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Editorial Announcements

Entrepreneurial Business and Economics Review

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Note from the Editor-in-Chief

'Entrepreneurial Business and Economics Review' (EBER), as a multi-disciplinary and multi-contextual journal, is dedicated to serve as a broad and unified platform for revealing and spreading economics and management research focused on entrepreneurship, individual entrepreneurs as well as particular entrepreneurial aspects of international business and international economics. It attempts to link theory and practice in different sections of economics and management by publishing various types of articles, including mainly research articles, but sometimes also conceptual papers and literature reviews. Our geographical scope of interests include Central and Eastern Europe (CEE) and emerging markets, however we also welcome articles beyond this scope if they deal with our focus.

Starting from 2019 we decided not to publish thematic issues of our journal and not to divide articles into 'Thematic Articles' and 'Other Articles' sections. Currently, we decided to publish all articles on the first-come, first-served rule, regardless their topics, if they meet our aim and scope. It is worth reminding that EBER accepts the articles from the following fields:

- **Entrepreneurship and Business Studies**, in particular entrepreneurship and innovation, strategic entrepreneurship, corporate entrepreneurship, entrepreneurship methodology, entrepreneurial orientation and organizational behaviour, entrepreneurial management, entrepreneurial business, management methodology, modern trends in business studies and organization theory, policies promoting entrepreneurship, innovation, R&D and SMEs, education for entrepreneurship,
- **International Business and Global Entrepreneurship**, especially international entrepreneurship (IE), new trends in international business (IB), IB methodology, teaching IB, international management, international marketing, global strategy, emerging markets, European business,
- **International Economics and Applied Economics**, in particular the role of entrepreneurship and the entrepreneur in the economy, international economics including the economics of the European Union (EU) and emerging markets, as well as Europeanization, economies of the region of Central and Eastern Europe (CEE), new trends in economics, economics methodology.

Currently, EBER is indexed in numerous international databases, among others our journal is on the coverage list of Scopus® (Elsevier) and EconLit® (American Economic Association), what is more we are indexed in ESCI Web of Science Core Collection® (Clarivate Analytics). EBER provides immediate open access to its content on the principle that making research freely available to the public supports a greater global exchange of knowledge.

We do hope that the articles presented in this issue will inspire further research. Moreover, we would be happy to publish the results of future studies in the upcoming issues of our Journal. We invite you to participate in our academic conversation.

On the behalf of the Editorial Board, I would like to give my special thanks to all people involved in the editorial and publishing process, first of all to all authors and reviewers, but especially copy editors and proofreaders as well as the layout editor and the DTP specialist.

Krzysztof Wach
Editor-in-Chief
and the Founder of the Journal

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Republic of Poland

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10.15678/EBER.2019.070101

The Social Dimension of the Entrepreneurial Motivation in the Central and Eastern European Countries

Zoltán Bartha, Andrea S. Gubik, Adam Bereczk

ABSTRACT

Objective: Discovering and categorising the entrepreneurial motivations of university student entrepreneurs in the CEE region, and uncovering the influencing factors behind the different motivation factors. The aim is to understand what factors shape the social motivations of entrepreneurs, and give insights on how these motivations may be enhanced in order to make social entrepreneurship more effective.

Research Design & Methods: The study is based on the 2016 GUESSS database that contains 19.338 answers for eight selected CEE countries. Factor analysis was used to detect the motivation factors; a General Linear Model was set up to identify the influencing factors of the Social mission, one of the motivation factors of the university student entrepreneurs.

Findings: Five factors of entrepreneurial motivations were identified: Social mission, Customer focus, Competition/market focus, Individual goals, and Collective/community goals. Most of the factors are intrinsic in nature. Social mission factor is influenced by education, the entrepreneurship-related courses and programmes, a cultural dimension called uncertainty avoidance, and country-level characteristics that are not cultural in nature.

Implications & Recommendations: Entrepreneurship courses and programmes influence attitudes and motivations, and so higher education institutions should focus on such programmes. The standard courses do not enhance the importance of intrinsic motivations, such as the social mission, so more emphasis should be put on the social dimensions.

Contribution & Value Added: Our study contributes to the entrepreneurial motivations and social innovation literature, and calls for further comparative research, as the social mission GLM showed that country-level differences exist in the CEE region.

Article type: research article

Keywords: entrepreneurial motivation; entrepreneurship; social innovation

JEL codes: L26, L31, O35, O52

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INTRODUCTION

The symbiosis of economic efficiency and social justice has formed the core of the European Union strategies. The Lisbon Agenda formulated in 2000 envisioned a 'dynamic and competitive [..] economy, [..] with greater social cohesion, and respect for the environment' (*EMPL*, 2010, p. 11). The current 'Europe 2020' strategy calls for 'smart, sustainable and inclusive growth', and efficiency goals (e.g. employment, R&D) as well as fairness goals (e.g. education, poverty) are featured among its key indicators (*EC,* 2010, p. 3; Stanickova, 2017).

Entrepreneurship has traditionally been linked to economic efficiency, the first component of the dual core. Efficiency is improved by market competition, which on the other hand is driven by entrepreneurs bringing new ideas to the market. Better and more efficient ideas prevail, creating better and more jobs. Empirical statistics seem to confirm the above. The US government's Business Dynamics Statistics (BDS) dataset shows that startups (zero age firms) add an average of three million jobs per year, while the net employment effect of existing (age one or older) firms is typically negative (Kane, 2010).

Unfortunately, not all entrepreneurs have the textbook attitude. Hurst and Pugsley (2011) using data of entrepreneurs who were just about to start their businesses, show that few entrepreneurs have the desire to innovate or to grow, and most of them do not intend to bring new ideas to the market. Running tests on the BDS dataset, Haltiwanger, Jarmin and Miranda (2010) show that when controlling for firm age, there is no significant difference in job creation among firms of different sizes. Another way of putting this is that a high growth rate can come from firms of any size. Schrör (2006) using Eurostat data points out that younger entrepreneurs (below the age of 30) make businesses grow much faster than older ones (40 or above). Autio (2005) on the other hand highlights that enterprises run by highly qualified entrepreneurs grow faster.

Entrepreneurs may play a key role in the promotion of social justice as well. Current societal trends addressed by the Europe 2020 strategy can be perceived as opportunities for innovation. The process of new idea generation and implementation that tackles such societal challenges is called social innovation, which is innovation in the Oslo Manual sense with a social motive: its primary goal is to create social change (*EC,* 2013, p. 7). Entrepreneurs motivated by social goals are important agents in the initiation and implementation of social innovation.

Given the key importance of high growth firms (in improving efficiency), and social innovation (in promoting social justice), and taking into consideration the observations of Schrör (2006) and Autio (2005), in this study we concentrate on the entrepreneurial motivations of university student entrepreneurs. As Autio (2005) pointed out, firms ran by highly qualified entrepreneurs grow faster, which can be used as an argument for focusing on university students. But this is also a limitation of our study, since it does not cover all types of entrepreneurial youth. Motivations are important because they determine whether entrepreneurs seek to bring new ideas to the market, or they are satisfied with providing an existing service to an existing market. Motivations can have an effect on the social motives of enterprises as well.

Data from the Global University Entrepreneurial Spirit Students' Survey (GUESSS) database is used to identify the significant patterns of entrepreneurial motivations. Although GUESSS includes data for more than 50 countries, our study focuses on the Central and

Eastern European (CEE) countries. The CEE members of the EU are not completely homogenous, but they have a similar historical background. They are also below the EU average in most economic and social progress indicators, including the Europe 2020 ones (Radulescu, Fedajev, Sinisi, Popescu, & Iacob, 2018). This means that meeting the Europe 2020 targets is a major challenge in the CEE region, which explains the focus of this study.

The aim of this study is to discover the important factors of entrepreneurial motivation, especially the ones connected to the social mission, and give insights on how these motivations could be enhanced. For this reason we identify the distinctive patterns of the entrepreneurial motivations of university student entrepreneurs in the CEE countries using factor analysis. We point out the main differences among CEE countries, and identify the factors that explain the differences. These factors are important to policy makers, since the economic efficiency and social justice goals may be achieved more easily by influencing them. We set up a General Linear Model of the Social mission of student entrepreneurs to point out the most important influencing factors.

LITERATURE REVIEW

Main Definitions

The theoretical background of our study is focused on three key definitions: entrepreneurship, entrepreneurial motivation, and social innovation.

Entrepreneurship can be defined as 'the mindset and process to create and develop economic activity by blending risk-taking, creativity and/or innovation with sound management, within a new or an existing organisation' (*EC*, 2003, p. 5).

Although motivation, motives, incentives, goals, etc. are a focal point of entrepreneurship research (see Zygmunt, 2018 and Carsrud, Brannback, Elfving, and Brandt (2017) for a comprehensive review of the literature), there is no clear definition of entrepreneurial motivation. Here we build on the ideas of Maslow (1946), and Nuttin (1984), and define entrepreneurial motivation as a human drive to satisfy certain needs (including, in its highest form, achievement motivation), and an aspect of the entrepreneur's behaviour that is responsible for moving behaviour toward a certain direction or object.

Social innovation is basically an innovation process with a strong social motive. The World Economic Forum defines it as 'the application of innovative, practical, sustainable, business-like approaches that achieve positive social and/or environmental change, with an emphasis on low-income or underserved populations' (*WEF*, 2013, p. 3).

Entrepreneurial Motivations

The motivation of entrepreneurs is typically linked to entrepreneurship through entrepreneurial intentions. The way enterprises react to challenges, identify business opportunities, and develop plans to take advantage of them is an intentional behaviour that is strongly influenced by entrepreneurial intentions (Bird, 1988). The dominant model of entrepreneurial intentions is based on the theory of planned behaviour (Ajzen, 1991), and the idea of the entrepreneurial event (Shapero, 1982), and was developed by Krueger and his associates. This linear model of entrepreneurial intentions suggests that intentions are influenced by perceived feasibility (self-efficacy, the confidence of the individual in suc-

cessfully addressing the entrepreneurial challenges), and by perceived desirability (the desire of the individual to start tasks related to entrepreneurship) (Krueger, Reilly, & Carsrud, 2000). Motivations in this model are drivers of the latter, perceived desirability (e.g. Douglas, 2013; Nicolli, Ramaciotti, & Rizzo, 2016).

Elfving, Brännback and Carsrud (2009) argue that the intention process may not be linear, and they suggest a new model called context-specific entrepreneurial intentions model (Elfving *et al*., 2009, p. 29). Motivations are explicitly included in the Elfving *et al*. (2009) model, and in fact they are the first factor to be considered once a triggering event occurs.

Existing motivational theories are mostly rooted in economics and psychology, and they often conflict with each other. Drive theories concentrate on the so called push factors; the incentives approach focuses on the pull factors. Entrepreneurs are motivated by both achieving a certain success, and avoiding failure (Deci, 1975). Motivation can come internally (intrinsic motivation), and externally (extrinsic motivation). Intrinsic motivation comprises of intangible motives that endogenously foster an entrepreneur to make a move. The need for achievement, self-actualisation or reciprocity are all examples of such intrinsic motivations (Nuttin, 1984). Extrinsic motivation on the other hand refers to external rewards (e.g. recognition, monetary payoff).

Empirical tests confirm the idea that motivations influence behaviour, and so they are an important influencer of entrepreneurial intentions and activity. Ryan and Deci (2000) find that if the competence, relatedness and autonomy needs of the individual are satisfied, intrinsic motivation is the primary influencer. If, however, the above needs are not met, extrinsic motivators become dominant in behaviour. Although not an empirical, but rather a theoretical investigation, Benabou and Tirole (2003) show in their analysis how intrinsic and extrinsic motivations effect the individual's behaviour in different circumstances.

Lüthje and Franke (2003) tested MIT engineering students, and they found that personality traits that can be interpreted as motivation factors have a strong impact on the entrepreneurial intentions. Surveying engineering students in Spain, Barba-Sanchez and Atienza-Sahuquillo (2017) also find that the motivation, namely the need for independence is in a significant association with entrepreneurial intentions. Focusing on academics at the University of Ferrara, Antonioli, Nicolli, Ramaciotti and Rizzo (2016) find that academic entrepreneurial intentions are mostly driven by intrinsic motivations, while the role of extrinsic motivations are largely mediated by the academic position and the work environment. Chmielecki and Sułkowski (2016) asking Polish undergraduate business students found that students associate both intrinsic (e.g. journey, adventure) and extrinsic (e.g. exploitation) metaphors with entrepreneurship. These social and economic effects also embrace the possibility of strengthening the foundations of a modern economic governance structure supported by the new generations of higher education entrepreneurs (O'Leary, 2015). On the other hand, the social and economic importance of promoting entrepreneurial intentions between university students is wildly accepted amongst scholars, and the influence of entrepreneurship education in this process cannot be underestimated (see the study of Krpálková, Krelová, and Krpálek, 2016; Badzińska and Brzozowska-Woś, 2017; Çera *et al.*, 2018; Dvorský *et al.*, 2019).

Motivations also influence behaviour through intentions. Doing basic association tests on a sample of Czech small and medium-sized enterprises (SMEs), Kozubikova, Sopkova, Krajcik and Tyll (2017) find that SMEs led by entrepreneurs with an extrinsic

motivation (starting a business for money) are more likely to develop new products (i.e. engage in innovation). Running multivariate tests on a large sample of French start-ups, Gundolf, Gast and Geraudel (2017) show that the entrepreneurial motivation is associated with the innovation method the firms choose. Wach and Wojciechowski (2016) tested Cracow-based students, and found that the risk attitude, and the business/non-business study field also effect entrepreneurial intentions.

Sieger, Gruber, Fauchart and Zellweger (2016) investigate the social identity of entrepreneurs. They also use the GUESSS database, and concentrate on the same entrepreneurial motivation questions. Following some adjustments (deleting some questions from the analysis), they establish three factors, that they identify as Darwinian, Communitarian, and Missionary identities. They find that there are significant regional differences in entrepreneurial identities among Western regions.

Social Innovation and Business Enterprises

Social innovation is the main process through which entrepreneurs driven by different motivations can contribute to social justice. European countries face a number of global, European and country-specific problems that go beyond the issue of economic efficiency. Climate change, demographic trends, growing unemployment and social isolation among the disadvantaged, rapid changes in health care and in the natural environment, negative externalities of global competition, mass digital illiteracy are examples of global challenges. Challenges that the European Union wants to address include: aging population; early school dropouts; sex discrimination; quality and efficiency of health care and public services. The peripheries of the EU, especially the Mediterranean and the Central and Eastern European members face further challenges related to budgetary limitations and social tensions.

European countries, and especially the peripheral regions are in great need of organisations and initiatives that not only help in achieving stable growth, but they also contribute to the reduction of social inequity. Initiatives that are based on social interaction and address social problems on the level of communities are commonly referred to as social innovation. According to the European Commission, 'the social innovation approach is understood to mean not only a new governance mode working across traditional fields of responsibilities with an active involvement of citizens, which is effective in addressing the challenges of climate mitigation, social justice, ageing, etc., but also the culture of trust and risk-taking which is needed to promote scientific and technological innovations' (*EC*, 2011, p. 7). Some macro-level institutional models, such as the one developed by Turker and Vudal (2017, Figure 1 on p. 101), explain how the social innovation process is connected to the rest of the economy.

Enterprises that were established with a social innovation goal in mind are called social enterprises. Some studies exclude traditional profit-oriented firms from their analysis, like Fici (2015) and Soviana (2015), and also some well-known experts (e.g. the Yale School of Management, The Goldman Sachs Foundation Partnership on Nonprofit Ventures, or the Seattle Social Enterprise Consultants) do so (Kerlin, 2006), while others suggest that profit firms can also be included if their vision and the attitude of the entrepreneur makes them sensitive to social issues (*UnLtd*, 2014; Lönnström, 2015; Fekete *et al*., 2017; Bilan *et al.,* 2017). Mugler (1993) when assessing the social and economic utility of SMEs, lists the following 12 components: economic result; stabilising a pluralist society; strengthening the system of market economy; extending supply in the market; promoting technological

development; sharing risk – crisis prevention; performance – motivation; improving quality of life; supporting vocational training; stabilising growth; environmental protection; foreign trade. These factors harmonise with the dual core of efficiency and justice.

MATERIAL AND METHODS

GUESSS investigates entrepreneurial intentions and activities of university students. The survey explores the students' career intentions, investigates their motivations and goals, their orientation and behaviour in their business activity. It also analyses the role of higher education and culture in the decision. We investigate the sample of CEE countries. Table 1 shows the distribution of the sample according to the countries of the respondents.

Table 1. Distribution of Answers in the CEE Sample

Country	Frequency	Valid in %
Estonia (EST)	811.000	4.2
Latvia (LVA)	426.000	2.2
Poland (POL)	6.388	33.0
Czech Republic CZE)	1.135	5.9
Slovak Republic (SVK)	3.266	16.9
Hungary (HUN)	5.182	26.8
Slovenia (SVN)	575.000	3.0
Croatia HRV)	1.555	8.0
Total	19.338	100.0

Source: own elaboration.

The female-male ratio of the sample is 64.4-35.6%. As for the field of study, 32.9% of the respondents studied economics and law, 23.2% engineering (incl. computer sciences and architecture), 9.6% human medicine/health sciences, 8.5% social sciences, 5.8% arts/humanities, 5.4% mathematics and natural sciences, and 1.1% science of art. The exact field of study cannot be identified in the case of 13.5% of the students. 73.3% of the respondents were 24 or younger at the time of the survey, 17.9% were 25-30, and only 8.8% were older than 30. The share of entrepreneurs within the sample is not homogenous (Table 2).

After reviewing the available literature and previous research findings, there are still some questions that remain unanswered. That is why the following hypotheses are formulated and tested:

H1: There are significant differences among CEEC countries in the social dimension of entrepreneurial motivations.

H2: Education has a significant impact on social motivations.

H3: Cultural differences affect the development of social motivations.

H4: Students who plan long-term entrepreneurial career are more committed to the social mission.

H5: Business orientation is a significant explanation of the differences observed in social motivations.

Mainly descriptive statistics were used to describe entrepreneurial motivations (especially the role of intrinsic motivations) in the CEE region, and the stochastic relationships

among the variables were tested. The General Linear Model (GLM) was used to check the combined effect of the analysed variables. The analysis was conducted with SPSS 25.0. The structure of the tables follows the logic of the output tables of the software.

Table 2. The Share of Those Who Answered 'Yes' to the Question: Are You Already Running Your Own Business / Are You Already Self-employed?

COUNTRY	Ratio of entrepreneurs	Within this				
		self employed	micro	small	medium	large
EST	12.7	30.2	68.8	0	0	1
LVA	7.7	19.4	80.6	0	0	0
POL	3.8	45.0	45.0	7.0	3.1	0
CZE	10.1	53.4	42.7	2.9	1.0	0
SVK	6.9	58.3	39.4	2.3	0	0
HUN	5.6	48.4	47.7	3.9	0	0
SVN	6.8	25.0	66.7	5.6	2.8	0
HRV	3.3	19.1	68.1	8.5	4.3	0

Source: own elaboration.

RESULTS

The motivation and goals were surveyed by Question 9.2 of GUESSS. The first batch of questions discovered the motivations that were most important when starting the business (Table 3).

Table 3. Business Start-up Motivations

Action	EST	LVA	POL	CZE	SVK	HUN	SVN	HRV
to make money and become rich. (1/1)	4.24	5.45	5.14	4.47	4.76	4.83	3.89	4.31
to mainly achieve financial success. (1/2)	4.35	5.62	5.37	4.79	4.96	4.63	4.97	5.06
to advance my career in the business world. (1/3)	4.51	4.90	5.29	4.50	4.93	4.77	4.83	5.56
to be able to signal my capabilities to others. (1/4)	4.59	5.40	4.32	4.44	4.69	4.22	4.42	4.96
to solve a specific problem for a group of people that I strongly identify with. (1/5)	4.43	4.97	3.91	3.55	4.14	4.41	4.29	4.60
to play a proactive role in shaping the activities of a group of people that I strongly identify with. (1/6)	3.37	4.83	3.77	3.48	3.87	4.30	3.50	4.38
to solve a societal problem that private businesses usually fail to address. (1/7)	3.28	4.17	3.84	2.85	3.39	3.50	3.39	4.15
to do something that allows me to enact values which are core to who I am. (1/8)	5.47	5.65	4.59	4.89	5.07	4.94	5.17	5.43
to play a proactive role in changing how the world operates. (1/9)	4.45	4.66	4.65	3.74	4.04	4.28	3.97	4.65

Please indicate your level of agreement with the following statements. I created my firm in order…
(1=strongly disagree, 7=strongly agree)
Source: own elaboration.

The second batch of questions investigated the primary motives of the founders (Table 4).

Table 4. Founder Motivations

Action	EST	LVA	POL	CZE	SVK	HUN	SVN	HRV
to operate my firm on the basis of solid management practices. (2/1)	4.33	4.94	5.71	4.45	5.44	4.91	4.75	5.29
to have the financial prospects of my business thoroughly analysed. (2/2)	4.46	5.10	5.61	4.76	5.56	5.76	4.64	5.63
to provide a product/service that is useful to a group of people that I strongly identify with. (2/3)	5.44	5.68	5.23	4.71	5.63	5.57	5.08	5.63
to convey to my customers that I want to satisfy their needs rather than just to do business. (2/4)	5.70	5.93	5.42	5.34	6.05	5.87	5.75	5.82
to be able to express to my customers that I fundamentally share their views, interests and values. (2/5)	5.44	6.00	4.93	5.04	5.67	5.27	5.14	5.69
to be true in serving a group of people that I strongly identify with. (2/6)	5.59	5.63	4.51	4.44	5.23	5.37	5.33	5.48
to be a highly responsible citizen of our world. (2/7)	5.28	4.93	5.14	4.17	5.11	5.11	5.08	5.53
to make the world a 'better place'. (2/8)	4.81	4.89	4.51	4.00	5.13	4.96	5.03	5.13

As a firm founder, it is very important to me… (1=strongly disagree, 7=strongly agree)
Source: own elaboration.

The third batch of questions (Table 5) concentrates on the most important goals during the operation of the firm.

Table 5. Motivations During Operation

Action	EST	LVA	POL	CZE	SVK	HUN	SVN	HRV
to have a strong focus on what my firm can achieve vis-à-vis the competition. (3/1)	5.41	5.57	5.50	4.93	5.31	5.34	5.00	5.43
to establish a strong competitive advantage and significantly outperform other firms in my domain. (3/2)	5.32	5.63	5.50	4.87	5.53	5.04	5.03	5.42
to have a strong focus on a group of people that I strongly identify with. (3/3)	4.94	5.11	4.69	4.40	5.07	5.29	5.11	5.02
to support and advance a group of people that I strongly identify with. (3/4)	4.98	5.45	4.65	4.41	4.74	5.25	5.08	5.43
to have a strong focus on what the firm is able to achieve for society-at-large. (3/5)	4.96	5.07	4.54	4.45	5.11	4.93	4.89	5.41
to convince others that private firms are indeed able to address the type of societal challenges that my firm addresses. (3/6)	3.93	4.58	4.66	4.08	4.69	4.65	4.47	5.35

When managing my firm, it is very important to me… (1=strongly disagree, 7=strongly agree)
Source: own elaboration.

Factors of Entrepreneurial Motivation

There are significant differences among countries in case of all motives and goals (the value of Eta is between 0.15 and 0.3, p=0.000). Further differences can be detected according to sex, age, evaluation of the higher education environment, and study field. The outcomes, however, are very difficult to map because of the high number of variables. In order to decrease the number of variables, and to get a better idea of the background structure, a factor analysis was conducted, and five factors were identified. The value of

the Kaiser-Meyer-Olkin is 0.898, which means that our data are perfectly suited for a factor analysis. The five factors explain 66.75% of the total variance. Table 6 shows the factor weights of all the variables belonging to our five factors.

Table 6. Factor Weights and Factors of Entrepreneurial Motivations

Question	Component				
	1	2	3	4	5
1/9	0.787				
2/8	0.743				
1/7	0.734				
3/6	0.669				
3/5	0.647				
2/7	0.580				
1/8	0.570				
2/5		0.780			
2/4		0.770			
2/3		0.742			
2/6		0.722			
3/1			0.820		
3/2			0.804		
2/1			0.637		
2/2			0.587		
1/2				0.853	
1/1				0.817	
1/3				0.619	
1/4				0.428	
3/3					0.649
1/6					0.628
3/4					0.622
1/5					0.618

Extraction Method: Principal Component Analysis; Rotation Method: Varimax with Kaiser Normalization; a. Rotation converged in 12 iterations
Source: own elaboration.

There are five distinctive motivations of university student entrepreneurs in the CEE countries. In the following section we provide a short description of the five factors.

1. Social mission: one of the motivators is to follow a strong societal agenda, play a proactive role in trying to change the society, solve social problems, and spread specific values in the community. The social mission is a purely intrinsic motivation (Component 1/Table 6).
2. Customer focus: another specific motivation is to identify and serve the special needs of the customers, which also means that the entrepreneurs with a strong customer focus motivation tend to focus on a specific group of customers instead of the wider public. The customer focus is an intrinsic motivation (Component 2/Table 6).
3. Competition/market focus: The third group of motivators prompt to an analytical focus (the goal is to have a very good understanding about the market position of the

firm, about the strength and opportunities), and the strong will to compete and to outperform the competitors. Yet another intrinsic motivation (Component 3/Table 6).
4. Individual goals: Factor 4 is the only one in our analysis that includes extrinsic motivations (Component 4/Table 6).
5. Collective/community goals: Similarly to Factor 1, this factor also includes variables that are focused on solving social challenges and playing a proactive role in the community. The difference between the two factors is the scope: while Factor 1 includes goals that concern the society as a whole, Factor 5 is limited to smaller, specific communities. In this sense, Factor 5 is the closest to the motivations of the social entrepreneurs (Component 5/Table 6).

Differences in the Five Motivation Factors

When trying to uncover the possible explanations of the differences in the five motivation factors, the following six areas were tested:

Student Demography (sex, age)

Significant differences between the sexes can only be detected in the case of 2. Customer focus and 4. Individual goals. The females in the sample have a stronger customer focus, while the extrinsic motivations of Factor 4 are stronger in the case of the male respondents. As far as age is concerned, Factor 4 is the only motivator where a significant difference is observable. The relationship between age and the Individual goals is weak, and has a negative sign (r=-0.16, p=0.000), which means that the extrinsic motivations are slightly stronger among the younger students.

CEE Country Differences

The motivation factors significantly differ among the CEE countries (the value of Eta is between 0.13 and 0.2, p=0.000). Figure 1 shows the differences in Factor 1 and Factor 5.

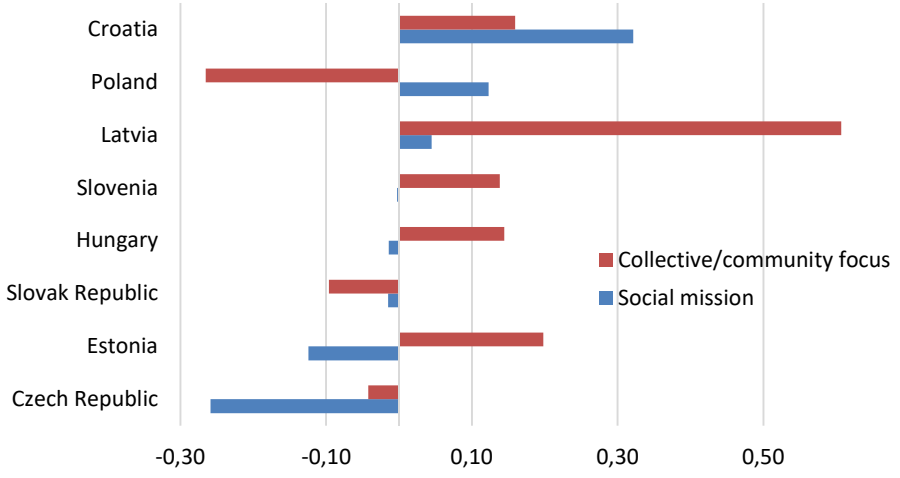

Figure 1. Differences among the CEE countries in the Social mission and the Collective/community goals motivations of the entrepreneurs
Source: own elaboration.

