making process (Calof, 1993:98; Welch and Wiedersheim-Paul, 1980:334). Andersson (2000) mentioned that various decision-makers can make different strategic decisions in the same situation. In addition, Andersson (2000), Madsen (2005) as well as Maitland and Sammartino (2015) pointed out that a theoretical foundation of Johanson and Vahlne (2009)'s Uppsala internationalization model is actually bounded rationality, although their model did not include the importance of individual actors and whether/how decision-makers' cognitively constrained processes shape firms'

internationalization (Maitland and Sammartino, 2015). Specially, Liu, et al (2008) proposed to use bounded rationality to interpret the unique internationalization patterns of Chinese private-owned firms.

If individual decision is bounded rational, it becomes critical to analyse individuals' decision processes. Andersson (2000) pointed out that, under the assumption that the decision-maker is rational, the differences of levels of aggregation in analysing internationalization processes, the individual actors' level, the firm level, and the firm's environment level, become unimportant because the decision-makers is rational and he will make the optimal choice in different situations. However, according to Simon (1997), human decisions are bounded-rational, which means that the decisions of individuals cannot be optimal according to the situations of the firm. Therefore, it becomes critical to distinguish the individual level analysis from firm level or the firm's environment level because individual decision is different from the optimal decision that perfectly reflects the situations of firm and firm environment (Andersson, 2000). Gray (1997) made this differentiation, in which he appealed that export promotion programs should target the needs of individual decision-makers, rather than organizations that employ them.

There is also a need to understand the export decision in the context of Chinese SMEs for three reasons. First, export is a dominant mode of internationalization of Chinese SMEs (Loane and Bell, 2011:22). Second, the export of Chinese SMEs contributes to China's total export significantly (Cardoza and Fornes, 2013). Third, very little has been known in terms of how Chinese SMEs export because only a few scholarly research has been conducted, which leads up to a huge gap in the academic literature (Cardoza and Fornes, 2013).

This research chooses to analyse the export decisions of entrepreneurs of Zhejiang private firms. The first reason is that Zhejiang province is renowned for its private owned business. It has thousand years of business cultural tradition and many export-oriented companies concentrate in this province (Andersson, et al. 2015). Second, in the recent years, the export of Zhejiang private enterprises became increasingly important for its economy. The share of export of private owned enterprises in Zhejiang's total export grew continuously from 54.3% in 2011 to 74.1% in 2017 (Zhejiang Provincial Bureau of Statistics, 2018). Finally yet importantly, Hu (2010) pointed out that private SMEs are the main force of Zhejiang's internationalization.

2 Method

This research applies the qualitative approach. The reason is that there is a lack of knowledge of the decision process of individuals making MEDs, especially in the Chinese cultural context. In-depth semi-structured interviews were conducted to explore the hidden characteristics of those individual inner thinking and logic processes. The unit of analysis is the complete *personal very first* export decision processes of entrepreneurs of Zhejiang private-owned MSEs³⁹.

3 Backgrounds of the cases

The case firms were in completely different industries when interviewed entrepreneurs made their personal first export decisions. Entrepreneur A produced meat-processing machinery. Entrepreneur B was specialised in costume. Entrepreneur C designed and manufactured connectors for track traffic. Nevertheless, they share a couple of similarities. First, they are not only export speculators without any long-term export strategy. Second, they are successful in term of export performance. Firm A is even highly export oriented. Entrepreneur A mentioned that for more than 20 years, they are always focusing on export. They export to more than 70 countries. They do not sell much domestically. Similarly, firm B has plenty of sales networks in more than 40 countries and regions in Europe, USA, Middle East, South East Asia, etc. Export volume of firm C is not comparable with that of firm A and firm B. Nevertheless, it manages to export its product to three countries in about two years. Meanwhile, it is making more effort to develop the international market.

4 Data collection

Primary data was collected through in-depth semi-structured interviews with the entrepreneurs of private MSEs in Zhejiang province. In order to deal with recall inaccuracies (Yin, 2009), an interview guideline was sent to entrepreneurs to inform them to recall their first-time export decision-making process three days before the interviews was conducted. The purpose of sharing the guideline with them is to support their recall process. This guideline includes all the key aspects of the interview based on the research objectives. Online face-to-face interviews

³⁹ As the interviewed entrepreneurs were making their personal first export decisions, their firms were either micro-sized or small-sized.

was conducted. The interviews started with a short self-introduction. Before the conversation began, the interviewer provides necessary information regarding the interview purpose, anonymity, rights to withdraw. Thereafter, the interviewer initiated the dialog by giving a general question: how did you begin to think about export? All interviews follow the same data collection process. After the first interviews with entrepreneur A and entrepreneur B, it was found that more information must be collected to answer the research question. Therefore, second interviews with both entrepreneur A and entrepreneur B were conducted. Verbatim transcripts in Chinese language were written for all interviews. The interviews with three entrepreneurs resulted in three verbatim transcripts of about 13.000 words, 13.600 words and 15.400 words respectively⁴⁰.