In terms of Social mission, Croatia has the highest factor score, and Poland and Latvia are also above the average. The Czech Republic is on the other end of the spectrum, which means that the societal agenda in the motivation of the Czech entrepreneurs is significantly weaker than in other CEE countries. Estonia also scores below the average, while three countries: Slovenia, Hungary and Slovakia have factor values very close to the average.

The Community focus of student entrepreneurs is highest in Latvia, and is above the CEE average in Estonia, Slovenia and Hungary. Poland, Slovakia, and the Czech Republic are below the average in this respect.

Higher Education Specifics

In our study we investigated the effect of three variables related to higher education: the study field of the student; the presence of entrepreneurship related courses; and the entrepreneurial atmosphere of the university.

Our respondents are significantly different in motivation Factor 3 (Competition/market focus), and Factor 4 (Individual goals), if we involve the study field in the analysis. Law and economics/business students score above the average in both factors, while students of health sciences, arts and humanities and science of art have below the average factor values.

Courses (compulsory or elective ones) and programmes with an entrepreneurial focus are in a positive and significant association with Factor 3 (Competition/market focus), and Factor 4 (Individual goals). These results may indicate that the education can influence the analytical and materialistic motivations of the students, but it does not have an effect on the more intrinsic, societal motivations.

The way students perceive the entrepreneurial atmosphere surrounding the university is positively associated with Factor 1 (Social mission), Factor 3 (Competition/market focus), and Factor 5 (Collective/community goals). While formal courses seem to affect the materialistic motivations, the entrepreneurial environment of the university may influence the societal motivations of the student entrepreneurs.

Cultural Differences

Our database consisted of information on 4 GLOBE dimensions (for a detailed description see House *et al*., 2004), namely In-Group Collectivism (IGC), Uncertainty Avoidance (UA), Performance Orientation (PO), and Power Distance (PD). IGC is in a weak but significant association with Factor 2 (Customer focus; r=0.106, p=0.001), and Factor 3 (Competition/market focus; r=0.151, p=0.000). UA is in weak association with three of the motivation factors: Factor 1 (Social mission; r=0.117, p=0.000), Factor 2 (r=0.108, p=0.001), and Factor 3 (r=0.174, p=0.000). Finally, there is a weak but significant association between PO and Factor 3 as well (r=0.114, p= 0.000). The relationships are very week, but one of the possible interpretations of the results is that a stronger market/competition focus (e.g. to establish a strong competitive advantage over other firms, focus on innovation – see the results presented in point 6) in the motivation is associated with more collectivist (e.g. duties are important in the behaviour), high uncertainty avoidance (e.g. taking calculated risks, relying on formalised procedures), and high performance oriented (e.g. valuing competition and materialistic incentives) student entrepreneurs. Entrepreneurs with high uncertainty avoidance can have a stronger social mission focus in their motivations as well.

Career Plans

51.7% of those students who ran a business at the time of the survey plan to make the enterprise their primary source of income after graduation. 32.7% of the rest wish to work for an SME or a large corporation, and the final 23.9% target the government, the academic or the non-profit sector for a job. Students who would like to continue their careers as an entrepreneur (either by taking over an already existing enterprise, or by funding a new one), are generally more motivated in all factors, but especially in the case of Factor 1 (Social mission), and Factor 4 (Individual goals).

Among those who envisioned their career as an employee immediately after graduation, the Social focus was higher for those targeting the non-profit sector, and Factor 5 (Collective/community focus) was higher for those targeting employment at small enterprises. This second group can be characterised with a lower Factor 4 (Individual goals) score.

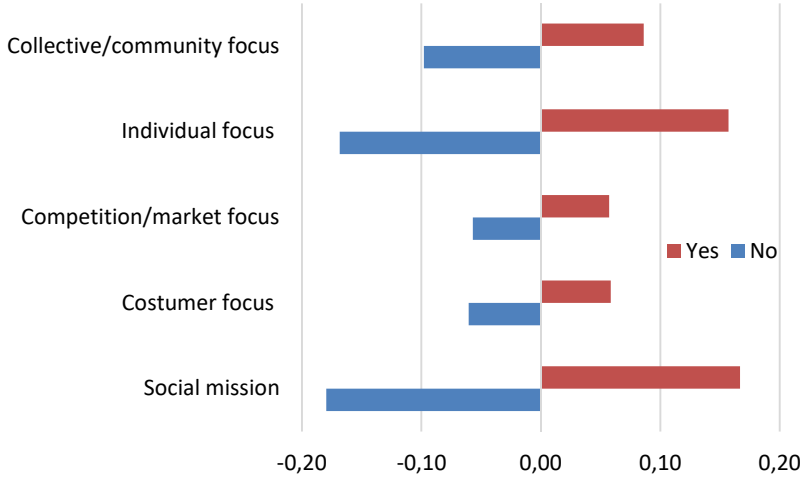

Figure 2. Factor values according to career choice intentions
(Do you want this business to become your main occupation after graduation? (yes/no))
Source: own elaboration.

Business Orientation

We also tested the association between ideas about the innovativeness of the enterprises and the entrepreneurial motivation factors. The GUESSS questionnaire asked student entrepreneurs about the importance of the following goals: to introduce a new generation of products/services; to extend the product/service range; to open up new markets; to enter new technology fields; to improve existing product/service quality; to improve flexibility in producing goods/services; to improve yield or reduce material consumption. We found that students more committed to innovation have higher factor values with the exception of Factor 5 (Collective/community focus). The difference is even more robust if commitment to exploration innovation (seeking new knowledge/technology) is compared to other innovation goals. Factor analysis was used to separate exploration innovation goals from exploitation ones. The strongest association was detected with Factor 3 (Competition/market focus; r=0.366, p=0.000).

Another question related to the entrepreneurial orientation (EO) measured risk taking, innovativeness and proactivity of students (based on Covin-Slevin, 1989). All three areas of EO are in a weak but significant association with Factor 1 (Social focus; r=0.207, 0.206 and 0.204, p=0.000), and in an even weaker one with Factor 5 (Collective/community focus). Risk taking is in significant association with Factor 4 (Individual goals). The linear correlation coefficient of the other relationships is around 0.1 (but significant). These results suggest that the traditional EO concept can be used to social enterprises as well, as it was shown in earlier studies (Balta, Darlington, Smith, & Cornelius, 2012; Kusa, 2016; Kozubíková *et al.*, 2017).

A Regression Model of Social Mission

The variables tested in our study are generally in a weak but significant association with the motivation factors. To set up a regression model, we need to use a method that shows both the partial and the combined effect of these variables. For this reason we set up a GLM in our study. GLM integrates linear regression and variance analysis, and it enables to express the dependent variable as a function of both continuous, and discrete independent variables (Ketskemety & Izso, 2005). Our specific model is a univariate GLM. Its dependent variable is Factor 1 (Social mission), which is especially important for social innovation, and all the previously introduced variables were used as independent variables.

We have to reject our null hypothesis stating that the sample is homogeneous according to Factor 1, because of the low value of p (0.000). The explanatory power is only 14%, shown by the adjusted r square at the end of Table 7.

Table 7. Social Mission GLM Test Results

Dependent Variable: Social mission					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	149.774[a]	20	7.489	8.627	0.000
Intercept	5.955	1	5.955	6.860	0.009
Proactivity	10.777	1	10.777	12.415	0.000
Studies	11.396	1	11.396	13.128	0.000
Risk-taking	5.134	1	5.134	5.915	0.015
Uncertainty avoidance	4.744	1	4.744	5.465	0.020
Exploration	11.774	1	11.774	13.564	0.000
Career choice	12.502	1	12.502	14.403	0.000
Country	13.798	7	1.971	2.271	0.027
Career choice * Country	18.160	7	2.594	2.989	0.004
Error	798.604	920	0.868		
Total	948.483	941			
Corrected Total	948.378	940			

[a] R Squared = 0.158 (Adjusted R Squared = 0.140)

Source: own elaboration.

The variables that have a significant partial effect (even when all the other variables are controlled for) are worth discussing despite the low explanatory power of the model. The area of study does not affect the Social motivation goal, but education does. The variable for the presence of entrepreneurial courses/programmes was used in the model, but the

university atmosphere is also a significant influencing factor (this latter one was left out of our model because of the multicollinearity between the two education variables).

Our variables measuring EO tell us that risk taking, commitment to innovation, and proactive approach are all important in developing a Social mission motivation in the entrepreneurs. Those students who wish to continue as an entrepreneur after graduation are also more committed to the Social mission. As far as cultural determinants are concerned, Uncertainty avoidance is the only remaining significant factor. The need of the student to rely on formal procedures, to be orderly, and to only take calculated risk seems to coincide with a stronger commitment to the Social mission of an enterprise. Significant differences can also be detected among countries (even when UA is controlled for). The demographic characteristics of the students (sex, age), and firm specific characteristics (size, profitability) do not influence the Social mission factor of motivation.

CONCLUSIONS

Since 2003, GUESSS research has grown to an international scale. The conceptualisation and operationalisation of research issues have matured, which guarantees that a reliable database is available for the countries surveyed. With the established measures the reliability of research teams is also assured. The GLM model of Social mission is statistically acceptable, although its explanatory power is only 14%. The low explanatory power is one of the key limitations of our findings, the other being the fact that we limited our analyses to the motivations of university student entrepreneurs.

An analogy can be drawn between the identified five factors of entrepreneurial motivation, and Sieger and his colleagues' three factors of entrepreneurial social identity. (Sieger *et al*., 2016) Their factor called Darwinian identity corresponds to our Factor 3 (Competition/market focus), the one called Missionary identity corresponds to Factor 5 (Collective/community goals), and the Missionary identity corresponds to Factor 1 (Social mission). They find that considerable regional differences exist within the Western world as far as the factors are concerned; our findings indicate that the differences can be observed on a country-level as well.

Our results suggest that entrepreneurship courses/programmes can prove beneficial in boosting the social mission of entrepreneurs. These initiatives provide students with knowledge necessary to start and to manage a business, and with modern teaching methods they can also get hands on experience about the practical challenges of an enterprise. Furthermore, the knowledge, the experience, the examples of good practice, and entrepreneurship tutoring increase the self-confidence of students, which on the other hand makes them more convinced that they are able to cope with the role and duties of an entrepreneur. These developments, on the other hand, form the attitudes of students as well. One of the roles of entrepreneurial programmes is to create a positive attitude toward starting a business, but making the orientation of the students more entrepreneurial (risk taking, innovative, and proactive) is an equally important goal.

An area where we feel education is lacking, is the lack of attention of these courses to the social goals of an enterprise. Some courses explain the societal challenges of our societies, and the idea, the targets, and the characteristics of social enterprises are also presented in some (mostly business-oriented) programmes. But the issue of social enterprises is still isolated from the mainstream of entrepreneurial studies in the CEE region.

Another important result is that there are considerable country-related differences in the Social mission of university student entrepreneurs. These differences emerge even when uncertainty avoidance is controlled for, meaning that they are of non-cultural origin (or are determined by cultural factors that were not part of our analysis). This finding calls for further comparative analysis in the CEE region to identify good institutional practices. The need for further research is also apparent from the low explanatory power of the GLM of Social mission set up in our study.

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Specifics of the Mutual Trade of the Post-Soviet Countries

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ABSTRACT

Objective: The proposed article discusses specifics of mutual trade between selected countries in the post-Soviet region, its structure, nature and development.

Research Design & Methods: To analyse foreign trade, an analysis of competitiveness was used and conducted for 2000 and 2015. Cluster analysis of individual commodity aggregates was conducted, and the monitored countries were divided into several groups. The following indicators were used in the cluster analysis: RCA, coverage of import by export, and the Lafay index.

Findings: A decline in comparative advantages in the mutual trade connected with the Russian Federation is substantial; however, the country remains an important business partner for the majority of the monitored countries. There is also considerable dependence on raw materials, which are a significant part of the overall foreign trade. In this regard, Russia or Kazakhstan are extremely dependent on trade performance in raw materials, especially natural oil and natural gas.

Implications & Recommendations: Russia and Ukraine bear the closest similarity in the competitiveness of their foreign trade. Contrariwise, Azerbaijan is highly dissimilar, as its indicators of foreign trade competitiveness are significantly different in comparison with the remaining countries. Kyrgyzstan represents a country which reports the highest degree of resemblance in its indicators of foreign trade competitiveness to the other post-Soviet countries. The degree of similarity is low between Russia and, for example, Kazakhstan and Kyrgyzstan. It is evident that the Eurasian Economic Council countries focus on different commodities in order for the trade structure to be utilised and not to be identical.

Contribution & Value Added: Contribution to the international trade theory and political economy.

Article type: research paper

Keywords: international trade; oil; cluster analysis; regional integration

JEL codes: F13, F15, F5

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INTRODUCTION

Transformation of the economy of the post-Soviet countries is connected with the important change of foreign trade priorities and its impact on economic growth and development. The trade that was based on a governmental decision began to be influenced by the competitiveness of individual countries. The benefits deriving from foreign trade concern gaining a competitive advantage in individual commodities or groups of commodities. However, it is necessary to mention in this regard that in the case of the post-Soviet countries foreign trade played a negative role, for instance when in the 1990s it resulted in economic deceleration and downturn.

Simultaneously, over the last decades foreign trade has been linked to the increasing foreign trade liberalisation not only regarding goods, but also services and capital. In addition, the WTO rules enable the establishment of trade agreements and an increase in trade exchange within these agreements. This trend is evident in the Eurasian region as well, where a trade area for potential cooperation was created after the dissolution of the Soviet Union. Since the post-Soviet countries share a common heritage, it could be assumed that efforts to extend economic cooperation will considerably influence both the current and the future situation.

Nevertheless, these countries represent an interesting contrast in their foreign trade. On the one hand, they were very closely interconnected in the past, on the other, political factors appear in the region, hindering cooperation in many cases not only with regard to foreign trade. Russia plays a significant role here with its attempts to re-establish its position of a global player. The first step in this case is to establish a dominant position among the remaining post-Soviet republics and to encourage dependence of these countries on Russian trade.

Current cooperation of the post-Soviet countries relates to the end of the bipolar world and subsequently of the USSR. Over the last decades, they have undergone economic transformation which is connected with liberalisation of foreign trade (Cusolito & Hollweg, 2015). Individual countries first started their cooperation at a bilateral and later continued at a multilateral level (Obydenkova, 2011). At the latter level, the market was connected with an attempt to admit individual countries (except for Tajikistan and Turkmenistan) to the WTO (Roberts & Wehrheim, 2001) and to create a regional integration agreement. However, for a long period of time the regional cooperation seemed to be rather of a declaratory nature (Atik, 2014; Dragneva & Wolczuk, 2012). During the 1990s and in the first decade of the 21st century, other groups were formed and the cooperation between Russia, Belarus, Kazakhstan and Ukraine deepened (Mostafa, 2013; Ziegler, 2009). Simultaneously, formation of a similar bloc among Central Asian States was expected (Bohr, 2004). The Eurasian Economic Union is the most recent grouping which, according to the Kremlin, should symbolise a certain counterbalance to the European Union (Kuplewatzky, 2015; Zahorka & Sargsyan, 2014). Since the beginning of their mutual cooperation, all the participating countries have been striving to solve problems connected with their foreign trade, which experienced considerable difficulties particularly at the turn of the century (Åslund, 2003; Kirkow, 1999) since it was based on standard market principles (Kuznetsova, Kocheva, & Matev, 2016). The fact that the Central Asian or the Caucasus states are landlocked is also a major problem (Benešová, Novotná, Šánová, & Laputková, 2016).

In order to assess the situation relevantly, answers to several fundamental questions must be found. What is thus the current position of individual post-Soviet republics within their mutual trade? Is Russia the only dominating country or has the trade structure changed dramatically? Are there significant differences between the countries or is it a group of more or less homogeneous countries in terms of foreign trade?

Cluster analysis will be used to classify the analysed countries into groups. The first part of the article includes a literature review and hypothesis development. The methods used are described based on the previous chapter. The second part discusses competitiveness of the post-Soviet market and characteristics of the selected groups. The conclusion summarises the previous sections and also introduces new questions.

LITERATURE REVIEW

At the beginning of this century, Russian foreign trade showed structural surplus with the majority of the post-Soviet republics and focused solely on raw materials (Hare, Estrin, Lugachyov, & Takla, 1998). However, the structure of foreign trade did not pose a problem in the case of the Russian Federation only, but in the majority of these countries (Horváth & Zeynalov, 2014). The structure of foreign trade and its focus on raw materials in particular also influences economic growth (Cavalcanti, Mohaddes, & Raissi, 2011; Neumayer, 2004). Bildirici and Kayikçi (2013) discussed the impact of crude oil production on economic growth in 4 post-Soviet states and recorded a positive correlation. At the same time, Havranek, Horvath and Zeynalov (2016) add that it is vital to consider whether this is simple dependence on natural resources or their possible surplus in the production process. In addition, Al-Ubaydli (2012) states that the institutional quality and political structure are also crucial. Russia utilises its natural resources as a geopolitical instrument (Chyong & Hobbs, 2014; Cobanli, 2014; Kirkham, 2016).

Nonetheless, the structure of Russian export depends on the differences between domestic and world prices with very low competitiveness of, for example, food, agricultural and wood products (Benešova, Maitah, Smutka, Tomsik, & Ishchukova, 2017). On the contrary, regarding raw materials or precious stones, the price of Russian products is competitive (Gnidchenko & Sal'nikov, 2014). However, it is essential to mention that competitiveness also depends on the region involved (Ishchukova & Smutka, 2013; Svatoš, Smutka, & Ishchukova, 2014).

Hypothesis Development

Mutual trade of these countries is strongly influenced by the fundamental relationship defined by Head, Mayer and Ries (2010) and based on the post-colonial connections further extended into the post-Soviet republics (Mazhikeyev & Edwards, 2013b; Mazhikeyev, Edwards, & Rizov, 2015). A typical hub and spoke principle could be applied to the relationship between Russia and other countries (Furusawa & Konishi, 2007; Kowalczyk & Wonnacott, 1992; Puga, 2001). Russia very often understands foreign trade as a zero-sum game and practises neo-mercantilism as an instrument for expanding its influence (Mansourov, 2005; Ziegler, 2009). Norling and Swanström (2007) caution that the trade between these countries is starting to become more continental rather than regional and favours broader relationships. With regard to international trade of individual countries, there are significant differences in the geographical structure of the

market, where China or other Asian countries are important business partners for Central Asian republics (Chiaruttini, 2014; Linn, 2012; Spechler & Spechler, 2013; Yun & Park, 2012). Regarding the Caucasian countries, it is mainly Armenia that cooperates more closely with Russia (Kirkham, 2016). Contrariwise, Georgia and Azerbaijan focus more on the EU (Pardo Sierra, 2011). The position of Moldova, Ukraine and Belarus is different. Despite its industrial past, Belarus is dependent on Russian crude oil (Connolly, 2008) and markets. Moldova represents an indigent agricultural country, and Ukraine, with its focus on trade with the EU, is experiencing a civil war.

As is evident from the above, the majority of the post-Soviet countries appertain to a group of countries that have recently undergone economic transformation. However, the question is whether the transformation related to foreign trade has already been completed and whether any changes have occurred in its structure, dynamics and orientation during the transformation process.

Based on the above facts, research hypotheses referring to the competitiveness of the monitored countries and their position in the mutual trade can be formulated.

H1: Openness of the economies of the monitored countries increased during the monitored period.

H2: Competitiveness of the majority of the monitored commodity aggregates of the analysed countries increased during the monitored period.

H3: The structure of mutual trade changed significantly during the monitored period.

H4: Competitiveness of the monitored countries in individual commodity aggregates is currently similar.

MATERIAL AND METHODS

This article focuses on mutual foreign trade of the post-Soviet countries, its structure, nature and development. The analysis of the current state is based on three major pillars:

- Analysis of business relations within the post-Soviet countries (trade flow).
- Analysis of competitiveness of individual countries within the group.
- Long-term development of business relations within the group of the post-Soviet countries.

The purpose of the above analyses is to conduct comprehensive assessment of the overall situation in the region. The objective of the article is to identify the role and the position of individual former post-Soviet countries on the entire market. The emphasis is placed on the position of Russia as a business hegemony within the region. The analysis was conducted on the data acquired from the UN COMTRADE database. For the purposes of this research, Standard International Trade Classification (SITC) Rev. 2 nomenclature one-digit code group was selected. The analysis was conducted on the datasets from 2000 to 2015.

Research Methods

The analysis of trade flow is based on the analysis of import and export, their composition, trends and dynamics. The overall openness of the economy was also evaluated using the trade/GDP measure. The analysis of competitiveness was conducted using different indexes of competitiveness and specialisation. The Balassa index (Balassa, 1965; 1977) was the first indicator of specialisation applied which is suitable in order to determine

export specialisation. Trade data within the group only were used for comparison. This is a relative index which reports whether the country possesses a comparative advantage in a given commodity (RCA > 1) or not (RCA < 1). If RCA equals 1, the trade proportion of the given commodity corresponds with the average values of the group. The RCA index was applied to the bilateral relationships between the countries and commodity aggregation. However, since the data for some of the countries did not seem trustworthy, the RCA index was calculated based on exports only.

The Herfindahl-Hirschman Index (HHI) is used to evaluate concentration of a given market (Hirschman, 1964; 1980). The level of the HHI increases with the market concentration level (Calkins, 1983). The values determined by the US Department of Justice were considered to assess the concentration level, with HHI ≤ 1.500 representing a perfectly competitive market, 1.500 ≤ HHI ≤ 2.500 a moderately concentrated market, HHI ≥ 2.500 is then a highly concentrated market. The HHI index was calculated using two methods – Russia was included in the first case. If the concentration for individual commodity aggregates is high, the HHI value without Russia is calculated. This step indicates the real position of the other countries in their mutual trade. The Lafay index (LFI) is another indicator applied to assess mutual trade (Bojnec, 2001; Iapadre, 2001; Lafay, 1992). The idea of this index is to provide the basic overview related to the existence of bilateral comparative advantages between two analysed trade partners. If the value of the LFI index is higher than one, the comparative advantage is proven; if the value is less than one, the comparative advantage is not proven.

Based on the LFI and RCA analyses, individual countries could be divided into four basic groups (Figure 1), the first of which consists of the countries that possess comparative advantages and competitiveness within their mutual trade relations. These countries possess general comparative advantages and are located in the top right quadrant. The second group consists of the countries without proven comparative advantages at a general level, although they can be competitive at a bilateral level in relation to specific partners (the bottom right quadrant). The third group covers the countries without any proven comparative advantages and without the ability to be competitive (the bottom left quadrant). The last quadrant (top left) includes the countries with proven comparative advantages, but their real competitiveness is questionable (they can be competitive only in relation to selected partners).

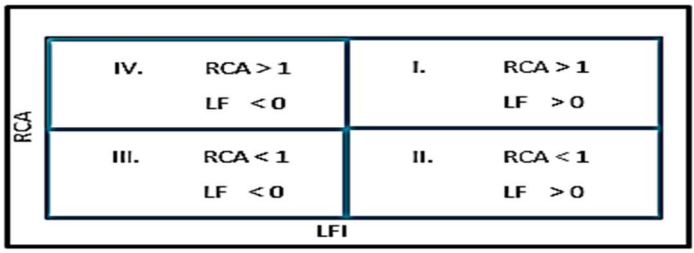

Figure 1. Division of the countries according to the lFI and RCA
Source: own elaboration.

Cluster analysis (CA) was used for the comprehensive assessment of selected indicators. The purpose of this method is to investigate details of multidimensional objects and

their classification into categories (clusters). The data were clustered using hierarchical clustering. This type of clustering is based on hierarchical organisation of objects and their clusters (Hebak, 2005). Ward's method of clustering was used in this study, the principle of which lies in minimising cluster heterogeneity according to the criterion of minimum growth of the intra-class sum of squared deviations of objects from the cluster centre. In each step, the increase in the sum of squared deviations is calculated for each pair of deviations occurring due to their clustering. Subsequently, the clusters merge, which the minimum value of the increase corresponds with exactly (Meloun & Militký, 2012).

The countries in question are as follows: Armenia (AR), Azerbaijan (AZ), Belarus (BE), Georgia (GE), Kazakhstan (KZ), Kyrgyzstan (KG), the Republic of Moldova (MO), Russian Federation (RU), Tajikistan (TJ), Turkmenistan (TR), Ukraine (UA) and Uzbekistan (UZ).

RESULTS AND DISCUSSION

Competitiveness of the Post-Soviet Market

The HHI index was applied to assess overall competitiveness of the market. The results clearly illustrate the dominant position of Russia on the overall post-Soviet market. The HHI values do not decrease below 1600, conversely, they are in the range characteristic of a moderately concentrated market or the market is highly concentrated in some cases. This is evident predominantly at the beginning and at the end of the monitored period. A highly concentrated market concerns the following aggregates: Raw materials, inedible, except fuel, Chemical and related products, Machinery and transport equipment and Miscellaneous manufactured articles. When Russia is excluded, the change is significant, the remainder of the market does not tend to concentrate. The market was moderately concentrated until 2013 only in the aggregate Mineral fuels, lubricants and related materials. It is thus evident that Russia represents a hegemony in all the directions in the given area and this directly encourages Russia's power and is also influenced by it.

Commodity and Territorial Trade Orientation

If the export value only is considered, Manufactured goods classified chiefly by material and Machinery and transport equipment contribute to the greatest degree to the overall export within the post-Soviet countries, which is determined by high added value of these commodity aggregates. Mineral fuels, lubricants and related materials also retain high contribution. The contribution of these three aggregates has been substantial long-term. Recently, there has been an increase in Food and livestock. On the other hand, the contribution of Beverages and tobacco, animal and vegetable oils is insignificant.

Mineral fuels, lubricants and related materials contribute to the greatest degree to the overall turnover. Their contribution is significant, long-term and comprises approximately ¼ of the overall turnover. These are followed by Machinery and transport equipment and Manufactured goods classified chiefly by material. These items have made long-term contribution to 60% of the overall turnover.

Regarding the **Mineral fuels, lubricants and related materials** (Table 1, Figure 2), a significant decrease in crude oil prices and related products is evident. When comparing the years 2000 and 2015, it is appropriate to mention that the economy of most of the Central Asian republics is closely connected with the production of crude oil or similar products.

Table 1. Mineral Fuels, Lubricants and Related Material – Comparison of Comparative Advantages (2000, 2015)

S3	2000	2015
AR	GE	AZ, GE
AZ	GE, UA	GE, UA, UZ
BE	MO, UA	MO, UA
GE	AR	AR, AZ, TJ, TR
KZ	UA	AR, GE, MO, UA
KG	TJ, UZ	AR, MO, RU, TJ,
MO	RU	UA
RU	GE, KZ, TJ, UA	BE, KG, TJ
TJ	KG, UZ	KG
TR	KG, TJ, UA	GE, KZ, MO
UA	MO	GE, RU, TJ
UZ	GE, KG, TJ, UA	KZ

Source: own elaboration based on data from UN COMTRADE.

When comparing this group of commodities with the previous ones, it can be concluded that, in mutual trade, a lower number of countries possess a comparative advantage over the remaining countries despite their expansion in comparison with 2015. This fact is influenced by their access to raw materials. The position of Belarus is interesting as it purchases crude oil from Russia for preferential prices and, subsequently, it either re-exports or processes it to manufacture products with higher added value. Regarding crude oil, Ukraine is an important business partner.

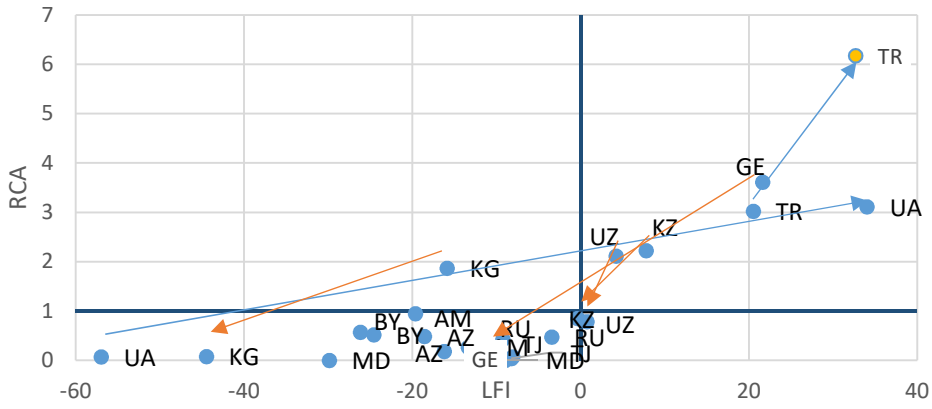

Figure 2. Mineral fuels, lubricants and related materials – comparison of RCA and LFI (2000, 2015)
Source: own elaboration based on data from COMTRADE.

The commodity aggregate S- 5 **Chemicals and related products** comprises products traded among the majority of the participating countries. Since this concerns products with higher added value, it might be concluded that their export contributes to economic growth of these countries. In comparison with the previous aggregates, considerable differences between the monitored years 2000 and 2015 are evident. Whereas in 2000 Russia possessed

a comparative advantage over all of the monitored countries except for Belarus, in 2015 the RCA value of Russia exceeded only 1 in its trade with Moldova and Ukraine.

The category S-6 **Manufactured goods classified chiefly by materials** is characterised by significant changes in the monitored years. In 2000 and 2015, nearly all the monitored countries conducted mutual trade with Russia in all the sub-categories of this product aggregation. Russia represented the most important business partner to all the countries.

Products with high added value are included in group 7 **– Machinery and transport equipment**. In 2000, Russia's position in this category of goods was the best – its comparative advantage was over seven countries. At the end of the monitored period, however, it was only over Azerbaijan, Kazakhstan and Turkmenistan. Improvement was evident in Belarus, which currently does not possess a comparative advantage only over the remaining Eastern European countries. Contrariwise, a decline is evident in Tajikistan, which possessed a comparative advantage only in its trade with Kyrgyzstan and Moldova in 2015.

Miscellaneous manufactured articles contain, for instance, furniture, travelling equipment, shoes or scientific instruments. This category is largely heterogeneous, and its added values differ. The position of Russia changed in the monitored period, as it lost its comparative advantage over many countries. When analysing the sub-categories (two-digit code), it might be stated that Russia trades all the commodities except for photographic equipment and supplies, and optical goods.

Division of the Countries According to Foreign Trade Structure

Based on the above analyses, cluster analysis of commodity aggregates was conducted. The following variables were included in the initial entering variables: balance, coverage of import by export, the Lafay index, RCA, contribution to overall turnover. At first, the correlation coefficient for individual variables entering the analysis was calculated based on which the following variables were excluded: balance and contribution to overall turnover. Subsequently, the cluster analysis was conducted based on the following variables: RCA, Lafay index and coverage of import by export. Subsequently, the countries were divided into individual categories based on the analysis, as illustrated in Table 2.

Based on the conducted analyses, it can be concluded that the Russian Federation possesses the best prerequisites for mutual exchange, followed by Ukraine and Moldova. Kazakhstan, Azerbaijan and Georgia follow, whereas the preconditions of the remaining Central Asian republics are very low. In this regard, Mazhikeyev and Edwards (2013a) and Mazhikeyev *et al*. (2015) also add that there is a significant difference between Kazakhstan and Kyrgyzstan, as these countries have already undergone a transformation process with the remaining central Asian republics. What cannot be stated is that participation in the regional integration entities improves the position of individual countries since, for instance, the Eurasian Economic Union member states Armenia, Kyrgyzstan or Belarus have improved their status. Russia is an exception in this case. As has already been stated above, the country exploits its dominant position against the remaining countries and thus does not provide the basis for fully-functional integration of foreign trade within, for example, the customs union. This fact is highlighted by Azizov (2017) who also adds that mutual trade of these countries is most favourable for Russia. Similar results have been recorded by Skriba (2016) while adding that the non-existence of simultaneous agreement with the EU is one of the conditions for mutual trade within individual agreements.

Table 2. Division of Countries According to the Characteristics of Foreign Trade

Group	1		2		3		4		5	
S1 0	TR, MO, KZ, KG, AR ,	coverage of import by export <1, LFI <0	RU, UZ, AZ	LFI positive, RCA >1	TJ	coverage of import by export <1, LFI>5, highest RCA	GE, UA, BE	highest coverage of import by export, LFI low but positive		
S1 1	AZ, UZ	highest coverage of import by export, very low RCA	BE, GE, KZ, KG,RU, TJ, TR,UA	very low coverage I/E, lowest RCA, LFI below 0	MO	RCA above 5, LFI slightly above 0	AR	highest RCA and LFI		
S1 2	AZ, KZ	highest coverage of import by export	BE, KG, MO, UZ	lowest coverage of import by export	GE, RU, TR, UA	very low RCA	TJ	highest LFI and RCA		
S1 3	RU, AZ, TJ, AR	LFI < 0 , RCA <1,	BE, KG, MO, UA	coverage of import by export close to 0, lowest LFI	GE, KZ, UZ,	RCA > 1, positive coverage of import by export	TR	highest coverage of import by export, RCA and LFI very high		
S1 4	AZ	coverage of import by export is very low, RCA > 1	BE, KZ, KG, TJ, TR, UZ, AR,	RCA close to 0	GE, MO,RU	highest LFI	UA	highest coverage of import by export, RCA > 1		
S1 5	AZ, GE,	highest coverage of import by export, LFI< 0	BE,KZ,RU, UA, UZ,	negative LFI, highest RCA	KG	lowest LFI	MO, TJM	very low RCA and very low coverage I/E	TR, AR	negative LFI, coverage I/E<1
S1 6	AZ	highest coverage of import by export and LFI	BE, GE, UZ, AR	RCA < 1, LFI < 0	KZ, KG, MO,TJ, TR	lowest coverage I/E and RCA	RU, UA	highest RCA		
S1 7	AZ	highest coverage of import by export, high LFI and RCA	BE, RU, UA, UZ	RCA around 1, LFI around 0	GE, KG, MO, TJ, AR	negative LFI	KZ, TR	coverage I/E close to 0, lowest LFI and RCA		
S1 8	AZ, GE	LFI close to 0, positive coverage I/E	BE, KG, AR,	highest LFI and RCA	KZ, MO,	lowest LFI	RU, UA	LFI close to 0	TJ, TR	negative LFI, lowest RCA, lowest coverage I/E

Note: I/E – import by export

Source: own elaboration based on data from UN COMTRADE.

The above mentioned division enables comparison of individual countries (Figure 3). Russia and Ukraine bear the closest resemblance in competitiveness of their foreign trade. Their degree of competitiveness in the majority of the monitored commodities is very high. The only commodity aggregates that reach different values of calculated indicators are food and livestock, mineral fuels, lubricants and related materials and animal and vegetable oils, fats and waxes. Conversely, the degree of similarity is low between Russia and, for example, Kazakhstan and Kyrgyzstan. It is evident that the Eurasian Economic Council countries focus on different commodities in order for the trade structure to be utilised and not to be identical. Furthermore, Belarus with Kyrgyzstan, Ukraine or Uzbekistan record a high degree of resemblance in the structure of their foreign trade. The degree of similarity is also very high in the case of Kazakhstan and Turkmenistan. Contrariwise, Azerbaijan is highly dissimilar as its indicators of foreign trade competitiveness are significantly different in comparison with the other countries. The differences are also recorded in the case of Tajikistan, which bears the closest resemblance to Kyrgyzstan and Turkmenistan. Kyrgyzstan represents a country which reports the highest degree of similarity in its indicators of foreign trade competitiveness to the remaining post-Soviet countries. Its status might be influenced by its membership in the Eurasian Economic Council. Concerning this, Kirkham (2016) emphasises that this is in order for the boom-bust cycle not to be synchronised should there be further integration. For this reason the hypothesis number 4 cannot be accepted, nor similarity between the countries in terms of their competitiveness.

	AZE	BLR	GEO	KAZ	KGZ	MDA	RUS	TJK	TKM	UKR	UZB	ARM
AZE	0											
BLR	0	0										
GEO	2	3	0									
KAZ	1	3	2	0								
KGZ	0	5	2	4	0							
MDA	0	2	2	3	4	0						
RUS	2	3	3	2	1	1	0					
TJK	1	2	2	3	4	3	2	0				
TKM	0	2	2	5	4	2	2	4	0			
UKR	0	5	3	2	2	1	6	1	2	0		
UZB	1	5	2	3	2	1	4	1	1	3	0	
ARM	1	3	3	2	4	2	2	3	4	1	2	0

Figure 3. Comparison of Similarities Between Countries
Source: own elaboration based on data from UN COMTRADE.

CONCLUSIONS

The structure of the trade between the post-Soviet countries is strongly influenced by the structure of their economies and overall economic maturity. Simultaneously and in a number of ways, the countries represent a territory which is important not only for Russia, but also for other countries. They are striving to change the current distribution of power through favourable business relations. In comparison with 2000, the structure of business partners of the monitored countries has changed – especially territorially, within the post-Soviet market.

When comparing the situation in the analysed period, it is evident that the pace of growth in individual countries still has not reached its final state. The first hypothesis about

the openness of the economy cannot be confirmed, as it decreased during the monitored period, which is evident for example in Belarus or Tajikistan. However, Belarus, Moldova, Turkmenistan and Ukraine are the most open economies. Regarding Belarus, the former two, this situation is specific since none of the countries is a member of WTO. When comparing the years 2000 and 2015, a higher degree of interconnectedness between the countries is evident, particularly those connected to Russia. The structure of foreign trade of the countries is also gradually undergoing changes. Closer interconnectedness between individual geographical units is evident here. In comparison with 2000, there was (in the period up to 2015) a significant shift in, for example, Georgia's business direction towards the EU rather than Russia and other post-Soviet republics. In terms of economic openness, it might also be stated that Tajikistan together with Uzbekistan are countries which were closest to autarky in 2015. When individual commodity aggregates are assessed, it might be stated that the majority of the countries experienced significant changes between 2000 and 2015. A decline in the comparative advantages in the mutual trade connected with Russia is substantial; however, the country remains an important business partner for most of the monitored countries. The third hypothesis can be confirmed. Belarus is the reverse since it has been able to increase the number of comparative advantages of the products with higher added value. In the last two years, Ukraine's foreign trade has recorded significant losses. This might be influenced by the civil war in its eastern part and problematic relations with the Russian Federation.

Considerable dependence on raw materials, which are a significant part of the overall foreign trade, is also evident in the selected countries. In this regard, Russia or Kazakhstan are extremely dependent on trade performance in raw materials, especially on natural oil and natural gas. This corresponds with the conclusion drawn by (Connolly, 2011).

When assessing intra-industry trade, it is important to mention similar specialisation of individual countries as well, for example, in pharmaceutical products, which signifies that these countries possess similar factor endowment and it is thus assumed that economic integration can be adjusted.

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Requirements for Scaling International Social Enterprises

Marek Ćwiklicki

ABSTRACT

Objective: The article aims to identify the requirements for a social enterprise to scale internationally. The explicit research objective is to explain which requirements enable to scale social ventures internationally with success.

Research Design & Methods: The study employs a multiple case study analysis based on systematic literature review used to identify papers examining international social enterprises. In total six cases were analysed using the criteria of organisational capabilities included in the SCALERS model.

Findings: The analysis showed that the most significant for scaling social enterprises internationally are: earnings generation and alliance building; next staffing, communicating, and replicating. Less significant are lobbying and stimulating market forces.

Implications & Recommendations: The existence of a strong business model, neutral from market sources, well-resourced, recognised in the public sphere associated with scaling up.

Contribution & Value Added: The article contributes by revealing that capabilities for ISEs scaling are varied in terms of their significance. The presented results go along with the observation that prior to scaling social impact the basic operational model must show its viability.

Article type: research article

Keywords: social entrepreneurship; internationalisation; scaling; SCALERS

JEL codes: L31, F23

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INTRODUCTION

The article aims to identify the requirements for a social enterprise to scale internationally. As most of the scholarship concentrates on national social entrepreneurship good practices and national settings, the issue of internationally operating social enterprises seems to be not-well researched. The 'social' aspect in the context of international entrepreneurship is also not always distinguished in the research (cf. Jones, Coviello, & Tang, 2011; Keupp & Gassmann, 2009). This was the main reason why this topic was chosen for consideration.

The explicit research objective is to explain which requirements enable to scale social ventures internationally with success. For this purpose the SCALERS model was chosen as the analytic framework (Bloom & Chatterji, 2009; Bloom & Skloot, 2010; Bloom & Smith, 2010a). In this exploratory research first the systematic literature review was employed in order to identify papers about international social enterprises (ISEs). In total six cases were recognised and coded according to the SCALERS criteria. These cases are: Benetech, Fairtrade International, KickStart International, Teach for All, Vestergaard Frandsen, and Viva Rio. The most significant factors were established after content analysis based on their joint description in secondary scholar papers.

The article is structured as follows. First, the theoretical background of international social entrepreneurship and the SCALERS model is presented. Next, the research method and materials are discussed. After that, the results are presented, covering each of the main capabilities derived from the SCALERS model: staffing, communicating, alliance-building, lobbying, earnings generation, replicating, and stimulating market forces. The limitations of the study and the direction of future research are discussed in the last section of the article.

LITERATURE REVIEW

International Social Enterprises

In spite of the growing body of literature about international entrepreneurship (cf. Jones *et al*., 2011; Keupp & Gassmann, 2009), its social side is still unrecognised. One of the potential reasons lies in a different nature of social entrepreneurship. Desa notes that 'descriptions of social entrepreneurship differ widely across international contexts from the narrow to the all-encompassing' (Desa, 2012, p. 728). Matching two separate issues: international entrepreneurship (IE) and social entrepreneurship (SE) leads to intersection consisting of the social aspect of doing business taken from SE and the international one taken from IE. The results of this intersection are international social ventures providing blended value, i.e., 'blends of financial, social, and environmental values' and aiming at social change (Zahra, Newey, & Li, 2014, p. 140). The seminal definition of IE was provided by Oviat and McDougall, who argued that IE is 'the discovery, enactment, evaluation, and exploitation of opportunities – across national borders – to create future goods and services' (Oviatt & McDougall, 2005, p. 250). Another offered definition is based on the synthesis of previous scholarship and characterises ISE as:

> *'the process of creatively discovering and exploiting social entrepreneurial opportunities overseas with the application of business expertise and market-based skills, with innovative social goods and services, either with or without profit orientation, but with the pivotal objective of creating societal value rather than shareholder wealth in the overseas territories where the enterprise functions.'* (Tukamushaba, Orobia, & George, 2011, p. 258).

Within this context three aspects influencing the cross-border business are worth mentioning: cross-border uncertainty, limited resources, and network dynamics (Sarasvathy, Kumar, York, & Bhagavatula, 2014; Zemaitaitiene *et al.*, 2016; Ratajczak-Mrozek). It establishes the initial set of problems which ISEs must face.

The distinction between for-profit and not-for profit ISE leads to the formulation of propositions based on the literature review (Yang & Wu, 2015). For-profit ISEs choose a more safe scaling up mode, while they do not experiment with operational modes focus and the choice of products. Expansion to other countries is based on two grounds: the for-profit ISEs choose those countries where a similar environment exists (or customers can be met), while not-for profit ISEs try to answer similar problems as in the original setting.

The literature review on ISEs allows to confer that this kind of business venture is quite new in scholarship although in recent years it has started to gain interest. This attention was raised mainly due to the project aimed at investigating the cross-national setting, such as International Comparative Social Enterprise Models (ICSEM) (Abbou *et al*., 2017; Brouard & Elson, 2014; Defourny & Nyssens, 2017).

There is no official nor unofficial data about the number of operating ISEs. Based on the cases identified for the purpose of this study, discussed in the 'Methods and material' section, one can conclude that only a few ventures become successful in expanding business internationally. It urges to investigate the reasons for thriving beyond the original settings.

The SCALERS Model

In this article I discuss the scaling social impact issue which gains international interest (e.g., Bradach, 2010; Dees, Anderson, & Wei-Skillern, 2004; Galera & Borzaga, 2009; Walske & Tyson, 2015; Weber, Kröger, & Lambrich, 2012; Westley, Antadze, Riddell, Robinson, & Geobey, 2014). But first the meaning of scaling (up) social entrepreneurship needs to be explained. Searching for the spread of the impact of social entrepreneurs leads to the distinction between dissemination, affiliation and branching (Dees *et al*., 2004). These ways of growth are quite well described in the literature though the framing parts of the most appropriate strategy are still questionable. Other similar expressions are: transferability, replicability and adaptability (Weber *et al*., 2012).

For the last twenty years a new research development has proved to be worth considering as potentially explaining success factors for scaling. Cases described in the literature give one piece of the puzzle: the number of staff. It spotlights the issue of resources and brings back to the discussion the resource-based theory as potentially capable to explain the scaling in social enterprises. Such a change happened in KaBOOM!, which is an example of the 'bricks-to-clicks' model (Bradach, 2010).

Scaling strategies were grasped by Weber, Kröger and Lambrich (2012). The Authors distinguished four modes: capacity-building, relationship defined by an ongoing

agreement, diffusion of knowledge, and one adjacency move (Weber *et al*., 2012, p. 7). In the context of strategies, the individual decision making path appears to be a sign of successful operation of the basic operational model. It means that first this model must prove its viability.

Residing in the scope of interest in research, the next issue is driven by the assumption about the place where a potential for scaling up appears: inside or outside the organisation. Taken the most significant feature of social enterprises – social value provision, the shift from internal to external conditions appears, which finally brings a mixture of these two approaches.

Currently, the most popular model explaining the success of scaling social impact is the SCALERS model developed by Bloom and Chatterji and for the first time explained in 2009 (Bloom & Chatterji, 2009; Bloom & Smith, 2010a). It is still in the theory-testing phase and needs the confirmation of validity (Cannatelli, 2017).

The SCALERS model explains a success at scaling social impact as the results of development in seven independent capabilities from which the acronym SCALERS comes from, i.e.: Staffing, Communicating, Alliance building, Lobbying, Earnings generation, Replicating, and Stimulating market forces in certain situational contingencies (Bloom & Skloot, 2010, p. 5; Petrů & Havlíček, 2017). As the components of the SCALERS model are well described in the mentioned sources, only a short presentation will be given (Table 1). The SCALERS model stresses the importance of the external environment. It assumes that the organisation's success depends on its ecosystem. The situational contingencies are: labour needs, public support, potential allies, supportive public policy, start-up capital, and dispersion of beneficiaries. For the presented study it is important to note that success in scaling does not depend on excellence in all the factors indicated by the model (Bloom & Smith, 2010a, p. 14). In fact, it could vary.

In this article the research subject is constituted by international social organisations which have already succeeded in scaling. In the SCALERS questionnaires the interviewers are asked to evaluate the organisation's own performance for the last three years and in comparison to other organisations (Bloom & Smith, 2010a, p. 25). It is also a limitation of this study, as the established descriptions were adjusted to a particular category not related to other organisations. It can be justified by the international character of the research subjects as it would be not suitable to match up to any other ISE.

MATERIAL AND METHODS

The methodology used for this research belongs to comparative analysis based on the multiple case study approach. The analysed data come from a systematic literature review (SLR). The SLR was performed in order to identify papers examining international social enterprises. First, we applied queries using the phrases 'international social enterprise*' and 'international social entrepreneur*' in abstract and the full body of full-text papers indexed in journal databases: EBSCO host, Scopus, Science Direct and Web of Science, which gave 1 235 articles in total. The elimination of duplicates provided 248 papers. Next, we performed content analysis of each of the papers. This phase of research resulted in excluding 198 ones as not referring to the topic 'social enterprise/entrepreneurship' working internationally. Finally, 50 papers were qualified for thorough

analysis. This phase resulted in the identification of six cases included in a detailed analysis using the SCALERS model. The reasons to reject papers from further examination were: not covering particular ISE enabling to evaluate it according to the accepted model, dealing with the internationalisation of SE but without references to a factual enterprise, describing only a hypothetical venture. Figure 1 depicts the procedure of selecting these cases and Table 2 contains a short description of them.

Table 1. The Description of the SCALERS Drivers

Driver	Depending situational contingency	Explanation
1. Staffing	labour needs	Hired staff (employees or volunteers) possessing necessary skills for given job positions
2. Communicating	public support	Successful persuading key stakeholders (donors, own personnel, beneficiaries, consumers, general public) to support the organisation in its change
3. Alliance-building	potential allies	effectiveness in creating partnerships (coalitions, joint ventures, etc.)
4. Lobbying	supportive public policy	gaining support from public administration institutions in introducing change
5. Earnings generation	start-up capital	having revenue exceeding the organisation's expenses
6. Replicating	dispersion of beneficiaries	reproducing (copying) the programmes and initiatives
7. Stimulating market forces	availability of economic incentives	creating incentives to convince pursuing social interests by people and institutions

Source: own elaboration based on Bloom and Smith (2010a, pp. 12-17).

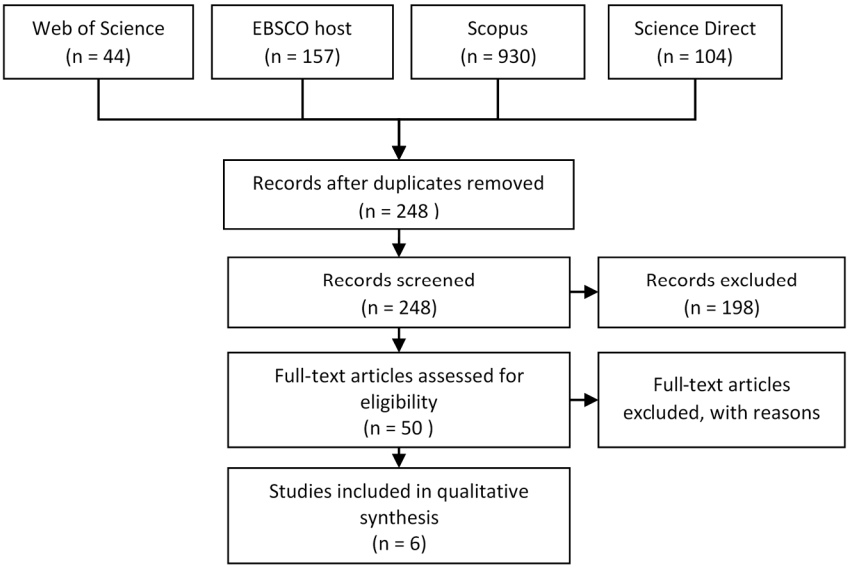

Figure 1. Stages in studies selection process
Source: own elaboration.

The described cases come from recent papers (2012-2016). It supports the inference about the novelty of undertaking the problem although the ISEs have been operating since '90s. What these ISEs have in common is putting above social aim which is helping disadvantaged people. As the main purpose of the article is to concentrate on drivers, the detailed presentation of each company was omitted.

Table 2. Description of ISEs Included in the Research

No.	Name of ISE	Year of est.	Country of origin	Business domain	Area of operation	Source
1.	Benetech	1989	USA	reading machine for blind people	worldwide	(Desa, 2012)
2.	Fairtrade International	2004	Germany	certification of fair trade standards	worldwide	(Bennett, 2016)
3.	KickStart International	1991	USA	irrigation technology	Africa	(Galvin & Iannotti, 2015)
4.	Teach for All	2007	USA	education	worldwide	(Friedrich, 2014)
5.	Vestergaard Frandsen	1957	Suisse	products for disadvantaged people	worldwide	(Agrawal & Gugnani, 2014)
6.	Viva Rio	1993	Brasil	preventing violence	Brasil, Haiti	(Davis, 2016)

Source: own elaboration.

Based on the content analysis of the identified articles I coded particular phrases referring them to scaling social enterprises operating internationally. As codes I used names of organisational capabilities included in the SCALERS model. The analysis of each case showed the lack of information about each of the detailed criteria incorporated in the SCALERS model. Therefore, the following data treatment was used. For each of the measures the depiction from a particular case was inserted and marked with numbers (in brackets) from Table 2, which allows to trace which case they refer to. The further analysis is done separately towards each of the seven drivers.

RESULTS

The first capability in the SCALERS model refers to Staffing (Table 3). It starts with meeting labour needs with skilful people. In this area there is a lack of its full explanation. We can conclude that having own workers was just a core, a base for operations of the company, while an operating business requires trained workers and in two examined cases such inference can be drawn. The second criterion in Staffing refers to the availability of capable volunteers. In two identified cases the access was limited and ISE was based on full-time workers. The last condition pertains to possessing proper skills by managers to scale up. In this field we can observe having skilful managers in four cases. Their competences were secured thanks to the selection procedures. Overall, we can state about the general importance of staffing in ISEs with strong emphasis on formal HRM practices aimed at possessing competent workers.

The second part of the SCALERS is Communicating which can be expanded into external communication and public relations. The first point is about communicating to key stakeholders. Examples derived from three cases proved that branding was crucial. For

that purpose ISEs used classical advertisement means, such as ads and campaigns with the goal to create the image of a professional, trustworthy organisation. The next section pertains to informing the individuals. Here the same tools as in the previous part were used, altogether with mass communication (declared in one case). The last communication is aimed at donors. In two cases we can see strong commitment to taking part in international venues showing transnational orientation of the social enterprises. Taken as a whole, this organisational capability presents as important for ISEs (Table 4).

Table 3. Staffing in International Social Enterprises

Staffing	Examples
Effective meeting of labour needs with people who have the necessary skills.	- not fully explained; only mentioned that there was not strong leadership (2) - selected top university graduates without any previous pedagogical course work (4) - the organisation's staff working together with local trained staff (5)
An ample pool of capable volunteers available to help us meet our labour needs.	- mostly based on full-time workers (5) - in replication the volunteers were engaged in the project (6)
Individuals at management positions who have the skill to expand our organisation, programme or principles.	- specialised skills but also volunteers (1) - operating own internal monitoring department in order to measure outcomes on the lives of buyers (3) - the selection procedures of the corps members (4) - using a public relations team, organisation created publicised partnerships (6)

Source: own elaboration.