Tab. 1: Information of interviews

| Information | Entrepreneur A | Entrepreneur B | Entrepreneur C |
|-------------------------|---------------------------|---------------------------|-------------------------|
| Position | President and owner | Owner and General Manager | Vice President |
| Industry ⁴¹ | Meat processing machinery | Textile and costume | Track traffic connector |
| Firm size ⁴² | Micro size enterprise | Small size enterprise | Small size enterprise |

Source: Own elaboration

5 Data analysis and findings

All the information, which is related to MEDs, was extracted. After that, the extracted data was summarized as process data (Langley, 1999), which enables the analysis of events in chronological order. The data analysis was conducted in two phases. First, we identify the MEDs of the interviewed entrepreneurs. This is to confirm which MEDs were actually made. Oftentimes the interviewed entrepreneurs did not mention their MEDs directly. The identifications of MEDs are based on the analysis of the actual meanings of the statements. For example, instead of directly saying the phrase *distribution method*, entrepreneur B mentioned that they wanted to find their own *direct* client. After the identification of MEDs of interviewed entrepreneurs, we analysed the orders of their MEDs.

⁴⁰ The numbers are accurate to hundred

⁴¹ at the time when the first export decision was made

⁴² at the time when the first export decision was made

Fig. 1 shows the overview of the analysis results related to MEDs. In fact, there are two observations, which are in line with the results of Styles and Ambler (1994). First, previous finding indicates that majority of exporters have started with the decision (whether or not) to export. Two of our interviewed entrepreneurs have also started with this decision. Although entrepreneur A did not start with decision to export, it was also the second of all his MEDs. Our observation confirms that decision to export tend to be made in the beginning of the export process. Second, our finding supports the conclusion that MEDs were made in different sequences.

Fig. 1: MEDs of interviewed entrepreneurs⁴³



Source: own elaboration

However, we also have three new discoveries, which shows the uniqueness of first export decision. First, not all the MEDs were made only once. Some of them have appeared sometimes twice or even three times in the personal first export decision processes of interviewees. For example, entrepreneur A made the choice of export market twice. His first choice of export market was Europe, which was a result of his vision and mind-set. This decision was later narrowed down to Germany. Entrepreneur B had similar experience. His first

⁴³ The main purpose of this figure is to show the sequences and frequencies of MEDs. The spaces between decisions do not represent the real time span.

choice of export market was also Europe. Later it was specified to France. The choice of export product was observed to be made more than once too. For example, entrepreneur B decided to export textile products, fabrics and costume because that was their specialty. The export product was specified after the interaction with client. Entrepreneur C even has to make the choice of product for three times. The first choice was their standard products. After the interaction with client, entrepreneur C decided develop a new product for their client. However, it was still not the final choice of export product. Entrepreneur C's newly developed product must be tested and certified by related institution before it was finally decided to be the right export product. To conclude, there is at least one MED in each case, which was made more than once. It indicates that it was very unlikely that entrepreneurs can make all MEDs once accurately in their personal first export decisions. Sometimes some of the MEDs have to be modified to adapt to the specific contexts.

Second, Styles and Ambler (1994) mentioned that choice of local representative is one of the MEDs in the export decision process. We find that, however, none of the interviewed entrepreneurs had made this decision. We argue that the absence of choice of local representative could be the second characteristic that distinguishes the personal very first export decisions from the usual export decisions mentioned in Styles and Ambler (1994). From the entrepreneurs' point of view, it seems that it does not make sense to have a local representative in the beginning before they had any practical export experience. Many things seem to be uncertain. For example, in the first export, entrepreneur A finally exported a new product that they actually did not manufacture at that time. Of course, he would not have chosen any local representative for a product that he did not have. Entrepreneur B had no international contact either and he was not sure whether they would manage to export. Entrepreneur B has taken about half a year to identify his first target client. In the context of high uncertainty and little knowledge on the target market, entrepreneur B also did not consider to choose a local representative. From the foreign partners' point of view, it is much more reasonable to represent a partner, who has both mature product and some export experience.