Table 4. Communicating in International Social Enterprises

Communicating	Examples
Effective at communicating what we do to key constituencies and stakeholders.	- operate in politically unstable countries (1) - ads (4) - the ability to create and circulate a broadly defined group identity that appeals to multiple sets of potential supporters (6) - brand itself as a development subcontractor specialising in community-based interventions within precarious regions (6) - communication campaigns to spread word of their struggles to commiserating international audiences (6)
Successful at informing the individuals we seek to serve about the value of our programme for them.	- using billboards in target counties (2)
Successful at informing donors and funders about the value of what we do.	- very successful at branding itself as a transnationally oriented NGO that can work in multiple local contexts (6) - very active in a variety of international civil society meetings and summits in Brazil and beyond (6)

Source: own elaboration.

The third part of the SCALERS refers to partnership and is called 'alliance-building'. It starts with successful partnership building with win-win situations. It can be in a form of receiving

donation of unnecessary equipment for the donors or supporting activities with the same social aim. Cooperation with others in new initiatives exists, but it was not often reported. Nevertheless, it appears to be more frequent in undertaking everyday actions (Table 5).

Table 5. Alliance Building in International Social Enterprises

Alliance building	Examples
Partnerships built with other organisations that have been win-win situations for us and them.	- received donations of the hardware which were not necessary for the giving company (1) - reaction to the call for projects which allowed the funding organisation to realise its goal, while ISE created an image of the leading company in operations in the developing world (5) - building strong connections with local NGOs instead of focusing on single issues (6) - co-sponsorship of other NGO projects in the country (6) - financing other actions or projects which have a similar goal (6) - networking with large NGOs has provided strong support (6)
Rarely trying to 'go it alone' when pursuing new initiatives.	- collaboration with other organisations working in the same areas (human rights groups) (1) - launching a project with other partners (5)
Accomplished more through joint action with other organisations than we could have by flying solo.	- working with other NGOs and foundations (1) - cooperation with the country government workers (5) - absorbing benefits from collaboration on the relationship between building ties with local communities and assessing what type of intervention the community requires (6)

Source: own elaboration.

Lobbying, the fourth section of the SCALERS model, was not expressed often in the examined texts. We can reason that lobbying is partially covered by public-partner partnerships. In the area of engaging government agencies in financial support was perceived as the recognition that official agencies were not successful to solve given problems as ISEs were. No observation was made about creating legal frameworks supporting ISEs activities in the identified cases. The last part of lobbying is about rising the cause to a higher place on public agenda. One observation proved that it had happened through escalating the problem to international audience who put pressure on the local government (Table 6).

Table 6. Lobbying in International Social Enterprises

Lobbying	Examples
Successful at getting government agencies and officials to provide financial support for our efforts.	- Showing that an undertaken action brings financial benefits for the government (5) - Showing that the organisation can successfully act in the areas where others institutions do not. Proving access to these areas (6)
Successful at getting government agencies and officials to create laws, rules, and regulations that support our efforts.	–
Able to raise our cause to a higher place on the public agenda.	- Through convincing strong partners to pressure from international audience on local authorities (6)

Source: own elaboration.

The fifth part of the SCALERS models is Earnings generation. Deducing from the number of phrases referring to this topic, we can state that it is an important issue to ISEs. The first section describes the stream of sales revenues. Due to financial situation of the customers whose buying potential is weak, the sale is subsidised by donors (private or government ones). In one case the customer's credit was introduced. The second segment of earnings generation reflects donors and funders who have been major sources of revenue. It is strongly true in the investigated companies. The next factor, ways to finance ISE activities, also found clear evidence as showed by the case of Viva Rio. It was claimed that the evolution from local to national to transnational NGO had been facilitated by sizable grants from large multilaterals, national governments aid programmes, international foundations, CSR actions, and sizable allocations from municipal and state governments (Davis, 2016). The ability to find different sources of finance seems to be the crucial ISE's capability (Table 7).

Table 7. Earnings Generation in International Social Enterprises

Earnings generation	Examples
Generated a strong stream of revenues from products and services that we sell for a price.	- customers credit (1) - not so important comparing to legitimacy. (2) - heavily subsidised through donor financing (3) - each local 'Teach for ...' programme is funded by public-private partnerships. - support through grants from the governments of countries where ISEs operate (4) (5)
Cultivated donors and funders who have been major sources of revenue for us.	- Business partners allowed delayed payments (1) - Tentativeness to achieve financial independence from grants and donations (3) - Grants funding from a couple of donors (3) - Using reputation and companies' CSR budgets for sponsorship of many such programmes (4) - Using funding from the city government (6)
Found ways to finance our activities that keep us sustainable.	- sold business (1) - financing coming from grants, (3) - venture philanthropy 'microlending' (4) - evolution from local to national to transnational NGO has been facilitated by finance from a difference source (6)

Source: own elaboration.

Second to last driver for scaling social enterprises is Replication. Products or services offered by the identified companies showed to work effectively in multiple locations or situations as the name of the first factor indicates. Their products proved to function in different countries or – after adaptation – in different situations. For example, reading systems working in English operate also in other languages (case #1). A solution elaborated to prevent violation becomes the base for a manual, a guidebook (case #6). These illustrations show operational modes focused on product/service transactions between countries. They assume the universal nature of the problem to fight with. Only the scale of the occurrence of the issue demonstrates the usefulness of the solutions. The next point in replication is its ease. This issue is complex as some products/services depend on the individual attitude of a customer who is willing to benefit from it. It is especially visible for

mindset changes but thanks to elaborated procedures, programmes and guidebooks, replication understood as launching the product in a new environment is quite easy. The description of controlling and coordinating programmes in multiple locations is missing. In one case we can point out such a possibility (Table 8).

Table 8. Replicating in International Social Enterprises

Replicating	Examples
'Package' or 'system' that can work effectively in multiple locations or situations.	- reading systems for the blind first for English, then outside the US (1) - the products aimed at preventable diseases in developing countries (5) - publication of 'Youth at Risk: The Fight for Peace Methodologies Manual', a guidebook for combining sports and civic education that has been translated into six languages (6) - creation of eight permanent environmental protection centres that offer training classes on conservation, recycling, gardening, and ecotourism and include greenhouses in which seedlings are cultivated to be replanted (6)
Easy to replicate our programmes.	- individual-led change is a central element in the appeal of the Teach for All model for potential recruits (4) - Viva Rio's experience worked with transnational gun-control organisations (6)
Successful at controlling and coordinating our programmes in multiple locations.	- launching or providing support for a series of community-based initiatives in favelas (6)

Source: own elaboration.

The last part of the SCALERS model is Stimulating market forces. This element was less often recorded in the investigated cases. Only individual instances appear to be suitable for sub-criteria; in one case even none. Therefore, it is difficult to 'demonstrate that business can make money through supporting ISEs' activities'. In case #1 it was possible to prove the business as for-profit is possible. In the next issue the approach applied in case #3 is interesting as it emphasises not the product itself but the final result to which this product contributes. The last topic – ability to trust market forces to help resolve social problems – was not covered in papers describing cases (Table 9).

Table 9. Stimulating Market Forces in International Social Enterprises

Stimulating market forces	Examples
Able to demonstrate that businesses can make money through supporting our initiatives.	in the absence of supportive institutional environments (1)
Able to demonstrate that consumers can save money through patronising our products and services.	the product is not the pump but rather a successful, rural family enterprise (3)
Able to trust market forces to help resolve social problems.	–

Source: own elaboration.

Based on the above descriptions of each organisation's capabilities, we can evaluate its significance. Table 10 shows the result of such analysis. Each sub-criterion was marked as: not very significant (+), just significant (++), and very significant (+++). Where there was no note about a given topic, the question mark was used (?).

We can notice that some of the criteria in a given group are more significant comparing to others. Trying to generalise this finding, the following inferences can be drawn. There is a differentiation in the sub-criteria in each main SCALERS's capability. The most consistent evaluation is in earnings generation and alliance building. The next almost coherent evaluation appears in communicating and stimulating market forces. The rest of the drivers have got diverse significance, such as in the case of staffing and replicating.

Table 10. Significance of Capabilities for Scaling International Social Enterprises

Drivers	Significance
Staffing	
Effective meeting labour needs with people who have the necessary skills.	+
An ample pool of capable volunteers available to help us meet our labour needs.	++
Individuals at management positions who have the skill to expand our organisation, programme or principles.	+++
Communicating	
Effective at communicating what we do to key constituencies and stakeholders.	+++
Successful at informing the individuals we seek to serve the value of our programme to them.	+
Successful at informing donors and funders about the value of what we do.	+++
Alliance-building	
Built partnerships with other organisations that have been win-win situations for us and them.	+++
Rarely trying to 'go it alone' when pursuing new initiatives.	++
Accomplished more through a joint action with other organisations than we could have by flying solo.	+++
Lobbying	
Successful at getting government agencies and officials to provide financial support for our efforts.	++
Successful at getting government agencies and officials to create laws, rules and regulations that support our efforts.	?
Able to raise our cause to a higher place on the public agenda.	+
Earnings generation	
Generated a strong stream of revenues from products and services that we sell for a price.	+++
Cultivated donors and funders who have been major sources of revenue for us.	+++
Found ways to finance our activities that keep us sustainable.	+++
Replicating	
'Package' or 'system' that can work effectively in multiple locations or situations.	+++
Easy to replicate our programmes.	++
Successful at controlling and coordinating our programmes in multiple locations.	+
Stimulating market forces	
Able to demonstrate that businesses can make money through supporting our initiatives.	+
Able to demonstrate that consumers can save money through patronising our products and services.	++
Able to trust market forces to help resolve social problems.	?

Source: own elaboration.

In order to receive a more general view on scaling ISE, the qualitative scale was re-scaled using the scale 1-3-5. The final picture of averages for each of the main organisation's capabilities is depicted in Figure 2. From this illustration the most significant for scal-

ing social enterprises internationally are: earnings generation, and alliance building. The second group of drives is constituted by staffing, communicating, and replicating. The less significant ones are lobbying and stimulating market forces.

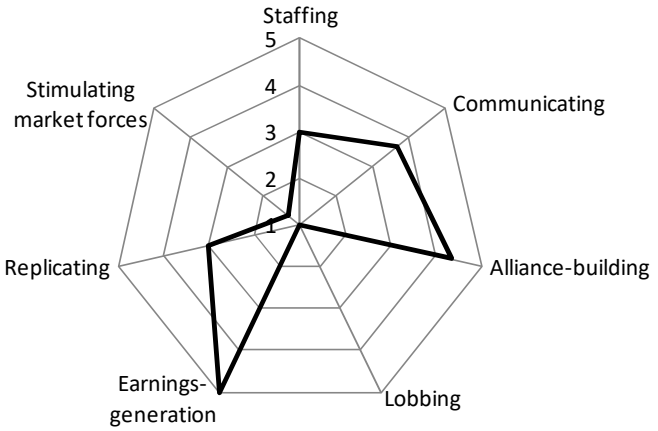

Figure 2. Significance of the SCALERS dimensions for an international social enterprise
Source: own elaboration.

DISCUSION AND CONCLUSIONS

The presented results go along with the observation that prior to scaling social impact basic operational model must show its viability (Weber *et al*., 2012). In each case, the beginning of expanding operation into foreign countries was done after success in the country of origin.

Capabilities for ISEs scaling are differentiated in terms of their significance. It supports Bloom and Smith's comment that the appearance of capabilities is not set and 'in some situations, effective deployment of all the SCALERS may be needed for successful scaling' (Bloom & Smith, 2010b, p. 13). In the case of ISEs this observation was proved with limitations described in the next part of the article.

We note differentiation which allows to conclude about the existence of a strong business model, neutral from market sources, well-resourced, recognised in the public sphere associated with scaling up. The last issue covers three dimensions (communicating, lobbying, and alliance buildings). It refers to embeddedness which is understood as 'the nature, depth and extent of an individual's ties into the environment' (Jack & Anderson, 2002) and transposed to a level of the organisation means 'the degree of connection and interaction with local actors or stakeholders in the community' (Yang & Wu, 2015, p. 39). We observe rather strong significance of alliance building and communicating together with weak lobbying. Albeit these terms are interrelated, these antecedents for scaling up were included in earlier studies on this phenomenon as part of political skills embracing: coalition formation, networking, advocacy, and lobbying (Frances & Antadze, 2010).

Strong significance of earnings generating comes from all six cases included in the study. We can notice different approaches in this area due to the type of ISE (for-profit/not

for-profit). The inclusion of this aspect in the description of each case corroborates its significance. It is one of the main features of social enterprise, which expresses its hybridity (Doherty, Haugh, & Lyon, 2014).

Staffing was also found a significant factor. It is linked to the proposition about existing correlations between the managerial global vision elements and the company internationalisation scale (Kowalik, Danik, Král, & Řezanková, 2017).

The less visible factor for ISE in scaling up is stimulating market forces. It would be false to state that this element was absent, but it was not fully reported. Provision of products by ISEs captured in the study relates to at least two of sub-criteria. Especially in case #3 it is exemplified as for the company not selling goods is its main business logic, but to offer the development of the family enterprise through its product. This observation guides us to the limits of the study described in the last section of the article.

LIMITATION AND FURTHER RESEARCH

The research described in the article as every kind of scientific procedure has its own limitations. In the main one I include relying solely on secondary data taken from works picturing cases with different aims that one established in this article. Another limitation is due to conducting coding by myself, which could increase the risk of subjective evaluation of data which could lead to discrepancies and false conclusions. The next limitation stems from merging descriptions of different organisations which were treated as one case.

The limitations pointed out above can be overcome by the following directions of future research. First, it is recommended to collect primary data from ISEs which scaled up successfully using structured forms like the SCALERS model. The next suggestion is to analyse data by a team of researchers whose cooperation will strengthen internal validity thanks to triangulation used. Third, the scaling process should be reconstructed and attempt to investigate the influence of national settings on scaling up.

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How Entrepreneurial Orientation Stimulates Different Types of Knowledge in the Internationalisation Process of Firms from Poland?

Agnieszka Głodowska, Marek Maciejewski, Krzysztof Wach

ABSTRACT

Objective: The aim of the article is to verify how entrepreneurial orientation affects different types of knowledge in various stages of internationalisation of Polish firms.

Research Design & Methods: The research method applied in the paper is the critical analysis of prior studies as well as a survey conducted on a sample of 355 businesses from Poland. The research is based on the previously known typology of knowledge: market knowledge and experiential knowledge.

Findings: On the basis of the research, it can be concluded that entrepreneurial orientation plays a key role in the use of knowledge in internationalisation of Polish firms. Higher entrepreneurial orientation determines a more intensive use of knowledge on various stages on internationalisation. Network knowledge is used in the initial as well as mature internationalisation. Entrepreneurial knowledge is intensely used on the stage of mature internationalisation. Market and sociocultural knowledge is by far more explored in the initial internationalisation stage.

Implications & Recommendations: The study identified the gap in the literature regarding entrepreneurial orientation and knowledge in the internationalisation process. Obtained results have useful value for business practice, especially for managers thinking of going international.

Contribution & Value Added: An added value of this paper and at the same time a new view of the studied problem is the inclusion of knowledge and its role in the internationalisation process determined by the influence of entrepreneurial orientation.

Article type:	research paper
Keywords:	entrepreneurial orientation; knowledge; internationalisation; international business; international entrepreneurship
JEL codes:	F23, L26, M16

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INTRODUCTION

Entrepreneurial orientation in the international approach is a research problem systematically developed within studies on international entrepreneurship (Maciejewski & Wach, 2019; Wach, 2017a, 2017b; 2018). In this article entrepreneurial orientation refers to the process of the internationalisation of firms, which is a substantial contribution to research into internationalisation understood as an entrepreneurial process, or to be more exact, entrepreneurial internationalisation (Wach, Głodowska, & Maciejewski, 2018; Głodowska, Maciejewski, & Wach, 2019). An added value of this article and at the same time a new view of the studied problem is the inclusion of knowledge and its role in the internationalisation process determined by the influence of entrepreneurial orientation.

Therefore, the aim of the article is to verify how entrepreneurial orientation affects different types of knowledge in various stages of the internationalisation process on the basis of Polish businesses. The research method applied in the theoretical part is critical analysis of previous literature. In the empirical part, quantitative methods were used to present research results from survey conducted on a sample of 355 businesses from Poland.

The article is structured as follows. In the next section, the literature review of prior studies is presented. In the third section, the research methodology used in the study is explained. The results are discussed in the fourth section. The last section summarises our empirical findings, indicates the limitations of the study and recommendations for further research.

LITERATURE REVIEW

The connection of entrepreneurial orientation and knowledge in the internationalisation process can be understood differently on the theoretical basis. The entrepreneurial orientation itself is perceived as a strategic construction derived from the concept of strategic management (Gaweł, 2015). Transposing this term to the international level resulted from the development of the international entrepreneurship idea. The new term was created as international entrepreneurial orientation explicated from the three basic components of entrepreneurial orientation: innovativeness, proactiveness and capability of risk-taking (McDougall & Oviatt, 2000; Knight, 2001). Knowledge as a driving force of internationalisation is noticed in all internationalisation theories: conventional and alternative, as well as macroeconomic and microeconomic models. Its special importance is accented in the concepts which treat internationalisation as an entrepreneurial process (Autio, 2017; Matiusinaite & Sekliuckiene, 2015). Therefore, it can be assumed that the theoretical premises of combining entrepreneurial orientation and knowledge in the internationalisation process have common ground in the international entrepreneurship concept which integrates the aspects of international business, entrepreneurship and strategic management. Thus, on the grounds of theory, it is appropriate to associate entrepreneurial orientation and knowledge with the internationalisation process, but in the existing studies those issues functioned as individual research problems, not related directly.

Entrepreneurial orientation in itself has been one of the most important research topics within research into entrepreneurship since as early as late 1980s (Al Mamun *et al.*, 2017; Kumar *et al*., 2018), but in the international dimension it was investigated much later (Wach, 2015). Knight (1997) was one of the first to combine entrepreneurial orientation with the

functioning of firms in various international cultures. He proved that entrepreneurial orientation is the crucial factor of success, determining international accomplishments of firms (Knight, 2001). Similarly, Florida (1997) proved that entrepreneurial orientation makes businesses undertake new ventures by penetrating international markets to sell their goods. Yiu, Lau and Bruton (2007) indicated innovativeness, efficiency and strategic decisions as constructs of entrepreneurial orientation. The authors added that the factors play a very important role in the internationalisation process, indicating the element related to risk-taking as particularly important. Emöke-Szidónia (2015) emphasized that small and medium-sized enterprises with high entrepreneurial orientation are leading entities of transition countries in Europe. Rant and Černe (2017) observed that differentiation via innovation positively impacts firm performance on international markets in the case of firms from the region of CEE. Numerous studies confirm a positive relation between entrepreneurial orientation and the internationalisation process (Florida, 1997; Yiu, Lau, & Bruton, 2007; Etemad, 2015; Swoboda & Olejnik, 2016; Tolstoy, 2018). However, this is not the final position of the researchers. Zahra and Garvis (2000) noticed a negative relation and Andersen (2010) indicated an insignificant link between entrepreneurial orientation and the internationalisation of firms. Great importance of entrepreneurial orientation, and especially of proactiveness in the internationalisation process is stressed by authors who deal with studying born globals and international new ventures, indicating that firms of this type are in their nature entrepreneurially-oriented, operating pro-actively all over the world (Sharma & Blomstermo, 2003; Weerawardena, Mort, Liesch, & Knight, 2007; Andersson, 2011; Andersson & Evers, 2015).

Knowledge and its significance in the internationalisation process is the area much more recognized in the literature of the subject. Empirical research into this problem was conducted in the first place within classical and alternative concepts concerning international trade. Therefore, it was an attempt to empirically verify the influence of knowledge on export or other forms of international activity within selected concepts of international trade (Sjöholm, 1996; VIllar, Alegre, & Pla-Barber, 2014; Geldres-Veiss, Uribe-Bórques, Coudounaris, & Monreal-Pérez, 2016). In addition, the role of knowledge in internationalisation has been verified empirically on the grounds on the Uppsala model (Johanson & Vahlne, 1977), the eclectic model (Prashantham, 2005; Casillas, Acedo, Gallego, & Ramos, 2009; Mejri & Umemoto, 2010), international entrepreneurship theories (McDougall & Oviatt, 2000), as well as knowledge-based models (Grant, 1996). Definitely the most attention was devoted to knowledge in Johanson and Vahlne (1977) model as well as its polemical concepts created by McDougall and Oviatt (2000). Prashantham (2005) rightly observed that in spite of a seeming tension between those two approaches, in both of them we can see a specific albeit varied role of knowledge, its types and sources. Therefore, it is important to identify different types of knowledge that can have a varied impact on the internationalisation process, depending on the level of its advancement. In the stages model of internationalisation this is the market knowledge that contributes to the optimisation of the firm's resources engaged on foreign markets, thus, the lack of market knowledge becomes a substantial obstacle in the internationalisation process of firms (Forsgren, 2002; Petersen, Pedersen, & Sharma, 2003; Johanson & Vahlne, 2003; Johanson & Vahlne, 2009; Xie & Amine, 2009; Sommer & Haug, 2011; Hsu, Chen, & Cheng, 2013). In turn, in the context of international entrepreneurship, not only market knowledge but also specialist knowledge is particularly appreciated (McDougall & Oviatt, 2000).

This article adopts the typology of knowledge arising from the knowledge-based internationalisation model by Mejri and Umemoto (2010), which distinguishes two main types of knowledge: market knowledge coming from written documents, reports and explicit materials, and empirical knowledge which arises from practice and can be acquired exclusively via personal experience. The types of knowledge thus defined were juxtaposed by the authors with the internationalisation process in which they distinguished three phases according to the firm's experience level: pre-internationalisation phase, novice internationalising phase and experienced internationalising phase. Different intensity of acquiring and using specific types of knowledge falls on these phases, which is presented in Figure 1.

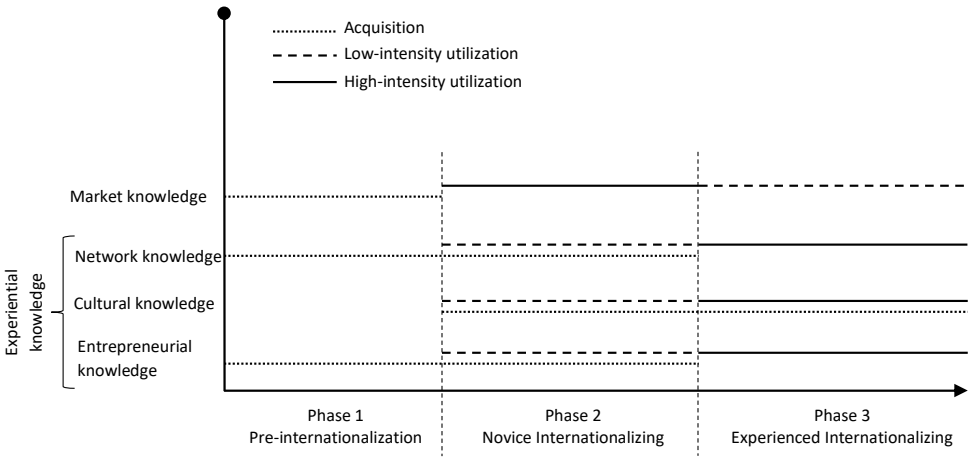

Figure 1. The role of market and experiental knowledge in the internationalisation process in the concept by Mejri and Umemoto
Source: Mejri & Umemoto (2010, p. 162).

Market knowledge refers to the information about foreign markets, their size, competitors and regulations. The acquisition of this type of knowledge in the pre-internationalising period is of key importance for undertaking internationalisation and in the first phase of its process. Using this type of knowledge in the novice internationalising phase arises from the need to acquire any available information about the target market due to a high level of risk related to entering this market. With the increasing engagement in the internationalisation process, the intensity of the use of knowledge about the market decreases in favour of the growth of the significance of empirical knowledge.

In the empirical or experiental knowledge Mejri and Umemoto (2010) included network, sociocultural and entrepreneurial knowledge.

Network knowledge is acquired within the functioning of the firm in formal and informal social and business networks in the pre-internationalisation period and in its first phase. Knowledge acquired as a result of mutual learning and the exchange of experiences enables to reduce apprehensions towards foreign markets, which facilitates and accelerates the internationalisation of firms, particularly SMEs. It is used to a various extent on individual stages of the internationalisation process.

Sociocultural knowledge refers to the familiarity with the values, attitudes and mindsets occurring on foreign markets. Acquisition of this type of knowledge begins with entering the internationalisation process of the firm. The intensity of the use of sociocultural knowledge grows with the level of its absorption by the firm.

Entrepreneurial knowledge refers to the recognition of market opportunities and the ways of its use. Knowledge of this type is acquired since the beginning of the firm's existence, thus still in the period preceding internationalisation, and its deepening takes place already after foreign market entry. The use of entrepreneurial knowledge on the international market grows with the experience the firm gains on it.

Amplification of the Mejri and Umemoto (2010) model with the aspect of entrepreneurial orientation is justified indirectly in studies by Omar, Aris and Nazri (2016), Åkerman (2015), Prashantham (2005), Fletcher (2004), Wiklund and Shepherd (2003). These authors proved positive influence of entrepreneurial orientation and knowledge on the firm's functioning but they did not take into account the international dimension directly. Analogically, it can be assumed that the same dependence occurs between entrepreneurial orientation, knowledge and the internalisation process (Figure 2).

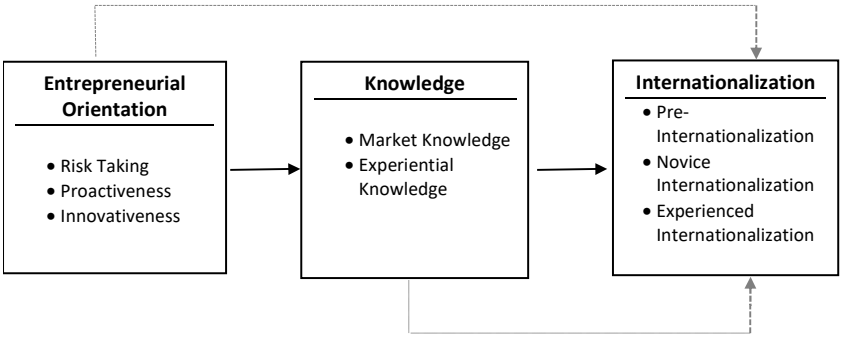

Figure 2. The impact of entrepreneurial orientation on knowledge in the internationalisation process
Source: own elaboration.

To sum up, the conducted overview of research confirms the validity of combining the influence of entrepreneurial orientation on different types of knowledge in the internationalisation process. What is more, a substantial shortage of empirical studies in this area is indicated (Gupta & Moesel, 2007; Cui, Fan, Guo, & Fan, 2018). On that basis, the following research hypothesis was formulated:

H: Firms with higher entrepreneurial orientation more intensely use both market knowledge and experiental knowledge (i.e. network knowledge, sociocultural knowledge, entrepreneurial knowledge), both in the novice and experienced internationalisation phase.

MATERIAL AND METHODS

As it has been already mentioned, Mejri and Umemoto's (2010) model assumes high use of market knowledge in the first period of internationalisation and its low use in the case

of mature internationalisation. On the contrary, experiental knowledge (network, sociocultural, entrepreneurial knowledge) is subject to high use in the mature phase of internationalisation, and low use in the pioneer phase. It is worth supplementing this model with entrepreneurial orientation, since it may be expected that firms with higher entrepreneurial orientation use specific types of knowledge in the internationalisation process more intensely than firms characterised by lower entrepreneurial orientation. This concept is the authors' development of the model, combining the output of models based on the knowledge and learning process with the international entrepreneurship school.

The research sample was selected based on firms registered in Poland in REGON (National Business Register) out of which 7,100 firms were randomised and to which the survey was directed. Out of those firms only 355 gave their consent to take part in the survey (5%).

Stratified random sampling was applied in accordance with the following criteria:

1. The sample includes only internationalised firms (being at least experts);
2. The sample includes firms of different sizes but reflecting research needs, namely (a) with a small participation of micro-enterprises as the least internationalised, although they are the most numerous group in the studied population, (b) a relatively small participation of large enterprises which, although they are the smallest group in the population, are the most typical research objects in the subject of internationalisation, but it was assumed that each of those groups should be about 10-15% of the research sample, (c) with a relatively large participation of both small and medium-sized enterprises, which, according to the assumptions, should constitute 25-45% of the sample.

The survey was conducted by means of Computer Assisted Telephone Interview (CATI) technique. The survey questionnaire was divided into four thematic parts, namely: (i) the firm's characteristics, (ii) modes and scope of internationalisation, (iii) internationalisation patterns and strategies, (iv) resources and competences, (v) domestic and foreign environment, (vi) entrepreneurial orientation, (vi) characteristics of the entrepreneur.

For the needs of statistical calculations and with the use of the survey questionnaire the following variables were used:

1. IEO – international entrepreneurial orientation with the use of variables developed by Covin and Slevin (1989);
2. MARK_KNOW – market knowledge, with the use of the author's questions with measures on the Likert's scale;
3. SOCIO_KNOW – sociocultural knowledge, with the use of the authors' questions with measures on the Likert's scale;
4. NET_KNOW – network knowledge, with the use of the authors' questions with measures on the Likert's scale;
5. ENTRE_KNOW – entrepreneurial knowledge with the use of the authors' questions with measures on the Likert's scale.

Out of 7 100 randomised firms from the REGON, the research sample was theoretically 5%, but in reality the randomised part of the population included 3 313 firms, and the final research sample was de facto 10.7%. The total of 355 questionnaires were collected (Table 1). The reasons for not considering the other firms in the study were as follows:

– 28.1% (1 991) were not internationalised firms, that is, they did not meet the first criterion;

– 25.3% (1 796) had a wrong phone number in the REGON, or nobody answered the phone, thus, they could not take part in the research;
– 22.9% (1 627) refused to participate in the survey;
– 18.7% (1 331) firms came across difficulties or caused difficulties for various reasons, which made obtaining reliable responses impossible.

Table 1. Characteristics of the Research Sample

Size of the firm (in %)		**Sector of the economy (in %)**	
micro	14.1	agriculture	1.7
small	43.1	manufacturing	56.4
medium-sized	29.8	construction	1.9
large	13.0	trade	22.4
		services	17.6
Foreign ownership (in %)		**Age of firms (in years)**	
Average	**28.0**	Average	**24**
Min	0	Min	1
Q1	0	Q1	14
Median	0	Median	20
Q3	68.5	Q3	25
Max	100.0	Max	183

Source: own calculation based on the survey (*n* = 355).

Telephone interviews were conducted in the first quarter 2015, and then their results were subject to adequate statistical calculations with the use of specialist computer software *Statistica PL* v. 10.0.

RESULTS AND DISCUSSION

The use of knowledge was studied in the dynamic approach in 2011 and in 2014, with the use of the retrospective managerial perception. The period of three years was related to defining internationalised firms from inception, and the literature of the subject defines them as internationalised within the first three years from inception. As for the period of time which passed from the firm's establishment to its internationalisation, it fluctuated from 0 to 61 years, but according to the median interpretation, in half of the cases it was a year and less, and in half it was a year and more. 75% of the studied firms internationalised in the 8th year of activity at the latest, and only 10% in the whole sample undertook foreign expansion after 16 years from inception. In majority, that is in as many as 61.5% cases, we had to do with fast internationalisation (namely, three years from inception).

It was found out in the sample that in 2014 only 65 out of 355 firms were characterised by high IEO indicator (average from 'risk taking', 'proactiveness' and 'innovativeness' was equal to at least 5). The firms were characterised by a little, although statistically insignificant, higher market knowledge (*t*-test -0.7819 [0.2174]). On the other hand, however, they were characterised by significantly higher network knowledge (*t*-test -1.8061 [0.0359]). Yet, no differences between firms in terms of sociocultural knowledge consid-

ering IEO indicator were found. Taking into account the classification made, it was observed that firms with higher IEO are characterised by statistically significant higher level of entrepreneurial knowledge (*t*-stat=-1.7358 [0.0417]). In general, firms with the higher IEO indicator were characterised by a higher level of knowledge on three discussed levels, namely, market knowledge (statistically insignificant, though), network, entrepreneurial knowledge. Such a relationship was not discovered for sociocultural knowledge.

The decision was also made to check whether an analogous situation took place also in 2011. Based on the t-student test for medium-sized enterprises it was found out that higher IEO indicator values were accompanied then by statistically significant higher values of market knowledge (*t*-stat -1.3852 [0.0834]). An analogous situation concerned the indicator of network knowledge (*t*-stat -2.3523 [0.096], sociocultural knowledge (*t*-stat -2.3755 [0,081]) and entrepreneurial knowledge (t-stat -4.7076 [0.000]. Such a relationship was not discovered for sociocultural and entrepreneurial knowledge.

The results obtained (Table 2) univocally prove that higher international entrepreneurial orientation intensifies the use of entrepreneurial knowledge and network knowledge on the experienced internationalisation stage (but not in its novice stage), which is the essence of international entrepreneurship. The calculations made do not enable to build general conclusions concerning experiental knowledge *en bloc* (no confirmation for sociocultural knowledge).

Table 2. Results of t test linking four types of knowledge with EO during the novice and experienced internationalisation phases

Type of knowledge (*n* = 353)	**Novice internationalisation (first 3 years of operating on foreign markets)**			**Experienced internationalisation (after at least 3 years of operations on foreign markets)**		
	t-stat	*p*-value	*Sig.* [a]	*t*-stat	*p*-value	*Sig.* [a]
Market knowledge	**1.3852**	**0.043**	**	-0.7819	0.217	X
Network knowledge	**-2.3523**	**0.096**	*	**-1.8061**	**0.035**	**
Cultural knowledge	**-2.3755**	**0.081**	*	1.9112	0.689	X
Entrepreneurial knowledge	**-4.7076**	**0.000**	***	**-1.7358**	**0.041**	**

[a] significance levels: *** < 0.01; ** < 0.05; * < 0.1.

Source: own elaboration based on the survey (*n* = 355).

In the initial internationalisation phase, in addition to market knowledge (which is compliant with theoretical bases), firms with higher entrepreneurial orientation use sociocultural knowledge (being one of the three components of experiental knowledge) more intensely, which may positively influence the course of the firm internationalisation process, thus, entrepreneurial orientation can stimulate internationalisation much earlier than it is assumed in earlier theoretical concepts which do not consider entrepreneurial orientation. Considering a very limited number of studies combining entrepreneurial orientation, knowledge and internationalisation, or rather their lack in the prior literature, it is difficult to compare and confront the obtained results. We can assume that our findings are compatible with the studies by Omar, Aris and Nazri (2016), Åkerman (2015), Prashantham (2005), Fletcher (2004), Wiklund and Shepherd (2003).

CONCLUSIONS

Entrepreneurial orientation is nowadays one of more important issues discussed within research into internationalisation. The main components of entrepreneurial orientation: risk taking, innovativeness and proactiveness are regarded as significant causative factors of effective internationalisation. Including the aspect of knowledge in the deliberations on entrepreneurial orientation and internationalisation seems to be naturally justified on the grounds of theoretical concepts, however, it is an area rather skipped in empirical research. This article combines the issue of entrepreneurial orientation and knowledge on the example of Polish firms basing on the knowledge-based internationalisation model by Mejri and Umemoto (2010). On the basis of the conducted analysis we can find out that entrepreneurial orientation is substantial in the use of knowledge in the internationalisation process. Firms characterised by higher entrepreneurial orientation much more intensely use individual types of knowledge on various stages on internationalisation. Network knowledge is more used by those firms both in the initial and mature internationalisation. On the other hand, entrepreneurial knowledge is intensely used on the stage of mature internationalisation. Market and sociocultural knowledge is by far more explored in the initial internationalisation stage.

Therefore, based on the conducted statistical analysis we can only partially accept the verified research hypothesis, as not all types of knowledge are explored to the same extent on different internationalisation stages by firms characterised by higher entrepreneurial orientation.

The article can be of not only cognitive but also applicative character. However, it is not deprived of limitations. Firstly, it is a study conducted on the sample of Polish firms, and the research findings cannot be generalised. Moreover, it is a cross-sectional study, which makes it impossible to verify cause and effect relationships between the studied variables, which is possible only when conducting dynamic research. This article goes much further than existing research in the search for the point intermediating between entrepreneurial orientation and internationalisation, however, attention should be also paid to other factors which by means of entrepreneurial orientation influence the internationalisation process (organisational culture, management, etc.). What is more, the study adopted an assumption as for the types of knowledge, thus it is recommended to verify the research problem posed adopting also other taxonomies of knowledge. Therefore, it is recommended to carry out further research eliminating the indicated limitations. Future research may go towards international comparative analyses in the studied problem. What is more, it is worth continuing research not only on the relationship of entrepreneurial orientation and knowledge in the internationalisation process, but also on factors determining this relationship.

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Economic Potential of Internationally-Oriented Patenting Activity in Russia

Irina Ervits

ABSTRACT

Objective: This article investigates the dynamics of internationally-oriented patenting activity in Russia, with the objective of exploring the link between innovation and entrepreneurship in an emerging economy.

Research Design & Methods: By using the Patent Cooperation Treaty (PCT) statistics, we create a typology of PCT applicants. Patent categories are compared based on their technological footprint, measured as consequential patent references.

Findings: The article reveals a shortage of domestic companies engaged in internationally-oriented innovation in Russia. The majority of international patent applications published by WIPO in 2013 were filed by individuals. Russian companies, as well as individual applications, demonstrate lower technological impact, measured as citations, than foreign subsidiaries operating in Russia.

Implications & Recommendations: The innovation capability of Russian business, small or large, must be prioritised and strengthened via creating the right incentives and providing a stable institutional and infrastructural foundation.

Contribution & Value Added: This project discovers the weak role of the domestic private sector in international patenting, which points to the imbalanced nature of the Russian national innovation system (NIS).

Article type: research article

Keywords: national innovation system; Russia; patent statistics; patent data; innovation; invention; entrepreneurship

JEL codes: O30, O31, O38

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INTRODUCTION

This project operates under the assumption that patenting is an important indicator of inventive activity, which in turn is an integral part of the innovation process[1]. We look at the nature of so-called 'international' patent applications from Russia filed through the Patent Cooperation Treaty (PCT) and published by the World Intellectual Property Organization (WIPO) in 2013. By using this database we pursue three objectives. First, we create a typology of patent applicants involved in internationally-oriented invention activity in Russia. As applied to emerging economies[2] such as Russia, where admittedly the institutional protection of intellectual property rights is lacking (Kouznetzov & Jones, 2009, p. 90), which then inhibits the commercial use of invention, we should expect that patent applications seeking international approval will involve a genuine intention to internationalise or diffuse these inventions abroad. The relationship between the two strategies in pursuit of growth-innovation and internationalisation-is an underdeveloped field of research (Hagen, Denicolai, & Zucchella, 2014), and patent activity in the form of PCT applications represents a combination of the two strategies. In this respect we look into the nature of actors engaged in internationally-oriented innovation in Russia.

The second reason to understand the nature of patenting activity in Russia is to gain insights into the Russian national system of innovation (NIS)[3] and its external spillovers. The systematic approach to analysing the process of innovation at the national level or NIS underscores the dynamism of interactions between public and private institutions (Freeman, 1995; Nelson, 1993). The major elements of NIS include private businesses and universities, as well as government-financed research institutes and other government initiatives aimed at enhancing national technological competitiveness. Even though strategic importance is attributed to government efforts to stimulate innovative activities (King, Gurbaxani, Kraemer, McFarlan, Raman, & Yap, 1994), especially in developing countries (Breznitz & Murphree, 2011), in market economies these are private enterprises that are credited with the ability to drive technological change (OECD, 1997). Private companies[4] are involved in each stage of the innovation process, from invention to turning new ideas into functional forms and, finally, to commercialising them accordingly. Looking beyond the efforts of the Russian government to enhance the nation's technological competitiveness, the involvement of the private sector in innovation presents an important area of research. This area

[1] Innovation is defined as a process of three overlapping stages: Invention, innovation, and diffusion (King, Gurbaxani, Kraemer, McFarlan, Raman, & Yap, 1994, p. 140). *The Oslo Manual*, the guideline for measuring and collecting innovation data, provides a comprehensive definition of technological product and process innovations (TPP) (OECD & SOEC, 1996, p. 31).

[2] Russia has been classified as an 'emerging economy' thanks to its rapid growth rate in the last decades (growth rates surpassing those of developed economies being one of the defining features of emerging markets). However, its recent economic growth could be attributed primarily to high commodity prices (Hidalgo, 2013, pp. 5-7).

[3] The definition and origin of the concept are discussed extensively in OECD (1997, 1999) and Carlsson (2006). The main elements of a well-functioning NIS, including the collective efforts of the private sector, universities, science and technology (S&T) institutes, government policies and regulations, as well as cultural traditions, produce a 'distinctive national character of innovation system' (Carlsson, 2006, p. 63). Based on this systematic view, innovation is generated in the midst of a complex interplay between cooperating and at the same time competing forces through an exchange of knowledge, people, and resources (OECD, 1997, p. 12).

[4] For example, the American model of innovation is characterized by an active involvement of private actors that channel ideas into the marketplace (Segal, 2011).

calls for more empirical investigations, not only at the firm level (Kuznetsova & Roud, 2014), but also at the macro level. In the context of developing economies and emerging economies, where NIS linkages between different actors might be missing or there is a lack altogether of a 'coherent strategy to integrate the fundamental ingredients' (Dzisah & Etzkowitz, 2008, p. 103), the simple question about the main actors involved in inventive activity, and the value of their contribution, is still relevant. Patent statistics can provide valuable insights into the nature and sources of inventive output at the national level.

Third, we discuss the link between entrepreneurship and innovation. Who initiates a patent application is relevant to its further commercialisation, an entrepreneurial act which implies practical application, economic realisation, and profit extraction. This is a private enterprise´s *raison d'être*. The motives of individual inventors and, most importantly, their capabilities might not fully fit this entrepreneurial model. Furthermore, there is a lack of empirical research on the link between entrepreneurship and innovation at the macro level, especially in emerging or transitional economies[5]. Essentially, it is a rarely discussed theme by entrepreneurship scholars[6] (Manev & Manolova, 2010, p. 77). Manev and Manolova (2010, p. 82) call for more empirical research to investigate the process of innovation in the context of transitional economies. Therefore, we explore the nature of entities involved in inventive activities in Russia by focusing on their economic and technological utility and, correspondingly, potential contribution to economic development. This angle is inspired by the debate on the differences between individual inventors and firms, which we discuss in the first section of the literature review. Additionally, we explore the difference between domestic companies and foreign subsidiaries of multinational enterprises (MNEs). The third section of the literature review addresses the idiosyncrasies of the Russian case. The value of patent applications or their potential economic utility is determined by references to the invention found in subsequent patents. The methodology section discusses the sources of patent statistics and procedures. Then we apply regression analysis and one-way ANOVA comparing different groups of applicants in Russia based on their citation record.

LITERATURE REVIEW

Individual Inventors vs Firms

Innovation does not happen by chance, it is driven by entrepreneurship (Munoz-Bullon, 2016), which is an integral part of the innovation process, as innovation involves not only the stage of invention or conceptualisation of a new idea, but also (and this is the role that Schumpeter (1947, p. 152) ascribes to the entrepreneur) the stages of practical application and commercialisation. Thus, according to Schumpeter, there is a fundamental difference between the 'entrepreneur' and the 'inventor' (Schumpeter, 1947, p. 152), as they represent two distinct functions. Entrepreneurs turn inventions into innovations, but to achieve

[5] Manev and Manolova (2010, pp. 70-71) assign Russia to a transitional economy, i.e. transitioning from a centrally-planned to a market economy.

[6] There are some exceptions discussed in González-Benito, Muñoz-Gallego and García-Zamora (2015, pp. 155035-7-8). Most of the literature, which professes that entrepreneurship leads to innovation, focuses on developed rather than developing or emerging economies.

their goals profit-driven entrepreneurs need resources, an appropriate business environment, and reward-oriented organisational backing: 'The major share of inventive activities finalized to economically exploitable technologies that goes on in contemporary capitalist societies is done in profit-seeking organizations with the hope and expectation of being economically rewarded, if that work is successful' (Dosi & Nelson, 2013, p. 15). Looking at the development of the market for technology from a historical perspective, Lamoreaux and Sokoloff (1996) identify two modes of thinking about the process of invention: the nineteenth-century early period, when inventors were viewed as creative individuals undertaking the exploitation of their inventions themselves, and the later twentieth-century period, when the patent system and the market for trade in technology matured, the process of invention became more specialised, the costs of inventive activity rose, and firms became more involved in generating, appropriating, and commercialising technology. In modern times, as innovation becomes a prerogative, a source of competitive advantage, and a major expense for profit-driven companies, individuals frequently lack resources to commercialise their inventions successfully (Hunter, 2012, p. 85).

A number of studies argue that patents commercialised by firms have a higher probability of success than those commercialised by individuals. For example, Braunerhjelm and Svensson (2010, p. 434) contend that invention and innovation should be undertaken as separate activities, which in effect substantiates the Schumpeterian position. Another example is the argument in Singh and Fleming (2010), according to which lonely inventors (especially those working outside of an organisation) generate patents that have a low technological, economic, or social impact, measured as citation statistics. Dahlin, Taylor and Fichman (2004) conclude, based on the analysis of US patents in the tennis racket industry, that there is a great deal of uncertainty associated with the value of innovation by independent inventors[7]. In his historic overview of the nature and quality of patents from Israel, Trajtenberg (1999, p. 17) discovered that in the period between 1968 and 1997, 37% of Israeli patents were so-called unassigned patents or patents filed by individuals. His conclusions were that these patents may ultimately find their way to 'successful commercial applications (and many do), but they typically face much higher uncertainty than corporate assignees' (Trajtenberg, 1999, p. 16). Furthermore, corporations are in the position to leverage better internal spillovers produced by these innovations and, therefore, corporate patents have higher economic potential (Trajtenberg, 1999, p. 16).

At the same time, Amesse, Desranleau, Etemad, Fortier and Seguin-Dulude (1991, p. 26), based on a mail survey of individual inventors in Canada, identified that a large portion of individual inventors were entrepreneurs. About 46% were self-employed and 65% of these owned a small business with employees. Furthermore, 43.3% of individual inventions were commercialised and in 42.7% of cases, the invention was commercialised in the company owned by the inventor. Of course, the institutional environment in Canada is more

[7] Dahlin *et al.* (2004) measure the value of patents based on a number of indicators. One of them is 'impact', namely the number of times a patent has been cited in subsequent tennis racket patents. Other indicators include the level of detail and scope, which are captured by a detailed technical content analysis of industry-specific patents. The measure of success is payments of maintenance or renewal fees. This project does not attempt to evaluate the technical characteristics of PCT patents coming from a variety of industries. We also do not possess renewal or maintenance fee statistics, since we deal with relatively recent patent applications. Thus, we stick to the citations' measure as an indication of a patent's technological and economic merit.

small business-friendly than in many emerging markets, where entrepreneurs might not enjoy the same opportunities. However, the dual role of Canadian inventors as entrepreneurs in almost 50% of cases of individual patents and the high level of their commercialisation are sobering facts especially in light of the scepticism about the economic output of individual patents. Weick and Eakin (2005, p. 5), based on the survey of 351 individual inventors in the US, conclude that 39% of respondents generated sales from their inventions. Most inventors tried to bring their inventions to the market either through selling or licensing patent rights or via the inventor´s own company (inventor as an entrepreneur). Weick and Eakin (2005, p. 14) conclude, however, that those who licensed their inventions vis-à-vis those who attempted self-commercialisation succeeded at generating higher sales.

Agiakloglou, Drivas and Karamanis (2014) addressed the commercialisation of individual patents via sale and licensing to a 'large entity' implying a larger company (not a small and medium-sized enterprise (SME)). Agiakloglou *et al*. (2014, p. 3) found that twelve percent of US patents between 1990 and 2000 assigned to individuals were commercialised by being sold or licensed to larger businesses. This implies that the rest of individual patents have been either commercialised by inventors themselves or not commercialised at all. Thus, the economic output of individual patents remains ambiguous. Inspired by this debate, the current project hypothesizes that patents filed by individuals have lower economic utility than patents filed by firms, and it compares the impact (measured as the number of times a patent is referenced) of individual and firm patent applications from Russia.

Domestic Firms vs Foreign Subsidiaries

According to Dunning's OLI paradigm, in order to overcome lack of knowledge of the local market and institutional specifics, and to be able to compete successfully in foreign markets, MNEs must have and harness a combination of (O)wnership, (L)ocalisation and (I)nternalisation advantages. Ownership advantages come from possessing and managing income-generating assets (Dunning, 2001, p. 176). The ability to leverage and successfully manage innovation across borders is part of the O advantages arsenal, especially in the later stages of the investment development path (IDP) achieved by host economies. More advanced stages of IDP imply that MNEs internationalise to seek out markets, efficiencies, and asset augmentation in desirable destinations rather than, as in earlier stages, resources or cheap labour (Narula & Dunning, 2010, pp. 267-268). In the later stages of IDP, a host country-specific, innovation-stimulating infrastructure determines localisation advantages for knowledge- and learning-driven MNEs. Thus, the level of innovation-driven advantages that an MNE enjoys vis-à-vis indigenous firms depends on the stage of IDP that a host economy has reached. The later stages of IDP imply that a host economy has matured in terms of striking a balance between incoming and outgoing FDI[8], competitive markets, conducive institutional infrastructure (including the protection of intellectual property rights (IPR)), and innovation-supporting government strategies (Narula & Dunning, 2010, p. 268). All of these are the components of a well-functioning NIS, which itself plays an important role in attracting R&D investment, as empirically confirmed especially for developed economies (Veliyath & Sambharya, 2011, p. 422). In a country that has not reached the advanced stages of IDP we should expect that local subsidiaries of foreign

[8] Capital flight, which is frequently the case in Russia, does not qualify as a value-adding FDI.

MNEs would demonstrate a higher propensity for innovation than domestic counterparts. These subsidiaries can draw not only from the local expertise (host country human capital can be a useful source of knowledge especially for adjusting to the local market needs), but also from internal networks. The embeddedness in a geographically dispersed internal innovation network frequently makes MNEs more technologically competitive than companies in host environments, especially in developing markets.

The Russian Case

Russia represents an interesting case to investigate the role of individual inventors, vis-à-vis firms in technological progress. On the one hand, Russia's invention record historically includes a long list of achievements-the result of the brilliance of individual inventors (Graham, 2013). The country inherited a well-developed education system from the Soviet Union, its science base is still strong, and the government commits substantial resources to R&D (Filippov, 2011, p. 187). On the other hand, according to Filippov (2011), Russia has little success in converting ideas into marketable innovations and commercialising them, which can be explained by the unstable business environment forcing firms to focus on short-term goals. Based on a large-scale monitoring survey of the behaviour of innovative companies, conducted by the Higher School of Economics, only nine percent of manufacturers in 2012 looked at innovation as a means of achieving competitive advantage (26% in the information technology sector) (Kuznetsova & Roud, 2014, pp. 11-12). Long-term investments into innovation are seen as too risky, especially for small firms. Furthermore, there is almost no early stage venture capital infrastructure in Russia (Gianella & Tompson, 2007, p. 29). As a consequence of recent economic sanctions against the Russian government, Russia's own efforts to control the inflow of foreign capital, and the overall deteriorating economic conditions, investment volumes and opportunities for the access to foreign venture capital have decreased substantially: '[T]he volume of private funds in the venture market has decreased by more than a half-from the beginning of the year [and] corporate funds have cut their support for projects by 61%' (IET, 2015, p. 336).

In effect, the government remains the main source of funding for innovation (Todosiichuk, 2011, p. 11), and this funding is mostly channelled to the public sphere. The leading role of the Russian government in technological transformation is the product of its Soviet legacy and the enduring characteristics of its NIS. About 60% of R&D activities in Russia, according to 2007 data, are publicly financed (Podmetina, Smirnova, Väätänen, & Torkkeli, 2009, p. 296). Furthermore, if seeking to broaden the definition of the public sphere to include not only state institutes, but also companies that are majority state-owned, it can be estimated that 98% of total budgetary funding for science is channelled to the public sector (IET, 2006, p. 244). This demonstrates the imbalanced nature of Russia's NIS and confirms that 'its entrepreneurial sector is almost invisible, while receiving, in effect, no direct support from the state' (IET, 2006, p. 244).

There is a lack of research dedicated to individual inventors in transitional economies, with Ivančič, Podmenik and Hafner (2014) being one of the very few studies to tackle the issue. The authors discuss the resources available to individual inventors in Slovenia[9],

[9] Generally speaking, Russia and Slovenia share common historic experiences, including the recent example of drastic political and economic transformations in the post-socialist period. Unlike Russia, however, Slovenia had

where individual inventors 'suffer from a deficiency of both opportunities and the necessary skills and competencies' to access formal NIS supportive networks, such as universities, research institutes, technology parks, etc. (Ivančič *et al.*, 2014, p. 249). In other words, individual inventors are operating outside of NIS and cannot therefore benefit from its financial or social infrastructure. We can subsequently draw parallels with the case of Russia, where firms and especially individuals do not have much access to either public or private funding. To conclude, since the business and institutional environment in Russia is challenging enough for the private sector to be able to engage efficiently in innovation, then the successful economic output of individual inventors must be particularly unrealistic to expect. We will test this assumption by looking at different categories of PCT inventors and the value of their ideas, measured as citations in other patents.

At the system level, Russia has not reached this level of development, which characterizes the so-called 'knowledge economy' stages of IDP. The main actors involved in innovation activities in Russia, namely publicly-funded research institutes and universities, state-owned and state-controlled enterprises, and the private sector, are isolated and uncoordinated (Ermasova & Ermasov, 2013). As a result, the mechanisms of knowledge transfer to the market are performing poorly, the outcomes of research activities are not properly diffused, and the system of S&T institutions (with the Academy of Russian Sciences on top) is disconnected from application (Gianella & Tompson, 2007; Gokhberg, 2004; Subbotina, 2007; Todosiichuk, 2011). Russia displays higher proclivity toward fundamental science rather than toward applied and market-oriented innovation (Tseng, 2009, p. 32). The active involvement of the private sector in innovation requires the decentralisation of economic decision-making, which is not the case in Russia (Golichenko, 2011, p. 57); since the main player on the nation's innovation scene is the government. Indeed, innovation entrepreneurship, or the efforts of entrepreneurial firms to create new ideas, translate them into concrete applications, produce, and deliver to the customer is not sufficiently developed in Russia (McCarthy, Puffer, Graham, & Satinsky, 2014, p. 245).

Since Russia has not reached the 'knowledge economy' stage, MNEs operating there, by definition, possess greater resources and capabilities of generating value-adding innovation than Russian firms. Indeed, MNEs are credited with the superior ability to organise innovation activities across their 'dispersed but interconnected international network' (Cantwell & Piscitello, 2005, p. 3). They are setting up R&D facilities in Russia, not because of the quality of its NIS but because it offers affordable engineering and other technical carders as well as government contracts[10]. Due to the innovation network management capabilities of MNEs, their global outreach, and the admitted limitations of the Russian NIS, we should expect better performance from those MNEs currently present in Russia than from domestic firms with respect to the ability to generate patent references.