Our third discovery is that export-production decisions, which is the decision to produce an exportable good (Echeverria, et al, 2009), have been a critical part of the first export decisions of all interviewees, although Styles and Ambler (1994) did not treat it as MEDs. Without export-production decisions, the first export decisions would not have been made and the first export could not have been done. In case of entrepreneur A, at least two production related decisions were identified. Before he could have given a quotation to his client,

entrepreneur A has to make the decision of the product design. After he has signed the contract with his client and started producing the products, he has to adjust his export-production decision again because there was an unpredicted production problem:

...however, in the first export, motor was not included in the machine...He (German client) would like to install the motor himself... There were technical communications (in the production process). He requested to use German motor. However, the German motor has its size. We were worried because we did not know whether the reserved space in our machine would match the German motor...then he posted a motor to us, then we could further produce...

For entrepreneur B, the export-production decisions are such sensitive and important that he emphasised that he has to take the decisions himself. For example, if the design from the client has no problem, entrepreneur B can simply produce the product according to the design. In case that the design of the client is improper, entrepreneur B has to take production decision by making a new design and persuade the client to accept his production decision:

...They (designers of clients) are people with super self-esteem. What a designer designs represents his aspiration. If there is anything improper in the design, I will intervene in the matter to take some decisions...we had a couple of different opinions with her (the designer of the client)... We made the sample (of her design) that, we thought, was not proper. At the same time, we also made a revised sample according to our suggestion. The old lady (the designer of the client) was much moved. She said that we not only found the problem but also provided a solution...

Following statement indicates that the export-production decision was also essential in the personal first export decision of entrepreneur C. Export-production decision has to be made repeatedly so that a proper product can be manufactured:

After they confirmed that there is no problem (with the design), there is no problem with quotation and there is also no problem with leading time, we signed a primary agreement. Then he let us develop (the product)...It takes usually 2-3 months to develop a new product...after the product was developed, it must be tested...after all the requirements were satisfied in the test. Then we handed over the product to them.

To conclude, we observed that the MEDs of the personal first export decisions of interviewed entrepreneurs were different from previous conclusions in three different aspects: 1) the frequency, 2) absence of choice of local representative, and 3) the appearance of export-production decisions. All these differences have replicated across the cases. Based on these observations, we have the following propositions:

Proposition 1: Due to the bounded rationality, entrepreneurs have to make some MEDs more than once in their personal first export decisions.

Proposition 2: The choice of local representative becomes unnecessary in the very first export, due to the high level of uncertainty for potential exporters and potential foreign partners.

Proposition 3: Export-production decision is one of the MEDs and part of the personal first export decision process.

Conclusions and implications

Although previous literature have shown the importance of first export, it seems that there is seldom any research, which addresses the *process* of entrepreneur's first export decision and how entrepreneur go through this decision process. Many of the previous studies focused on what could influence the decision (whether or not) to export, which is only the beginning of the export decision process. Our exploratory study provides evidences to show how entrepreneurs' personal very first export decisions are different from the subsequent export decisions by analysing MEDs and sequences of MEDs in the export decision processes of interviewed entrepreneurs. We found that MEDs in the personal first exports were very different from previous findings in three aspects: First, according to Styles and Ambler (1994), entrepreneurs should make all MEDs usually only once. Our observations show that some of the MEDs were made more than once. Second, the decision of local representative appeared in none of our cases. Finally yet importantly, the export-production decisions were an essential part of the export decision processes.

There are four implications arise from our research. First, future researches as well as export promotion institutions need to pay special attention to entrepreneur's first export decision, considering its uniqueness and its influence on subsequent internationalization behaviours. Second, our study implicates that future studies can and should apply a holistic approach. On one side, it is important to study what factors may influence a single MED, such as decision to export, choice of export market, etc. On the other side, our study shows that it is possible to study how decision-maker operationalizes all MEDs in complete decision process

in *real-life*. Third, export promotion program that are designed for new exporters should follow a holistic approach. It should not only concentrate on how to encourage a non-exporter to make the decision to export, which is usually only the beginning of the export process. In order to complete the first export, decision-maker must also deal with other MEDs effectively. Support may need to be provided to decision-makers as they are trying to reach those MEDs so that they do not give up halfway. Last but importantly, beside the knowledge of sequence and frequency of MEDs, future scholarly works are still needed to explore the cognitive process of how to reach those MEDs to find out the support method.

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