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to integrate into the EU community, which implied legal, institutional, and economic assimilation. Slovenia made significant progress in innovation, as it moved in 2015 into the category of 'innovation followers', or countries that approach the EU average, according to the 2015 Innovation Union Scoreboard (IUS) (European Commission, 2015, p. 10). Slovenia is the only ex-socialist country in this category. Taking the innovation progress achieved by Slovenia into consideration, Russia presents even a more of a discouraging case for private innovation initiatives.

[10] For instance, Siemens has won numerous government contracts and worked in close cooperation with a number of state corporations, including Rosatom (Womp, 2009), Russian Railways, RosNeft, etc. (Siemens, 2016).

MATERIAL AND METHODS

Data Sources: WIPO Statistics Database

This project uses statistics on patent applications filed through the Patent Cooperation Treaty (PCT) mechanism and published by the World Intellectual Property Organization (WIPO) in 2013. WIPO assembles data on patent filings and grants from national and regional IP offices in its comprehensive statistics database PATENTSCOPE. A patent is a set of exclusive rights granted for a period of usually 20 years (WIPO Glossary, 2015).

Patent statistics can be used as a measure of inventive activity, since they indicate (as a minimum requirement) the commitment of an applicant to pursue the practical application of an idea (Griliches, 1990 p. 1669). As a result, patents can serve as measurable proxies for inventive activity and, to some degree, innovative input, since they account for the first stages of the innovation process-the generation and conceptualisation of novel ideas. There is a fundamental difference, of course, between a patent application and a granted patent. Granted patents are registered and have gone through the process of assessment by national or international patent offices. Patent rights are granted by patent authorities when they represent a new and original technological contribution (Tseng, 2009, p. 30; Braunerhjelm & Svensson, 2010, p. 424). A patent application, however, is just an expressed intention to seek IP rights protection for a particular invention, hence the limitation of using patent applications vis-à-vis granted patents as a measure of invention.

PCT patent application data are, however, useful for a number of reasons. First, based on the description of a patent filing, one can deduce the nature of the applicants and divide them into categories. There are three categories of individuals or organisations mentioned in the patent application: applicants, inventors, and agents. Applicants file an application and possess IPRs when a patent is granted. Inventors are usually individuals who conceived an invention, and agents provide legal and technical support to file an application. For the purposes of this project, when an application was filed by an individual or a group of individuals (as applicants), it was classified as an 'individual application'. Thus, depending on the nature of an applicant (whether an individual or a legal entity, such as a company or a research institute), patents were assigned to different categories.

Second, PCT allows applicants to file for patent protection in 151 countries simultaneously (WIPO, 2017), which makes PCT statistics (due to the wide geographical application) a perfect indicator of internationally-oriented patenting activity. By filing a PCT application, applicants, by definition, announce their intent to pursue IPRs abroad. The PCT procedure includes several stages. The first phase involves filing with a national or regional patent office or WIPO. A patent's 'nationality' is based on where the application was filed and is determined by a two-letter country code assigned to each application. The country code for applications filed from Russia is 'RU'. Then an International Searching Authority (ISA) evaluates the patentability of the invention based on three criteria: novelty, inventiveness, and industrial applicability. After an ISA produces a written report or after 18 months since the application, the contents of the application are made public via their publication on the WIPO website. Lastly, an applicant pursues the grant of a patent directly with the national (or regional) patent offices of the countries where the protection is sought (WIPO, 2014).

Procedures

This project looked at the total number of resident[11] PCT applications from Russia published on PATENTSCOPE, the WIPO Statistics Database, in 2013. The fact that the applications were published indicates that they must have been screened by an ISA and a written opinion was produced. Each application was investigated individually; the total number of applications in 2013-1.075-was divided into six types of applicant entities involved in invention activities in Russia: an individual, a foreign subsidiary/foreign-registered firm[12], a Russian company, a university, and a research centre/institute. The objective of dividing patent applications into these groups was to inspect the structure of the NIS participants and understand the landscape of inventive activity in Russia.

Looking at patent citations as a measure of a patent's value with regard to its economic and technological impact, we identified the contribution of each group to the national-level inventiveness. Even though a frequency of citations per patent is not an accurate indicator of its technological or social value (Jaffe & Trajtenberg, 2002 p. 28), it is nevertheless an important indicator of the technological footprint of the patent (Hall, Jaffe, & Trajtenberg, 2000, p. 4). The cross-sectional nature of our data (patent statistics for 2013) ensures that all patents in the sample have an equal chance of attracting attention and being referenced. The year 2013 was chosen to allow some time for applications to be noted and cited. We used Google Patents to trace down references to each PCT patent publication on our list of 1.075, following which we compared the means of references for each application category using a linear regression to account for differences with regard to possible practical or economic utility expressed as citations. After dummy coding of the independent variable, five dummy variables were created with 'foreign subsidiary' being held constant as a reference group. We also used one-way analysis of variance (ANOVA) to account for mean differences in the categorical variable (six categories of patent applicants) as a predictor and a continuous variable (number of citations) as a dependent variable. Depending on how the variables are operationalised, the use of ANOVA is appropriate when comparing the means of several categories or groups (Sweet & Grace-Martin, 2008, p. 124).

RESULTS AND DISCUSSION

Domestic and International Patenting in Russia

Table 1 provides the basic descriptive statistics of Russian patenting activity from 1999 to 2016, including annual data on the total number of resident applications and applications abroad, total number of applications granted (domestically and by foreign IP officers), and PCT application statistics. These data were taken directly from the Russian country profile in WIPO Statistics database and utilised here to illustrate the general patterns of Russian domestic and foreign patent filings. The number of 'applications abroad' as a proportion of

[11] Resident applications are filed by country residents at their national patent office. 'Applications abroad' are filed at a foreign office. For exact definitions of what constitutes a 'resident application' and an 'application abroad', please see WIPO Glossary (retrieved on 15 February, 2015 from http://www.wipo.int/ipstats/en/help/)

[12] We came across a number of companies that were assigned a Russian patent code-RU-despite having a foreign address, for instance in British Virgin Islands. We categorised these companies as 'foreign registered'.

the total number of applications (resident and abroad) is nine percent on average, from 1999 to 2016. Even though the number of applications abroad increased over the years from three percent (from total) in 1999 to 15% in 2016, the overwhelming majority of patents in Russia are filed domestically. PCT applications constitute 37% (on average) of applications abroad. Interestingly, PCT patenting as a percentage of filings abroad decreased from 69% in 1999 to 24% in 2013, and then to 18% in 2016, which may indicate a limitation of using PCT applications as a measure of international patenting for Russia. PCT patent filings represent less than half of all internationally-oriented applications from Russia. It is important to note that roughly half of all applications abroad or applications filed by Russian inventors in other jurisdictions (including PCT applications) were granted patent protection, which means that the other half did not meet the criteria of corresponding national patent offices with respect to novelty, inventiveness, and industrial applicability, in turn decreasing even further the pool of commercially viable international inventions.

Table 1. Inventive Activity in Russia, 1999-2016

Years	Patent applications			Patents granted			PCT applications	% of PCT applications from Abroad
	Residents	Abroad	% of Abroad from total	Residents	Abroad	% of Abroad from total		
1999	19.900	691	3%	15.362	383	2%	478	69%
2000	23.377	716	3%	14.444	386	3%	533	74%
2001	24.777	880	3%	13.779	445	3%	557	63%
2002	23.712	787	3%	15.140	454	3%	540	69%
2003	24.969	675	3%	20.621	516	2%	587	87%
2004	23.118	1.922	8%	19.214	1.130	6%	519	27%
2005	23.796	2.152	8%	19.556	1.263	6%	658	31%
2006	28.070	2.505	8%	19.238	1.203	6%	696	28%
2007	27.716	2.773	9%	18.616	1.874	9%	735	27%
2008	27.936	3.159	10%	22.421	1.738	7%	802	25%
2009	25.824	3.035	11%	26.438	1.632	6%	736	24%
2010	29.022	3.815	12%	21.783	1.850	8%	814	21%
2011	26.879	4.585	15%	20.475	1.704	8%	1.009	22%
2012	29.174	5.205	15%	22.637	1.763	7%	1.114	21%
2013	29.120	4.945	15%	21.520	1.845	8%	1.191	24%
2014	24.370	4.142	15%	23.305	2.742	11%	948	23%
2015	29.567	4.225	13%	22.753	2.245	9%	876	21%
2016	27.136	4.765	15%	21.292	2.945	12%	851	18%
STDEV	2.684	1.623		3.417	792		211	
Mean	26.026	2.832	9%	19.659	1308	6%	758	37%

Source: adopted from Country Profiles, Russia, WIPO Statistics Database. Retrieved on December 4, 2017 from http://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=RU

The fact that the overwhelming majority of patent applications filed in Russia seek domestic protection, provide empirical basis for the arguments posited by Ermasova and Ermasov (2013), according to whom many Russian firms engaged in innovation are state-owned or state-controlled and receive funds directly from the government. These companies and scientists working for state-funded research institutes within the Russian S&T

system tend to apply for patents domestically (2013, p. 26). High levels of domestic patenting are an indicator that Russian inventions might not be patentable internationally, 'since the inventions may not be unique and may only serve as a means to block the importation of foreign produced goods' (Filippov, 2011, p. 189). The recognition of IPRs is easier to achieve domestically. The Russian patent law that *de jure* recognizes that inventions must be novel in practice fails to prevent the patenting of copycat inventions that do not differ significantly from the original (Gianella & Tompson, 2007, p. 20). From this perspective, patent applications filed abroad (and especially PCT applications, which imply multiple target jurisdictions) can be interpreted as an entrepreneurial attempt to internationalise Russian products and ideas. This makes the task of identifying who actually files PCT applications in Russia even more pertinent. The nature of agents engaged in international patenting has implications for understanding the dynamics of Russia's NIS and, most importantly, the potential economic and technological impact of this patenting activity. As discussed above, when an international application is filed by a company, we have more grounds to expect a potential economic realisation of this patent.

Composition of PCT Filings

This article explored the 1.075 PCT applications from Russia published by WIPO in 2013. From the total list of all PCT applications (over 200 000) published in 2013 we identified a sample of Russian PCT filings based on the two-letter country code (RU). As Figure 1 shows, the majority of international or PCT applications from Russia-52%-were produced by individuals. The proportion of Russian companies in PCT patenting in 2013 was 27%, with 16% constituting the subsidiaries of MNEs in Russia and other foreign companies. The rest of the PCT patents were generated by federal agencies, research centres, and universities, which is, in actuality, an insignificant contribution. Thus, the actors that are traditionally considered to be active participants of a well-functioning NIS, i.e. universities, government-funded research institutes, federal agencies, etc., play a marginal role in international patenting in Russia (despite generous government funding of public research institutions). Domestic companies, compared to individuals, also play a secondary role. This result confirms the conclusion that invention in Russia has historically been a 'lonely' affair, exemplified by the fate of inventors like Mikhail Kalashnikov, who never properly capitalised on their inventions (Graham, 2013). Obviously, the tradition lives on and promises bleak prospects for the Russian NIS. The finding, based on our data for 2013, that 52% of Russian PCT patents were filed by individuals is an alarming sign for the prospects of their commercialisation, since it is unclear who will apply and bring these inventions to the market during the next stages of the innovation process. This indicates the weak entrepreneurial potential of these patents. Table 2 provides statistics on the ten most prolific applicants in 2013. The high patenting record of a number of individuals is comparable to the number of applications filed by foreign research centres in Russia (Intel or Siemens), companies registered abroad (in this case in British Virgin Islands) such as Rawllin International Inc., and domestic companies, for example Parafarm.

Individuals engage in internationally-oriented patenting activity twice as actively as domestic companies. Theoretically, a PCT application must be part of an internationalisation strategy of innovation, and it is the search for new markets that pushes firms to internationalise. Internationalisation and innovation are the two main strategies employed to

achieve growth ascribed to profit-driven enterprises (Hagen *et al.,* 2014, p. 111). Technology-intensive companies pursue internationalisation strategies because they seek larger international markets to earn returns on their investment (Yamakawa, Peng, & Deeds, 2008, p. 67), whilst commercialisation is used to receive returns on investment and gain competitive advantage in the market 'for a particular product, process, or service' (U.S. Congress, 1995). Commercialisation of inventions (mostly executed by the private sector) is also part of the reward system. Consequently, the fact that internationally-oriented patenting activity in Russia is pursued mostly by individual inventors is noteworthy and sheds light on the nature of Russia's NIS. Ultimately, the logic behind IP protection is to create an incentive structure for inventors. As noted by Lu, Eric and Peng (2008), the so-called 'spontaneous innovation' generated by 'hobbyists' who do not benefit financially from their inventions can be detrimental for a continuous innovation effort.

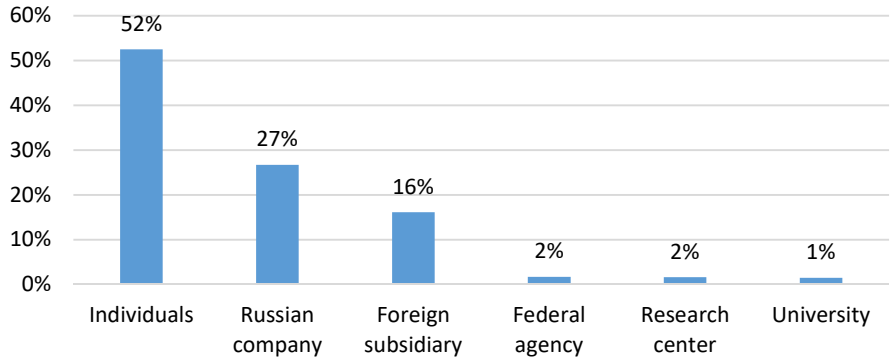

Figure 1. Percentage of Russian PCT applications in different categories of applicants published by WIPO in 2013

Source: WIPO Statistics Database, PATENTSCOPE. Retrieved in November-December, 2015 from https://patentscope.wipo.int/search/en/search.jsf

Table 2. Top Ten PCT Applicants for Applications Published by WIPO in 2013

No.	PCT top applicants (published in 2013)	Type of applicant	Number of publications
1	RAWLLIN INTERNATIONAL INC	Foreign subsidiary/foreign- registered	34
2	SIEMENS AKTIENGESELLSCHAFT	Foreign subsidiary/foreign- registered	29
3	INTEL CORPORATION	Foreign subsidiary/foreign- registered	23
4	GENERAL ELECTRIC COMPANY	Foreign subsidiary/foreign- registered	19
5	M.P.E.	Individual	14
6	OBSHESTVO S OGRANICHENNOJ OTVETSTVENNOSTJU "PARAFARM"	Russian company	11
7	B.P.A	Individual	10
8	BAKER HUGHES INCORPORATED	Foreign subsidiary/foreign- registered	9
9	BAUMAN MOSCOW STATE TECHNICAL UNIVERSITY (BMSTU)	University	8
10	SOCIETY WITH LIMITED LIABILITY DIS PLUS	Russian company	8

Source: WIPO Statistics Database, PATENTSCOPE. Retrieved in November-December 2015 from https://patentscope.wipo.int/search/en/search.jsf

Impact of Different Categories of PCT Applications

The results of the linear regression analysis are presented in Table 3. The coefficients for the five dummy variables (PCT applications by individuals, companies, federal agencies, universities and research centres) are displayed in the first column. The intercept coefficient at 0.47 is the mean of the 'foreign subsidiaries' category, which is a reference group. Table 3 shows that individuals (IND) and companies (COM) coefficients diverge significantly from the reference group – foreign subsidiaries (FS). Similar to ANOVA, this regression model compares means of patent citations in different categories of applicants (Grace-Martin, 2018). A regression reports one mean for FS as an intercept and the differences between this group and all other means. Thus, the average number of references to each category of applications significantly differs in two pairs of categories: individual and foreign subsidiary applications[13] and company and foreign subsidiary applications. In other words, individuals and firms in Russia attract fewer citations on average than foreign subsidiaries. The mean differences between individual and foreign subsidiary patent applications, as well as between company and foreign subsidiary applications, are statistically significant with significance levels below 0.01. Even though federal agency, university or research centre filings seem to differ in terms of mean references from foreign subsidiaries, their mean differences are not statistically significant[14].

On average, there are more references to patents filed by foreign subsidiaries in Russia than to individuals or domestic company filings. These results confirm the assumptions that both Russian-origin individual and firm applications have attracted on average fewer references than filings pursued by foreign subsidiary/foreign registered companies. The value of foreign subsidiary applications, based on patent references, is superior to the potential technological or economic impact of both domestic individual and company patent applications. As noted above, this can be explained by the superior innovation-based ownership advantages of foreign MNEs, including the ability to plug into intra-company knowledge depositories and networks on a global scale. This presents an undeniable advantage, especially in the context of host economies like Russia, which have not reached the advanced levels of the so-called 'knowledge economies'.

Table 4 presents the results of a one-way ANOVA, which displays the means of the number of references to each category of patent application. The model is statistically significant with *p* value less than 0.001 and F = 4.114. There is no significant difference in the average number of references by Russian individual and firm applications. As discussed above, both categories of PCT applicants have limited access to funding, either in the form of venture capital or government support. Firms´ international patenting in Russia is, indeed, deficient based on two parameters: The number of applications vis-à-vis individual applications and low reference performance. The poor international innovation performance of Russian firms can be explained by an unsupportive institutional environment. In developing countries entrepreneurial companies (including

[13] The group includes the so-called 'foreign-registered' applicants, but from this point on this category is referred to as 'foreign subsidiaries' or FS.

[14] This can be attributed to the low number of applications filed by these categories of applicants in our sample. We admit the limitation of cross-sectional design in this respect.

those that engage in innovation) operate in volatile environments with 'uncertain property rights and underdeveloped markets for goods and capital' (Ahlstrom & Bruton, 2010, p. 537). Consequently, entrepreneurial firms, reportedly the major drivers of innovation in countries such as the US (Segal, 2011) or Israel (Breznitz, 2007), are disadvantaged by deficiencies in the institutional environment such as that found in Russia. This applies particularly to small and medium-sized businesses (SMEs), since innovating SMEs in developing economies face a number of challenges, i.e. an unstable and risky institutional environment and an internal lack of resources; thus, their engagement in innovation is inherently risky (Zhu, Wittmann, & Peng, 2011).

Table 3. Results of Linear Regression Analysis for Five Categories of Patent Applicants and Foreign Subsidiaries (FS) as Reference Group

Category of Applicants	Coefficients	Coefficients Std. Error	Sig.
Intercept (Foreign subsidiary (FS))	**0.468**	0.065	**0.000**
Individual (IND)	**-0.325**	0.074	**0.000**
Company (COM)	**-0.297**	0.082	**0.000**
Federal agency (FED)	-0.302	0.211	0.153
University (UNI)	-0.406	0.223	0.069
Research Centre (RC)	-0.174	0.217	0.422

Source: WIPO Statistics Database, PATENTSCOPE. Retrieved in November-December 2014 from https://patentscope.wipo.int/search/en/search.jsf, and Google Patents, retrieved between December 2016-January 2017.

Table 4. One-way ANOVA: Mean Differences of Patent Application References

Category of Applicants	N	Mean	Std. deviation	Std. error	95% confidence interval for mean		Min	Max
					Lower bound	Upper bound		
Individual (IND)	564	**0.14***	0.823	0.035	0.08	0.21	0	16
Company (COM)	287	**0.17***	0.655	0.039	0.09	0.25	0	5
Foreign subsidiary (FS)	173	**0.47***	1.208	0.092	0.29	0.65	0	7
Federal agency (FED)	18	0.17	0.514	0.121	-0.09	0.42	0	2
University (UNI)	16	0.06	0.25	0.062	-0.07	0.2	0	1
Research centre (RC)	17	0.29	0.985	0.239	-0.21	0.8	0	4
Total	1075	0.2	0.858	0.026	0.15	0.26	0	16

* Statistically significant at the 0.01 level (post hoc test (Tukey))

Source: WIPO Statistics Database, PATENTSCOPE. Retrieved between November-December 2014 from https://patentscope.wipo.int/search/en/search.jsf, and Google Patents, retrieved between December 2016-January 2017.

Another possible explanation for the limited participation of the private sector in internationally-oriented patenting in Russia is the low diversification of the Russian economy. Hydrocarbon-based fuel, including oil and natural gas, as well as distillation products represent the highest value of exports-about 346 billion USD (69.5%) from the total value of Russian exports at about 498 billion USD in 2014 (Trade Map, 2015). Other value-contributing exports include iron and steel, precious metals, aluminium, copper, etc. Many resource sector companies are large, government-owned multinational corporations that do not feel much pressure to innovate (Filippov, 2011, p. 201).

CONCLUSIONS

At the national level, a variety of public and private actors participate in the innovation process, and their collective efforts condition the effectiveness of a national innovation system (NIS). Based on the empirical evidence collected by this study, the main participants in international patenting in Russia are individual inventors, as the majority of international or PCT patent applications published by WIPO in 2013 were filed by individuals. Russian domestic companies play a secondary role. This tendency for individuals (52%) rather than Russian companies (27%) or even foreign corporations with research subsidiaries in Russia and other companies registered abroad (including companies founded by Russian nationals) (16%) to apply for international patents has implications for the practical application and commercialisation of these inventions. 'Lonely inventors' operate outside of the NIS and might lack resources to put their inventions to practical use and then bring them to the market. They also, by definition, are not imbedded in organisational infrastructure, an advantage shared by firms (Coase, 1937) and have a limited ability to leverage linkages to the government, the main source of funding for R&D in Russia. Ultimately, this dynamics demonstrates the lack of entrepreneurial potential in Russia's NIS, where, at least with respect to PCT filings, patents have a lower chance of economic profitability, because the major driver of innovation, namely the private sector, lacks incentives to invent and patent.

Patents are an important measurement of inventive performance and, depending on who initiates the patenting process (an individual or an organisation), a valuable indicator of prospective benefits from innovation. Commercialisation embodies an act of entrepreneurship and serves as the key instrument for receiving economic rewards from invention. In addition, based on the structure of Russian PCT patenting activity dominated by individuals, it is a missing element of its NIS. The lack of motivation of Russian firms to engage in international patenting is directly linked to their institutional environment. The Russian innovation landscape is dominated by government-funded programmes and other forms of government financial support provided to research institutes and state-controlled businesses. The market for venture capital is virtually nonexistent and Russian businesses, especially SMEs, look at innovation as a risky undertaking in the climate of political and economic instability. That is why we failed to identify considerable differences between firm and individual PCT applications in Russia with respect to their economic utility. Both types of applications attract on average fewer citations than foreign MNEs´ subsidiaries operating in Russia.

The superior position of foreign subsidiaries in Russia with regard to the potential economic utility of their applications, vis-à-vis their Russian counterparts and individual inventors, is evident based on the comparison of mean references to patent filings in different categories. Foreign subsidiary filings attract more references than Russian individual inventors or companies, which confirms the assumptions of the OLI paradigm that, due to the ability to manage innovation successfully across borders and leverage intra-company innovation networks, MNEs have an advantage over domestic companies in host economies such as Russia that have not reached an advanced 'knowledge economy' status.

Against this backdrop, individual inventors are pursuing IP protection abroad, which is an alarming sign of the process of invention diffusion. We can only guess that these

individuals are driven by hopes of attracting foreign venture capital or being able to leverage their IP rights via technology licensing. Furthermore, as Griliches suggests, low real wages have something to do with the propensity of individuals to file patent applications (1990, p. 1696). As real wages rise, so does the opportunity cost of dealing with the patent system as an individual. This assumption has a direct relevance to Russia as a transitioning or emerging economy, where real wages are lower than in developed economies, which in turn pushes individuals toward economic self-realisation via inventive activity. The examination of the motives that drive individual inventors in Russia could become a focus of future research. Furthermore, since the limitation of this study is a short time span, future research could track patent citations over a longer period of time.

In sum, this project, based on the use of PCT applications as a source of insights into the internationalisation of innovation in a transitional economy, contributes by drawing the following conclusions. First, foreign subsidiaries operating in Russia attract more attention from subsequent patents in the form of references than their Russian counterparts or individuals, which implies the higher level of commercial and technical utility of these inventions. Second, the realisation and empirical confirmation that individual creativity is still a driving force behind Russia's international innovation performance is noteworthy. Private enterprise appears to play a secondary role in internationally-oriented patenting, so the entrepreneurial aspect of Russia's innovation internationalisation effort is weak, which testifies to the weakness of its NIS.

The ultimate recommendation in respect to policymaking that can be derived from this study is the necessity for a systematic approach addressing the needs and incentives of various contributors to the innovation process: venture capital, universities, publicly-funded research institutes and, most importantly, firms. Our study demonstrates that individual invention is a strong participant in Russia´s internationally-oriented patenting. Even though individual invention can theoretically channel ideas into the entrepreneurial effort by firms or other types of organisations, its immediate technological or economic utility is wanting precisely because the NIS might lack the necessary institutional or social infrastructure for embedding individuals into the business or academic networks and, thus, facilitating the appropriation and realisation of these ideas. Furthermore, on the receiving side, Russian business is poorly incentivised to pursue innovation domestically or internationally. The innovation capability of Russian business, small or large, must be prioritised and strengthened via creating the right incentives and providing a stable institutional and infrastructural foundation.

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The Evolution of Family Entrepreneurship in Poland: Main Findings Based on Surveys and Interviews from 2009-2018

Andrzej Marjański, Łukasz Sułkowski

ABSTRACT

Objective: The article deals with the issue of family entrepreneurship, which plays an increasingly important role in the Polish economy. The aim of the article is to discuss the phenomenon of family entrepreneurship in Poland in market economy and to explore the evolution of family businesses.

Research Design & Methods: The article is based on the review of the literature on the subject, its critical analysis and the results of empirical research conducted in this field by the authors in the years 2009-2018.

Findings: In their development, family businesses need to take into account coping with the principles and practices of market economy and internationalisation processes, as well as problems related to family and business relationships that are specific only to them and multi-generational perspective of functioning. Being successful requires a development strategy thanks to which the businesses build their own brand, improve management processes, introduce innovations and adapt their market behaviour.

Implications & Recommendations: Understanding the specificity of family entrepreneurship requires learning their essence and criteria for distinguishing these entities from other enterprises. The key factor is the duality of relations between the family and the business it runs.

Contribution & Value Added: The originality of this work lies in cross-years comparisons of empirical research conducted by the same researches in the field of family entrepreneurship.

Article type: research article

Keywords: family firms; strategy; entrepreneurship; research methods

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INTRODUCTION

The article focuses on the issue of family entrepreneurship and the process of its evolution taking place in the process of development of family businesses[1], which constitute a significant group of economic entities in the Polish economy. The development of family firms is one of the effects of the free market economy in Poland after 1989 and opportunities for the development of private entrepreneurship (Bednarz *et al*., 2017). It is also an example showcasing that many business ventures are created as a result of activities undertaken by the members of the family with the use of its human, material and financial resources. In the development of entrepreneurship research it is important to take into account the whole diversity and specificity of the organisations, which are the basic elements of collective cooperation in modern societies (Aldrich & Ruef, 2006).

One of the key areas of entrepreneurship is family entrepreneurship, which is an interesting example of dual relationships between the family and the business run by the family. The specificity of these relationships means that the functioning of such entities is in many areas different than in other firms, because in the process of managing a family business, in addition to business arguments, the interests of the family as a whole and its members are always taken into account. Family entrepreneurship is an important element of economic life, and family businesses are perceived as a spirit of entrepreneurship and innovation, and constitute a key element of market economies in most countries, including Poland. Among family businesses, there are micro- and small enterprises (small and medium-sized enterprises, SMEs), as well as large economic entities (large enterprises, LEs) operating on international markets. Estimates suggest that two-thirds of companies around the world are family-owned, family-controlled and family-managed. They provide 60 to 90% of global GDP (IFERA, 2003) and are important sources for creating stable jobs at the same time (Ibrahim *et al*., 2008).

In Poland, dynamic development of family firms was possible thanks to the systemic changes initiated in 1989, which enabled, among others, free development of entrepreneurship (Sułkowski & Marjański, 2015; Zygmunt, 2018). The first representative survey of Polish family businesses conducted in 2009 confirmed that they account for about 80% of all small and medium-sized enterprises (Sułkowski *et al*., 2009) and the development of family enterprises in Poland is an example of significant changes in the economy and is a symbol Poland's economic success.

Polish family firms participate in dynamic changes taking place on the market and have to face new challenges affecting their functioning and the shape of their strategy. In the aspect of progressing globalisation processes, strategic orientation directed at taking innovative actions that will enable the company to adapt to the requirements of the market economy, European integration and internationalisation are important (Wach, 2017; Rogalska, 2018; Ivanová, 2017; Korcsmáros & Šimova, 2018). At the same time, they are also subject to processes of changes resulting from their family nature connected, for example, with the processes of succession.

[1] The terms 'family business', 'family firm' and especially popular in continental Europe 'family enterprise' will be used interchangeably in the article.

The changes taking place in the development processes of Polish family firms have created a number of challenges related to the management of these entities. They have their consequences in the following areas:

- the functioning and development of Polish family businesses takes place in the conditions of low social capital in the Polish society and the threat of 'amoral' familism;
- there appear challenges related to succession, because generational change has become a permanent element in the functioning of family enterprises;
- the complexity of managing family businesses increases due to increasing competition and progressing globalisation and European integration.

Dominating the landscape of most economies by family businesses also creates the need to expand the scope of research that provides knowledge about the areas of management of family businesses (Chrisman, Chua, & Steier, 2003a). Noticing the significance and separateness of this type of business entities has led researchers to pay attention to family firms as a unique area of research and interest (Sharma, 2004) due to the fact that the family is a critical variable that allows to understand the essence of these businesses and their high economic and social importance (Astrachan, 2003). Thus, they arouse more and more interest in theoretical and empirical research (Cristiano, 2017). In family entrepreneurship, attention is paid to the uniqueness of these entities, resulting from the combination of the need to realise profits with the long-term perspective of building the enterprise's value and maintaining its functioning despite changing generations of the owners. Family is the sum of positive associations, hence family enterprises are becoming more and more popular. This is due to the fact that it is the family that carries universal values that are not subject to fashions or changing marketing trends. In families running a business for generations, business traditions naturally combine with a system of values, among which respect for work and for the other person is in the foreground.

Despite the existence of many different positions and orientations in the scientific discourse, ranging from the question of distinguishing and defining, researchers agree that in this type of entities members of the same family have the ownership and influence on their functioning and strategy (Astrachan & Shanker, 2003). Researchers agree that family businesses operate on the border between two qualitatively different social institutions – family and business (Lansberg, 1983) and the differences between family and non-family entities result from the fact that these two institutions exist for completely different purposes. The family is to care for family members and the main goal of business is to provide goods and services for economic benefits (Simon, 2009). In a family-owned firm, these two systems overlap and form a single business system that, due to family involvement, differs from a business that is not controlled by the family.

The aim of the article is to discuss the phenomenon of family entrepreneurship in Poland in the market economy and to explore the process of their evolution.

The article consists of three main parts. First, the findings of prior studies are summarised, taking into account its three main themes (nature, specific character and the Polish realities for family firm research). Second, reference was made to the methodological conditions related to conducting studies on family entities in the modern economy. Third, the academic discussion of prior research is presented.

LITERATURE REVIEW OF PRIOR STUDIES

The Nature of the Research Area of Family Entrepreneurship

At present, the dynamic development of entrepreneurship research is visible. The subject of entrepreneurship is taken up both by management sciences, where it gained the status of a separate sub-discipline, as well as by other disciplines of social sciences (e.g. sociology, psychology, economics) (Szaban & Skrzek-Lubasińska, 2018). The phenomenon of entrepreneurship is extremely diverse and is perceived in different contexts. Among various types of entrepreneurship, the literature on the subject is considered a separate kind of family entrepreneurship. In scientific research attention is more and more often paid to the uniqueness of family businesses, and their common feature is the implementation of economic results with the multi-generational perspective of building the value of the enterprise. It is possible thanks to the family and its commitment to running the business, and which is a carrier of universal values that are not subject to fashions or changing trends. The combination of family and business components translates into the theoretical complexity of research issues and implies the need to apply an appropriate methodological approach in empirical research (Wilson *et al*., 2014).

In the academic area, the issue of family entrepreneurship has been present since the early 1980s, with the appearance of the special edition of the *Organisation Dynamics* journal and as indicated by Astrachan (2003) it was the beginning of the quest for a new research area – family entrepreneurship. Before the 1980s, the term 'family business' appeared occasionally presenting scanty empirical research and most articles were of a theoretical nature. In 1988, the first scientific journal *Family Business Review* (FBR) devoted to studies and research on family enterprises was published (Astrachan, 2003). However, it was only in the 1990s that family business research began to constitute a separate area of scientific research (Bird, Welsch, Astrachan, & Pistrui, 2002). The research area of family entrepreneurship is multidisciplinary and distinguishes itself by focusing on a number of paradoxes that create family involvement in running a business (Sharma *et al*., 2014), located at the interface between different areas and creates the opportunity to conduct research combining economic and management, sociological psychological issues and many others and the unique nature of the ownership and organisation of family businesses gives the opportunity to ask many interesting research questions (Leszczewska, 2017).

In Poland, the interest in this issue dates back to the1990s. The first surveys of Polish businesses were conducted. The leading researchers in Poland include among others Krzysztof Safin, Alicja Winnicka-Popczyk, Wojciech Popczyk, Ewa Więcek-Janka, Łukasz Sułkowski, Andrzej Marjański, Jacek Lipiec, Nelly Daszkiewicz and Krzysztof Wach. The first representative surveys of Polish family firms were conducted in 2009. Currently, research on family entrepreneurship is regularly conducted in several research centres and is increasingly reflected in the Polish literature on the subject. However, there is a clear need to reduce the cognitive and empirical gap between domestic and foreign knowledge in the field of family entrepreneurship, especially in the field of broad and systematic empirical research (Jeżak, 2014, pp. 9-10).

In research on family enterprises, it seems crucial to strive to understand their specificity and characteristics that distinguish them from non-family enterprises, so that a full picture of these entities can be obtained. One should strive to define rules and distinguish

the specificity of a family business and indicate good practices that can be used by managers in the process of enterprise development and the reference to long-term success in the business and family dimension (Więcek-Janka, Contreras Loera, Kijewska, & Tirado, 2016). Many researchers indicate that the relationships between the family system and the enterprise system make the processes of managing and building strategies different from those occurring in non-family companies (Harris, Martinez, & Ward, 1994).

In the research undertaken, it is always necessary to address issues related to the particular involvement of the family in running the business (Sharma, Christman, & Gersick, 2012) and how family relations are combined in the business dimension of running the company (Chrisman *et al*., 2003). Many researchers, including Chrisman, Chua and Sharma (2003a) indicate that it is necessary to apply the theory of management and economics in studies on the essence of family enterprises because all key issues occurring in the theory of the firm, such as (i) why the enterprise exists, (ii) what its nature is, (iii) what the goals its activities are and (iv) where the boundaries of firms are refer also to family businesses.

A Specific Character of Family Entrepreneurship

Family entrepreneurship is undoubtedly characterised by a strong relationship with one or several families that determine the functioning and development directions of individual entities. In most cases, these are small or medium-sized enterprises, which is an important determinant affecting the shape of their development process (Cristiano, 2017). But there are also large family businesses that have increased their size in the process of their development. The creation of different types of family enterprises is also observed. The common feature of family businesses is the multifaceted connection between business and the owning family. Astrachan (2003) even indicates that the family is a critical variable that allows to understand the essence of family business.

Family entrepreneurship is the oldest form of entrepreneurship, the functioning of which is observed in all cultures and historical periods (Gasson *et al*., 1988). Also today, family businesses are the most numerous and natural form of doing business all over the world and include both small and medium-sized enterprises, as well as large family-controlled economic entities. Key factors that distinguish family businesses are: family ownership structure, family members' participation in management and participation of more than one generation in the functioning of the entity (Handler, 1989).

The family factor is essential for the functioning and development of the family business and for shaping its resources, which are valuable, rare and without substitutes. At the same time, the resources of the family business are difficult to imitate (Barney, 1991). Human capital, family social capital and material and financial capital are of key importance. In a family enterprise, intangible assets play a special role, which can be a source of sustainable competitive advantages and their impact can create synergies (Sirmon & Hitt, 2003). Knowledge-based resources and the entity's reputation are important for the family firm (Hadryś, 2018).

Family enterprises are distinguished by the dual impact of family and enterprise subsystems. This situation determines the way entities are run as well as the directions of their development (Moss, Payne, & Moore, 2014), which means that decisions and actions also reflect the unseen assumptions about the consistency of family participation in running the business and the willingness to hand the business to the next generation (Lumpkin & Brigham, 2011; Petrů & Havlíček, 2017). Such an option makes it possible to

create a strategic orientation enabling the creation of a competitive advantage expressed in the long-term development of basic competences as well as the development of organisational culture and relations with stakeholders (Miller & Le Breton-Miller, 2006). In a family business the strategic orientation must reflect the concern of the owner family to preserve the intergenerational continuity of the entity and it is also based on social and emotional factors and is undoubtedly one of the key factors determining the development of the entity (Gómez-Mejía *et al*., 2007; Kot *et al*., 2016). In shaping the strategic orientation, the key role is played by the company's stakeholders who are members of the owner's family and management. On the other hand, the shape of the strategic orientation of a family enterprise is the resultant of business and family factors as well as the preferences of managers and employees (Safin, 2014).

Family businesses are economic entities that on the one hand must have the characteristics attributed to the enterprise in general and, on the other hand, stand out with a number of features that allow them to be considered family businesses. In the research area the specificity resulting from the family nature of business is emphasised, which manifests itself in the long-term optics of functioning, parallel implementation of business goals and family goals, in the case of small and medium-sized entities, close connection with the local environment and a specific approach to human resources management. The specificity of the family business stems from the constant interpenetration of the business and family spheres. This constellation makes the behaviour of family enterprises different from the one in which the family factor is absent or marginal. An example of such a difference is among others intergenerational succession. The difference covers both the area of current activities, as well as strategic orientations and behaviours, as well as shaping their competitive advantage (Hoy, 2014). The dimension of the specifics causes that family enterprises are not only entities with a specific form of ownership, but constitute a separate type of enterprise (Safin, 2014).

The functioning of family businesses is subject to evolution, which is influenced by both changing operating conditions and internal factors. It is increasingly recognized that due to the introduction of new solutions in the area of management, there are basically no limits to the development of the firm. Therefore, one of the fundamental objectives of research into family enterprises is to learn how they differ from non-family enterprises, to explore benefits and challenges related to family ownership and family involvement in the company (Binz-Astrakhan *et al*., 2018) and to seek determinants shaping the success of these enterprises and to formulate, on this basis, postulates regarding directions of development and improvement of management methods in the dynamically changing reality. Together with the development of research on family entrepreneurship, the dynamisation of interdisciplinary research and the convergence of individual scientific disciplines are visible. But despite the progress in research, the issue of learning their nature and principles of functioning is one of the basic research challenges.

Characteristics of Family Entrepreneurship in Poland

It can be seen, from the nearly 30 years of experience of the functioning of the market economy, that family entrepreneurship is an important element of the Polish economy. It can be concluded that the intensive development of family enterprises illustrates the phenomenon of entrepreneurship of the Poles and is one of the key successes of the Polish economy. The majority of Polish family enterprises are included in the SME sector and

their significance results from both a significant share in generating GDP and jobs, which affects the stability of economic and social development. It is also important to refer to the specific features of family businesses, namely the ethical nature of the activity, the construction of community and loyalty and the development of teamwork skills. A family enterprise is also an example of combining work and family life.

The formation of many new family businesses in the 1990s was the result of the development of the free market and the creation of competition. A number of factors contributed to this, including:

- A wave of small business development in the first half of the 1990s. It resulted in the creation of new business entities in the years 1990-2000.
- A sudden increase in unemployment in the years 1990-1995 forcing entire families to take on new challenges in the form of starting a business.
- Very high cost of raising capital associated with high inflation and fiscal policy during the economic reforms (1990-1999) favouring family accumulation and allocation of capital needed to start a new business (McMilian & Woodruff, 2003; Bilan *at al.*, 2018).
- The key position of the family in studies of the hierarchy of social values in Poland that has been sustained over many recent decades (Nowak, 1981).
- A low and systematically decreasing level of social capital and trust strengthening the family relationship in the creation of new business ventures (Czapiński & Panek, 2011).
- Cultural syndromes: 'social vacuum' and 'amoral familism' resulting from historical reasons (lack of Polish independence for over two centuries, lack of civil society and democratic institutions), which strengthen the position of the family in comparison with other social groups (Sztompka, 1998).

As a result, many family enterprises, which currently constitute an extremely valuable element of the Polish economy, were created. They were founded by those who saw the possibilities of the new economic system and started working on their own. Changes in the behaviour of individuals and social groups in the perception of the role of entrepreneur and the importance of entrepreneurship in social reception were also extremely important. Family businesses were also started to be pointed out as places where work and family life are combined and teamwork skills and a sense of community and loyalty are developed. Currently, succession is already one of the key challenges for family businesses and about one quarter of them is undergoing a generational change The research confirms that young people who have been brought up in a family business environment have more developed entrepreneurial attitudes than people who do not have such experiences (Wach, 2015).

It was noticed that entrepreneurs are important initiators of social and economic changes and constitute a distinctive social group that is characterised by a high degree of independent thinking and an open attitude towards undertaking new ventures. In 1995, there were over 2 million small and medium-sized enterprises (SMEs) in Poland, employing about 60% of professionally active citizens, providing nearly half of GDP (Ministry, 1995). The implementation of the transformation programme of the Polish economy has enabled the construction of a thriving sector of private enterprises and introduced a number of legal and institutional reforms that led to Poland's membership in the European Union in 2004 (Ubrežiová, Wach, & Horváthová, 2018). It should be recognized that the accession to the European Union was an important factor determining the development of the Polish economy and the evolution of family enterprises.

Currently, the Polish economy is, in many areas, more and more comparable with the economies of countries with a stable market economy, which is visible in the inflation indicators, interest rates and stabilisation of the labour market. Macroeconomic conditions affecting the functioning and the level of enterprise development are gradually improving. The share of the enterprise sector in the generation of gross domestic product is approx. 75%, of which SMEs generate 48.5%, while microenterprises account for 29.7%. Eurostat data show that the share of the SME sector in Poland is at the same level as the average for the European Union countries and the enterprise sector is the main factor in the development of the Polish economy (PARP, 2014). A survey of Polish family businesses carried out in 2009 confirmed that they constitute approximately 78% of all small and medium-sized enterprises (Sułkowski *et al*., 2009). Taking into account the results of the report of the Polish Agency for Enterprise Development, it can be stated that Polish small and medium-sized family enterprises amount to almost 1 345 thousand employers giving jobs to over 4 546 thousand employees and contributing to the creation of over 37% of GDP. These figures indicate that the population of family enterprises in the Polish economy is comparable with other countries with a well-established market economy (PARP, 2014).

MATERIAL AND METHODS

The article is based on a review of the subject literature, its critical analysis and the results of research conducted in this field by the authors. It also indicates the methodological determinants for studying family firms. In order to achieve the goal of the article, the essence of the research area of family entrepreneurship was discussed and the characteristics of family enterprises in Poland was made. The results of the research carried out by the authors in the years 2009-2010, 2014-2016 and 2017-2018 were also referred to and the conclusions were formulated. The research samples used are as follows:

1. n = 1280 family and non-family entities in the years 2009-2010;
2. n = 10 family firms in the years 2014-2016;
3. n = 20 family firms in the years 2017-2018.

The quantitative approach (a survey) was applied in 2009-2010, while the qualitative approach (in-depth interviews and case studies) was applied in the next two research projects (1914-2016 and 2017-2018). More details will be discussed in the next part of this article.

The research area of family firms is a difficult and complex challenge and the methodology of research is rarely the subject of scientific reflection. This is due to the fact that the concept of a family enterprise is interdisciplinary and is an area of interest for many fields of science. This causes that, in many cases, it is a poorly explored area or treated as marginal for a given discipline. Also the differences in the criteria distinguished and categorised by a family business cause the need to reconcile the concept of a family business in a research process. As part of various research programmes, we have collected a number of observations and experiences regarding the use of various research methods and related methodological problems arising in the process of getting to know family businesses.

Numerous methods of quantitative and qualitative research are used in the research into family enterprises in the world. The quantitative research methodology, although

representative and leading to generalisations, does not always allow for a deeper understanding of complex social processes taking place in family enterprises. In contrast, qualitative methods are particularly useful for examining the problems of family businesses due to their specific connection of business (economic) relationships with family (emotional, personal and private). It seems reasonable to apply qualitative methods to research on the sphere of identity, culture, values and the relationship between family and business. As the experience of many researchers shows, qualitative methods allow for more effective obtaining of reliable data on 'sensitive' topics in comparison with quantitative methods (Sułkowski & Marjański, 2014).

Conducting research in family enterprises has some restrictions similar to those related to the research of business entities based on primary sources:

- it is difficult to reach the examined subject and make him/her participate in the study;
- much of the information is deliberately hidden because it is considered a source of competitive advantage, know-how or includes sensitive family issues;
- the quality of the acquired research material is highly diversified due to the different level of involvement of the subject of the study;
- an important problem is to achieve representativeness due to refusals to participate in the study;
- problems are caused by sampling because there are no reliable selection procedures that can identify family businesses.

In addition, in studies of family businesses, especially small ones, there are problems specific to this type of entities related to the limited size of the enterprise and a low level of formalisation. There is little standardised documentary material allowing to develop research based on primary sources. It is difficult to conduct research based on representative samples, because there are no sampling frames covering only family businesses. In the study, it is necessary to filter from a sample of small companies or from the SME sector, based on the definition of familism.

In this area of family businesses, there are no identical criteria and there is considerable diversity and multiplicity of definitions, based on various criteria such as: self-determination as a family business, planned or completed family succession, ownership and management of family members over the company. In practice, it is often difficult to check the existence of other criteria apart from self-determination. Many researchers and our experience point to a particularly sensitive area of research, which is the overlapping relationship between the company and the owner's family. For this reason, the family and nepotistic relationships and practices are usually camouflaged as well as the flows of resources between the company and the family.

One should take into account the special emotional attitude of family members owning the controlled economic entity, which often causes a very subjective and idealised description of experiences related to a family business. And it is possible to reach the key areas for the functioning of the organisation: social processes, identity, culture, values and norms related to the family character of the entity only by using in-depth methods.

Social research on the organisation side is particularly methodologically demanding and requires methodological pluralism, which gives the possibility of combining quantitative and qualitative methods and triangulation of methods, which is more often associated with qualitative methodology (Sułkowski & Marjański, 2014a). A diagnosis of these key

research problems indicates that qualitative research that allows for a deeper, individual understanding of the complexity of the phenomena studied may be particularly valuable cognitively, which is confirmed by the experiments of the authors of this publication. We mainly mean methods of organisational anthropology, such as: in-depth interviews, participant observation, autoethnography and case studies.

Qualitative methods are useful for researching the problems of small family businesses, in particular problems related to the sphere of identity, culture, values and the relationship between family and business. Qualitative methods allow for more effective acquisition of reliable data on 'sensitive' topics in comparison with quantitative methods. It is equally important to provide information on complex social processes that are explored better using open methods. However, one should be aware that it is not free of restrictions and by definition generalisations and theorising create problems. The results of research are subject to considerable subjectivism, which transforms into inter-subjectivity through the use of various methods and perspectives.

In family business research, methodological pluralism, which allows the creation of mixed research programmes, should be postulated. Combining quantitative and qualitative methods in one research programme can provide important but not always commensurate results. It is also possible to indicate the need for methodological triangulation and thus the use of various complementary methods and research techniques that will allow to describe the examined family company in its entire complexity.

EMPIRICAL RESULTS AND DISCUSSION

We have been conducting research for over a dozen years to understand the specificity of family businesses, including three main periods (as mentioned before):

1. 2009-2010 (e.g. Sułkowski *et al*., 2009; Sułkowski & Marjański, 2011);
2. 2014-2016 (e.g. Sułkowski & Marjański, 2015; Marjański & Staniszewska, 2017; Sułkowski & Marjański, 2018);
3. 2017-2018 (e.g. Marjański *et al*., 2018).

Quantitative and Qualitative Survey 2009-2010

As part of the implementation of various research programmes we have collected many observations. We were members of the team implementing the first representative survey of family enterprises in Poland which was carried out on a sample of 1 280 entities. The 'Family Businesses and the Polish Economy – Opportunities and Challenges' research programme was implemented in 2009-2010 at the request of the Polish Agency for Enterprise Development (PARP). This issue was taken due to the fact that family businesses were considered a valuable element of the entrepreneurial sector whose development should be supported as in many European countries. Until then, no activities were addressed to this group of companies. The adoption of a policy to support the development of family businesses required research to be able to characterise and examine their specificity and to identify their needs and problems in their operations. Moreover, the aim of the project was to fill the existing information gap within the scope of providing reliable data on the share of family enterprises in the SME sector and their characteristics against non-family entities (Sułkowski *et al*., 2009).

Due to the complexity and interdisciplinary nature of research issues and due to the fact that until now the issue of family entrepreneurship was not the subject of representative research in Poland, it was necessary to ensure that demands such as the following were met:

- application of qualitative and quantitative methods;
- ensuring a multi-stage research procedure;
- the need for methodological triangulation and data triangulation;
- participation in the study of various actors, both owners and managers and employees of the lower level, including those from outside the owner's family;
- including both representatives of family enterprises as well as external experts from scientific communities, business organisations, consulting and training companies and employees in the study.

Due to the lack of reliable data on the participation of family businesses in the SME sector and their structure, it was necessary to apply a multi-stage research procedure. This procedure made it possible to reliably estimate the share of family businesses in the SME sector (including the share in GDP and the overall employment structure) and also gave an answer to all of the goals and research questions posed. Thanks to the use of quantitative methods, it was possible to estimate the size of the population of small and medium family enterprises in Poland. However, a standardised interview or survey does not provide an image of informal family relationships that have a key impact on the functioning of the company.

On the other hand, thanks to qualitative methods, it was possible to obtain in-depth knowledge on the relationship between constraints and family values and the functioning of the company. The search for family relationships is often located in the sphere of problems and sensitive questions that are associated with nepotism. Therefore, to investigate the impact of family ties on organisational strategy, structure and culture, human resource management and training needs, it was extremely important to apply both qualitative and quantitative methods.

Data from various sources were used in the research process and many research methods were used (including free interviews, questionnaire interviews). Qualitative data and hypotheses formulated on the basis of them were verified on the basis of quantitative data which was obtained on the basis of a representative sample, while quantitative data on key research issues was deepened in qualitative research. An important issue was to capture in the research both the owner's family and employees from outside the family. In order to maintain the objectivity of assessments for fear that family business managers may be too emotionally connected with the company, their statements as well as the statements of employees of family enterprises were confronted with the opinions of experts cooperating with family businesses on a daily basis.

The study found that family businesses in Poland in terms of structural features including the number of employees, the scope of activity, the volume of turnover and the scope of investment undertaken are not fundamentally different from non-family entities. The specificity of the surveyed entities was identified in the sphere of values, organisational culture, level of social trust, hierarchy of goals and strategy. It was also important to determine, irrespective of the type of activity conducted, that family enterprises have common features influencing the shaping of their system of values, identity, organisational culture and family social capital. An interesting observation was also the fact that they were exposed in various ways in the surveyed enterprises.

It was established that the average Polish family firm is around 15 years old. In terms of some structural features, such as the size of the enterprise, the number of employees, the scale of operations, the volume of turnover or the scope of investment undertaken they are not in a fundamental way different from non-family businesses. There were also no significant differences in the perception of key barriers to the development of Polish entrepreneurship and expectations in relation to actions that should be taken to facilitate business operations. The analyses showed that the differences were more related to the size of the entity than to its family character. It can be assumed that this situation results from the fact that most of the surveyed enterprises were at an early stage of development, in which there were no problems related to family entrepreneurship such as: incorporation of new generations to work in the company, planning and conducting succession, or hiring external managers.

Essential differences indicating the specifics of family firms were identified in the sphere of values, organisational culture, level of social trust and hierarchy of goals. Regardless of the type of activity conducted, all family enterprises had common features which result in their identity, specific values but also problems they have to face. Not all managers emphasised the family characteristics of the company, considering that they could be received negatively. The positive and sometimes negative consequences of being a family company were pointed out. For this reason, the family characteristics of the company were not always exposed in its image.

The family character of the subject had a significant impact on the shaping of social capital. It was pointed out that with the employment of family members bound by blood ties and sharing common values and shared responsibility for the company's brand, the family name creates more trust in these people and ensures that the managers will not be cheated by them. Many years of work in the family allowed to develop a kind of 'code' that facilitates communication and easier and faster decision making both in operational matters and referring to the company's development strategy.

In the area of organisational culture, the family nature of the enterprise translated into a positive atmosphere at work through the transfer of a family atmosphere to the business ground. Employees from outside the family pointed to greater personalisation of relationships than in non-family companies in which they had previously worked. It was believed that the creation of a familial organisational culture allows the use of strengths of the family entity and to build strong ties between the company and its stakeholders.

The specificity of family enterprises was also manifested by a high level of responsibility for the family, employees and relations with the local communities in which they operate. The implementation of the long-term goal, which is the duration of the enterprise over generations, is visible in the desire to maintain and multiply assets for future generations. Therefore, it is much easier to make decisions about long-term investments and not focus on short-term profits. Despite the different valuations of familism, the respondents mostly considered familism as a factor conducive to running the enterprise. More than half regularly indicated the family nature of their business in their contacts and only one third did not underline the fact of being a family business.

An important feature of contemporary family businesses in Poland are succession processes that are implemented in many enterprises. The time that has passed since the founding of the majority of Polish family businesses causes that they will have to face the key challenge of succession soon. Only about 20% of Polish family businesses are run by

the second or next generation of the owner family, and these results are consistent with other authors (Surdej & Wach, 2011). These factors cause that the founders of companies start thinking about succession or are in the process of conducting a succession process. It was pointed out that the importance of succession in Polish family enterprises will grow due to the impending generational change in companies established in the period of the economic transformation in the 1990s. Most of the respondents pointed to the desire to make succession, of which 58% indicated the descendant as the successor. Unfortunately, a significant problem was the lack of succession planning and limited knowledge in this area. Only about 40% of the surveyed entities had a succession plan.

In the area of the development strategy, it was pointed out that the specialisation of the enterprise and location in the market niche were essential. The ability to perform individual and non-standard orders and high flexibility in relation to the clients' needs constitute one of the important elements of building a competitive advantage. It was also pointed out that the strategy must include correlated business goals and family goals, and the company's mission should reflect the family identity of the company. The succession plan should be the most long-term element of the strategy allowing for the preparation of a successor, but also the senior, the enterprise and the owner's family for generational change.

The results of the conducted research allowed to determine the specificity of family enterprises operating in the Polish economy and to indicate specific areas resulting from their family character and the sphere of management and social relations, including primarily the following problems:

- permanent overlapping of conflict-generating enterprise and family systems;
- planning and effectiveness of succession and the threat of a crisis accompanying the generational change;
- creation of strategic orientation and implementation of development strategies and barriers to development through the occurrence of the conflict of family goals and company goals, as well as limiting the growth of the entity;
- formation of cultural barriers resulting from familism and nepotism occurring in the organisational culture and human resource management;
- barriers in management resulting from limited knowledge of managers and limiting the participation of mercenary managers in business management.

Qualitative Research 2014-2016

Continuing the problems of the research conducted in 2009-2010, we developed the use of qualitative methods. In one of the studies carried out in the years 2014-2016 we focused on the analysis of the phenomenon of social capital in small and medium-sized family enterprises (Marjański & Staniszewska, 2017; Sułkowski & Marjański, 2018). We conducted qualitative research on 10 family enterprises aimed at analysing cases and comparing the results of both surveys. Among the research problems posed, we were looking for answers to the question why low social capital in Poland positively correlates with the development of small and medium family enterprises and why the high level of family social capital is a stimulus for the development of family businesses. The key method used was the in-depth interview, in which we encountered the problem of getting the respondent to reflect and establish communication with the researcher in a similar way as in the previous studies. By achieving this goal, it was possible to learn about important and complex issues

related to family social capital. The relatively small research sample and the long duration of the study also allowed the use of participant observation methods.

The research results show that a high level of social capital plays an important role in the development process of the surveyed enterprises. A well-developed dialogue between employees, as well as the care for maintaining good relationships with customers and the external environment are of great importance. The effectiveness of the surveyed enterprises was significantly influenced by the approach to employees, manifested, among others, by equal treatment of employees from outside the family as well as those from the family and the openness of managers to making new contacts and the ability to change previously defined goals. In the first place attention was paid to good performance of the task and not to who performs it. The phenomenon of the influence of familism on team development and constructive problem solving indicated in the subject literature was also confirmed.

The awareness of the family nature of the business was common among the entrepreneurs participating in the survey and family members involved in the functioning of the family enterprise. Attention was paid to the importance of commonly shared norms and values and the importance of a shared vision of the family and the enterprise. It was pointed out that the enterprise, regardless of formal provisions related to the organisational and legal form, is the joint property of the immediate family. They also pointed out that they had created their own enterprises to be able to work together with members of the immediate family. It was noticed that employees from the family, through blood ties and working on a joint account, are additionally obliged to work more effectively and also more than employees from outside the family, willing to sacrifice for the benefit of the company.

In both studies it was confirmed that a specific communication system based on a specific language code was developed, which translates into the speed and ease of decision making. On the other hand, close family relationships also allow family members to express their opinions in an easier way, less positive ones in particular. It is also important to transfer the family home atmosphere to the enterprise. Among the surveyed enterprises, there were three that were created as a reaction to previous bad work experience in non-family enterprises. One's own family business was the creation of a friendly workplace.

Building a good atmosphere and communication were influenced by the fact that people who work in the company share the same values because they come from one family or were hired because they 'fit' into its value system and organisational culture. External communication channels of small and medium family enterprises in Poland show high frequency of their use as well as flexibility and patency. As a result, companies adapt to the needs of their clients. Non-family employees indicated high personalisation of relationships and non-professional relations in interviews. The direct contact of the owner with the employees allowing good use of employee competences is of great importance for both parties.

Family social capital also facilitates the recovery of an enterprise from crisis situations. It was emphasised that in such situations members of the owner families undertake activities aimed at averting the crisis and limit the collection of funds from the enterprise to the absolute minimum or transfer private savings to the enterprise. In some family businesses, the problem was insufficient knowledge about the opportunities and threats resulting from the family nature of the company. It can be assumed that faster and sustainable development of family enterprises would be possible due to the implementation of effective measures aimed at understanding the importance of social capital in the process

of managing the family business. Also, social capital is of great importance while making key decisions by family members, because it is easier to communicate with each other. Corporate matters are often discussed at family gatherings outside the company's headquarters and the lack of formalisation is considered to be a strength of the enterprises because decisions are made faster.

The conducted research confirmed the thesis that the high level of social capital based on interpersonal relations of family members is manifested by a high level of trust and cooperation and a low level of formalisation translating into more efficient and effective communication and personalisation of organisational ties (paternalism, family atmosphere). The limited size of the formalisation is also affected by the limited size of the enterprise. The smaller the entities, the smaller the formalisation, only in medium-sized enterprises detailed positioning of the hierarchy of positions, determination of responsibility, job descriptions, flow charts or communication structure begin to appear, often caused by external factors, e.g. the need to introduce in the company standards that are required by large business partners.

The family nature of a company also translates into long-term business goals and ensuring stable growth in the long-term and greater adaptability of the company to changing environmental conditions. The key sources of high family capital were trust, common pursuit of the defined goal and greater involvement in the development of the family entity. It turns out that blood ties, sharing common values, co-responsibility for the surname, brand of the company cause that thanks to this the founders of companies are sure that they can count on the employees from the family.

The analysis of the results of the presented research shows great trust among family members, but on the other hand, it confirms the thesis about the crisis of social capital among the Poles – clearly indicating the deficit of social trust in relation to representatives of other social groups. The research shows that the level of trust in family businesses is directly proportional to the degree of family intimacy. The owners declare total trust in relation to people from the closest family circle and employees from the family are considered to be completely loyal and committed. This means that they are entrusted with key, responsible positions in the company in the belief that they will care for the brand of the family business. It should be recognized that the trust that family members endure is the foundation of a family business and is often the main bond of social capital. For this reason, the family was often referred to as a 'clan' – with all positive and negative consequences: very much trust in each other, distrust of people from outside the clan.

On the one hand, common values favour the development of family members and the company they run, but on the other hand, family members are obliged to work more effectively and make greater sacrifices for the company. The business owner knows all the strengths and weaknesses of the family worker and thanks to that he is able to manage it better and assign his employees tasks that will allow him to use their potential fully, as well as not require tasks in which the person is not good at or does not like to perform. It is worth noting that employees from the family show greater willingness to work outside the standard working hours and if necessary, they can take on all positions, even the lowest ones. Greater dedication to work also results from the financial responsibility that family members bear as an enterprise, as well as care for the material existence of the family.

Greater motivation to work and responsibility of family members is identified both by owners, managers, but also by employees from outside the family.

The analysis of the results of research on the positive impact of low social capital on development in small and medium-sized family enterprises in Poland allows for the following conclusions:

- the deficit of social capital in interpersonal relations and authorities encourages to undertake economic activity based on the primary community, that is the family;
- in small and medium-sized family enterprises the family is a source of social capital, which takes on a specific form of social capital of the family;
- small and medium-sized family enterprises rely on the interdependence of business and the owner's family and use a high level of trust for family members, and through strong and frequent personal interactions generate a special form of social capital that can be a source of their competitive advantage;
- there is reluctance in small family enterprises to formalise and coordinate cooperation in the entity;
- on the level of social capital of the surveyed family enterprises, the impact of commonly shared norms and family values is manifested;
- a high level of family social capital has a significant impact on the development of small and medium family enterprises.

It can be pointed out that the nature of social capital of small and medium family enterprises in Poland is of great importance for the family to achieve success together with the limitation of manifesting family emotions in the enterprise. Integration, common value system, trust and knowledge sharing are the result of a high level of social capital in the surveyed enterprises.

Qualitative Research 2017-2018

Another study on the strategic orientation in family enterprises was carried out in the period of 2017-2018 (Marjański *et al*., 2018). A qualitative approach was selected because it allows to reach specific cases and creates the opportunity to learn about the specifics of the surveyed enterprises (Toften & Hammervoll, 2010). The research sample consisted of 20 companies in which in-depth interviews were conducted based on a repetitive research scenario, which included the opportunity to ask interlocutors additional questions to further specify the issues raised. The interview scenario was consulted with three external experts. Interviews were conducted in family enterprises operating in the Lodz region.

Small and medium-sized enterprises, which declared themselves as family enterprises and met the conditions resulting from the adopted definition of a family enterprise understood as an economic organisation based on family ties and relationships, which seeks to sustainably maintain a decisive influence on the family business through participation in the future ownership, management and responsibility with the intention to transfer it to the next generation, were selected for the research.

The main research goal was to identify the specifics of strategic orientation in family enterprises by getting answers to some basic questions: do surveyed family enterprises have strategic orientation, and if so, is it superior to the strategy, or how familistic features influence strategic orientation and what significance in the strategic orientation has the opportunity to use development support instruments offered by business environment institutions.

The conducted research showed that obtaining data about strategic orientation was not easy. In the surveyed family enterprises, the common reluctance to reveal key information for the development of the company to researchers was confirmed. This situation is related to the overlap of the enterprise and family system, which means that the disclosure of business factors was related to the need to disclose information related to the family. Another problem that occurred in the research were terminological issues related to the ambiguous understanding of the terms: strategic orientation, strategy or development process.

The surveyed companies have strategic orientation, but in most cases they could not name it. In 14 entities, strategic orientation was superior to the strategy, and in the remaining entities the respondents were not able to take a position. In all enterprises, the impact of familism on the shaping of strategic orientation was pointed out, as well as the fact that the family nature of business is an important strategic factor increasing the opportunities for success in the dimension of the enterprise and the owner's family. It was pointed out that thanks to the family nature of the business, valuable and rare human resources are gaining, based on trust in the family social capital, as well as valuable material and financial resources. Familistic features also affect the easier development of knowledge resources and care for the company's reputation.

An important issue was to determine what role is played by strategic orientation in the development process of the surveyed enterprises. The respondents indicated that it is a guideline to undertake entrepreneurial activities as well as to seek and use market opportunities. The shape of strategic orientation translated into building a competitive advantage, which assumes operating in a niche market and innovation. It was pointed out that such an approach allows the development of the entity as well as the effectiveness of its functioning. The importance of the environment in which enterprises operate and the availability of financial and material resources was also pointed out. It was felt that it was necessary to ensure the development of the company by introducing new technological and organisational solutions in order to maintain its competitiveness and the possibility of transferring the company to the next generation in good condition. Entrepreneurs pointed out that in the process of enterprise development acquiring external sources of financing, especially non-returnable ones, is of crucial importance. In the enterprises surveyed, the strategic orientation was focused on the development of the company measured by qualitative changes such as: an increase in profitability, an increase in the value of product sales and the introduction of innovative technologies, as well as ensuring business continuity and conducting the succession process.

Since only family enterprises operating in rural areas were included in the research sample, the research results should be treated as a preliminary proposal requiring the extension of research to adopt a more utilitarian perspective allowing the most in-depth analysis and description of factors determining the strategic orientation of family enterprises.

CONCLUSIONS

The contemporary Polish economy is characterised by high dynamics of changes in operating conditions and diversity of entities functioning in it but Poland can be considered a country where family businesses are and will be the dominant form of running a business. One of the many advantages of family entrepreneurship is that it is not based only on economic indica-

tors, but also on a long-term development strategy and people are the most important capital of every family company. Entrepreneurship in family businesses in Poland is characterised by the specificity resulting from focusing primarily on the personal, material and financial resources of the family. On the other hand, the number of successions is growing.

Most family businesses that managed to survive the initial stage of activity are well-organised entities, aware of the family nature of the business and the emerging tradition of the company, often producing goods and services of the highest quality. Entrepreneurs of family businesses have mastered the strategy of finding market niches that 'giants' of economic activity do not penetrate. At present, family enterprises in Poland play a very important role on both the macro and micro scale. Family enterprises create the largest number of jobs, almost half of GDP and are a source of competition and development of the market mechanism. They are also able to compete with enterprises from the most developed countries. They have also proved that they are able to cope with globalisation processes in an increasingly integrating global economy.

Looking from the perspective of the transformation processes that took place in Poland, the development of family entrepreneurship is one of the most important successes. Family businesses are an expression of the entrepreneurship of the Poles and their families who took the risk of starting their own business. Many of these enterprises have achieved market and social success. Although the majority of Polish family enterprises operate on local markets, there are more and more often those that enter the path of internationalisation and successfully compete on global markets.

The functioning of family entrepreneurship in Poland is subject to constant evolution. The occurring changes result both from internal factors related to the life cycle of the company and family and succession processes, as well as from changes taking place in their environment resulting also from participation in the common European market and the internationalisation of operations. Enterprises which, thanks to their development strategy, have achieved success, build their own brand and improve management methods, introduce innovations and change their market behaviour. They also face many challenges related to family management as well as planning and conducting succession.

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Social Media in the Marketing of Higher Education Institutions in Poland: Preliminary Empirical Studies

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ABSTRACT

Objective: To investigate how higher education institutions (HEIs) in Poland take advantage of social media marketing activities. In particular, the work considers managerial and promotional implications of social media usage along with the barriers to implementing such activities in HEIs in Poland.

Research Design & Methods: The empirical research was carried out in the period of April-June 2017 on a sample of 90 HEIs in Poland, using an online questionnaire and individual invitations sent out to marketing departments of these institutions. 50 completely filled-out surveys were used to compile the results.

Findings: Social media are considered to be 'youth' media expressed in the target audience and content of the message. SM are not used for promoting research and academia. Researchers and Administration are perceived as stakeholders not understanding the potential of SM for building school's image and reputation. Universities in Poland operate with little support from external entities.

Implications & Recommendations: The article provides information how to grasp the dynamics of the development of the utilisation of social media by Polish HEIs. Juxtaposition of the findings with the results obtained from research conducted on students and academic staff members along with the comparison of the results with the research executed on different markets would shed a new light on the social media usage in HEIs.

Contribution & Value Added: It is the first study where social media marketing activities and strategies are analysed in the HEI sector in Poland. Social media are a significant communication channel for HEIs, determining the changes in the way the HEIs interact with their stakeholders.

Article type: research article

Keywords: social media; marketing; higher education institutions

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INTRODUCTION

Social media are usually defined as 'a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content as well as interactive discussion' (Kaplan & Mazurek, 2018, p. 275).

Social media are composed of Web 2.0 and web-based applications that enable a two-way communication involving sharing certain specific content, i.e. photos, videos, opinions, and comments (Kaplan & Haenlein, 2010, p. 61). Thanks to social media, their users are able to share their emotions, experiences, opinions, and remarks (Mazurek, 2008; Skulme & Praude, 2016). Blackshaw and Nazzaro (2004), highlighting the role of social media in marketing practice, define them as diverse sources of online information, where the information itself is created, initiated, circulated and used by consumers for the purpose of educating each other about products, brands, services, personalities and issues.

Social media differ significantly from the so-called traditional media (Chaffey & Ellis-Chadwick, 2012; Heinze, Fletcher, & Rashid, 2016). First, they are interactive, which somewhat forces a dialogue between their users with the simultaneous levelling-out of the hierarchy among them. This is what e.g. Himelboim, Golan, Moon and Suto (2014, p. 366) stress by claiming that the potential of social media is about their ability to facilitate the formation of relationships because they can make communication reciprocal, interactive, symmetrical, and dialogue-based. By taking advantage of social media, organisations can learn more about the needs of their stakeholders, develop the relations established with them, increase the level of engagement, and endorse and promote their brands (Mazurek, 2018).

The use of social media in organisations takes on three levels (Mazurek, 2018, p. 18):

- operational level – whose essence is using social media to pursue objectives related to brand promotion, image building, ongoing customer service, entering into and maintaining a dialogue between the organisation and the social media users;
- tactical level – which is about using social media and messages promoted via social media in order to generate conversions, i.e. to convert Internet (social media) users into customers who will be effectively encouraged to make a particular transaction based on the content they have been provided with (Macik, Mazurek, & Macik, 2012, p. 39);
- strategic level – which is essentially about using social media to change the way in which a given organisation functions – to make it networked, of undefined borders, creating value taking advantage of network approach and user engagement (Mazurek, 2014, p. 75). In this approach, social media should not be considered from the point of view of the function of marketing (plans, activities, projects) but from the perspective of a whole organisation, and one of the fundamental phenomena within this level is the emergence of virtual communities (Mazurek, 2008; Bartosik-Purgat, 2018).

Building a virtual community around the brand of a HEI and providing such a community with the right conditions to exchange experience or opinions regarding the institution translates into a high level of engagement of the involved stakeholders (students, employees, applicants, etc.) and bears fruit in the form of values created in a network of relationships (Nevzat, Amca, Tanova, & Amca, 2016, p. 555; Zickar, Ron, & Arnold, 2018; Lazányi *et al*., 2017). Nowadays, developing a strong and solid community is necessary not only to

attract new students but also to communicate with graduates and other stakeholders of a given school or university (McAlexander, Koenig, & Schouten, 2006, p. 114; Zickar, Ron, & Arnold, 2018). As HEIs are operating in the increasingly competitive environment (Sułkowski, 2016), the use of new communication channels by HEIs seems to be justified.

In order to find out how Polish HEI utilise social media tools for marketing purposes and communicating with their stakeholders, we conducted a quantitative study, based on the sample of 90 institutions in Poland. Surveys were sent to marketing departments of HEIs directly.

The article is divided into five sections, in the second section we present the literature review concerning the use of social media in the context of HEIs as well as its role in students' enrolment and in the process of studying. The third section is to present the methods of data inquiry, in the fourth one we present the results. Finally, the fifth section is dedicated to the concluding remarks.

LITERATURE REVIEW

Social Media and Higher Education Institutions

Today's social media are tools that offer an amazing potential, one that schools and universities are well aware of trying to take advantage of contemporary means of communication for promotion, enrolment, or education related purposes. HEIs have joined the ranks of organisations making regular use of innovative communication channels, featuring social media in their marketing strategies (Constantinides, Zinck, & Stagno, 2010, p. 10). Studies into social media prove that HEIs are increasingly more proficient in utilising the information appearing on various social media platforms with a view to making their offers more attractive, improving their image or taking care about the relations with their clients (Pharr, 2016, p. 11).

It is important to notice that today's market of higher education at the undergraduate and graduate level is dominated by a generation of the so-called digital natives – young people who treat the Internet as a natural element of their everyday life, a world where they spend hours on a daily basis (Jones, Ramanau, Cross, & Healing, 2010, p. 726). This target group is over 'one third of working adults', expecting online authenticity and transparency of brands making their online presence, with emotions and experiences being at the top of their list (Smilansky, 2017, p. 19). Studies also prove that contemporary students find it more convenient to use social media to stay in touch with their schools and universities (Rutter, Roper, & Lettice, 2016, p. 3099; Kajanová *et al*., 2017).

Press adverts, fairs, distributed leaflets and brochures, or popular web-based activities such as online advertising, website, or e-mailing campaigns are all examples of activities in the field of marketing communication – all pursued on a wide scale in the area of higher education. The development of the digital era accompanied by the changing habits and behaviours of Internet users has considerably limited the significance and effectiveness of the use of some of the abovementioned tools, which have been gradually replaced by more innovative ways to reach Generation Y. This generation, as studies show, not only prefers a more digital interaction with brands but also considers opinions and direct contact through social media more credible and valuable than the interaction based on traditional marketing solutions (Kelleher & Sweetser, 2012, p. 109; Janoskova & Kliestikova, 2018).

By adapting social media, universities are able to reach an audience that the traditional media may simply fail to get through to – especially in the case of a younger audience. What is more, interactive tools of online communication may also encourage representatives of other stakeholder groups, e.g. new academics and graduates to get in touch with a given education institution (Carver, 2014, p. 1).

The range of social media available to HEIs is highly diversified (Mazurek, 2014, p. 29; Mazurek, 2018). The social media taken advantage of by schools and universities include:

- social networking services (e.g. Facebook);
- online video-publishing/viewing/sharing services (e.g. YouTube);
- photo social networking services (e.g. Instagram, Pinterest, Flickr);
- services/applications designed for online publishing and short-time viewing of video content (e.g. Snapchat);
- blogging/microblogging services (e.g. Twitter);
- professional-business networking services (e.g. LinkedIn);
- online Internet forums (message boards) and discussion groups.

Each of the above may be used in communication with different groups of stakeholders. Also, the published content differs depending on the social media in use (see study findings presented further). The selection of a given social media platform depends also on the management aspect – managing each such platform requires both certain specific content and time, including time to interact with the users of a given platform. The available content, the selection of the platform according to a given target group, and the sphere of management at a given education institution are all factors crucial to the choice of the social media to be used in the intended communication activities.

Examples of operational utilisation of different social media platforms are shown in the Table 1.

Social Media and Students Enrolment

Social media are especially important tools in the context of enrolment activities in the higher education sector (Constantinides & Zinck Stagno, 2011, p. 18). From the point of view of a school/university, social media may make enrolment activities become more friendly and personalised thanks to the possibility of instant interaction with various groups of stakeholders – parents of applicants, current students, representatives of business partners working with the school/university, etc. Many higher education admissions experts confirm that communication through social media plays a particular part at the stage of enrolment because the applicants' experience in contacting the institution they have selected becomes more personalised, which is, in turn, of great significance in the times of intensified competition (Noel-Levitz, 2014). It is also reasonable to mention studies by Wilson (2013), according to which admissions offices of HEIs take advantage of social media mainly to get reach potential candidates in an environment where they feel best (Wilson, 2013, p. 53). The rate of penetration of social media is exceptionally high among potential students, who qualify as the aforesaid digital natives. These are people who are highly technologically literate, 'immersed' in social media. According to the young generation of digital natives, social media profiles (e.g. Facebook fanpage) can give you a better idea of the student life at a given school or university, i.e. about the academic culture, atmosphere, attractions, etc. than other sources of information, which helps

them make a better choice of the place where they are going to study and grow over the next few years (Constantinides & Zinck Stagno, 2011, p. 21).

Table 1. Examples of the Use of Social Media in the Higher Education Sector

Social media type	Example of the platform/service	Examples of activities	Target group
Social networking services	Facebook	Publishing news, recent events, and achievements of the school/university, students; Publishing interesting findings of scientific research; Publishing information about the offered programmes.	Applicants, Students, Media
Online video-publishing/viewing/sharing services	YouTube	Publishing interviews with outstanding professors, experts; Presentation of student profiles, scientific clubs; Video records of major events organised at the school/university.	Applicants, Business
Photo social networking services	Instagram, Pinterest, Flickr	Presentation of major events taking place at the school/university	Applicants, Students, Media
Services/applications designed for online publishing and short-time viewing of video content	Snapchat	Presentation of interesting events taking place at the school/university, student projects, scientific clubs, student groups	Applicants, Students
Blogging/microblogging services	Twitter	Information about major events and achievements	Media
Professional business networking services	LinkedIn	Presentation of research findings and results, interviews with professors	Graduates, Students, Business
Discussion forums, online communities	Google Groups	Answers to applicant inquiries, monitoring of content – signals coming from people interacting with the school/university.	Applicants

Source: own study.

The quoted studies somewhat prove by the way that from the point of view of an applicant, the selection of the school/university is not made based only on the education offer but also on the broadly defined value offered by e.g. scientific clubs, particular teachers, other students, graduates, and even the overall atmosphere or the social or sports activities pursued by or at a given institution. These additional values can surely be communicated through social media.

Regardless of the type of the social platforms in use, potential students expect personalised communication and authenticity, which lets them decide if a given school/university is the right place for them. To conclude, the increasing role of social media as the solutions applicants to HEIs choose most often to find information about the schools/universities they consider should not come as a surprise (Constantinides & Zinck Stagno, 2011, p. 21).

Social Media in the Process of Studying

Students who use social media in their everyday life see a clear difference in using them for learning-related purposes and for non-learning-related purposes (Jones & Czerniewicz,

2010, p. 319). In the former case, social media are present and utilised to a limited extent, which leads to a so-called digital dissonance. Their natural way of communication should be therefore embraced in and made part of the forms of communication used in practice by HEIs. The necessity for HEIs to adapt in the area of communicating with students is proven by studies carried out by e.g. Hrastinski and Aghaee (2012), according to whom students name social media, next to direct contact and knowledge management platforms, as the most important channels of the whole process of teaching and their functioning at their school/university (the so-called 'educational experience') (Hrastinski & Aghaee, 2012, p. 455). According to studies by Caraher and Braselman (2010), students use social media to communicate with other students, to work, and to communicate with their teachers (Caraher & Braselman, 2010). Moreover, taking advantage of social media as tools to encourage students to engage more actively in the academic life of their school/university may have positive effects and thus help schools/universities achieve the set objectives (Bennet & Maton, 2010, p. 329; Dumford & Miller, 2018). The utility of social media for higher education is therefore significant, especially in the scope of marketing communications targeted at the main groups of stakeholders of education institutions – applicants and students.

So far, there have been no extensive studies carried out in Poland to investigate this issue. The author focused in his study especially on the following matters:

- the scope and the aim of the utilisation of particular types of social media;
- the way communication in social media is managed;
- the barriers to a broader adoption of social media among HEIs in Poland;
- the attitudes of respondents – representatives of HEIs – to social media activity.

Therefore, our main research objective was to showcase how and why institutions of higher education utilise social media.

MATERIAL AND METHODS

The research was carried out in the period of April-June 2017 on a sample of 90 HEIs in Poland, using an online questionnaire and by means of individual invitations sent out to marketing/PR departments of these institutions – and to people representing these departments. The sample included all public HEIs listed as academic institutions of higher education and 20 best non-public HEIs, selected on the basis of the 2017 'Perspektywy' ranking. The decision not to include all non-public HEIs in Poland in the studies (261 institutions as of 07.06.2017) was made based on the assumption of potential overrepresentation of this group compared to its disproportionately lower impact on the sector of higher education in Poland, because of no social media profiles in the case of many of them, or because of an unclear status of some of them (e.g. 'in liquidation'). The invitations were sent to representatives of 90 HEIs, the survey was filled by 55 persons as presented below. 50 completely filled-out surveys were used to compile the results, which made it possible to arrive at a high rate of return, close to 56%. Respondents were people employed in the marketing department on the following positions:

- strategic positions (decision-making in the area of budget matters, course of action) – 22% of the respondents;
- management positions (budget implementation, team management) – 32% of the respondents;

– specialist positions (project implementation) – 38% of the respondents;
– assistant positions (support activities) – 8% of the respondents.

Table 2. Distribution of Heis Based on Type

Type of education institution	Number of education institutions	Number included in the research	Percentage-based representativeness of a given HEI type
Universities	18	14	78%
Technical education institutions	19	7	37%
Economic education institutions	6	5	83%
Teacher education institutions	6	3	50%
Agricultural/natural science education institutions	6	3	50%
Institutions of physical education	6	3	50%
Medical education institutions	9	8	89%
Non-public institutions of higher education	20	6	30%
Overall	90 institutions	50 institutions	56%

Source: own study.

RESULTS AND DISCUSSION

Management of Social Media at Polish Higher Education Institutions

The vast majority of HEIs (45 out of 50 surveyed) have been taking advantage of social media for at least three years, with 20 of them (40% of the whole surveyed sample) using social media for over six years. Only three of them admitted to have been using social media for just two years.

The way social media are managed at Polish HEIs differs greatly in terms of: the time devoted to do it, the number of people engaged in the process, or the support of external entities. 34% of the responding HEIs devote more than ten hours per week to use social media, 26% speak of six-ten hours, and 28% of one-five hours per week.

In 14% of cases, social media are managed/handled by more than six persons, in 44% of the respondents there are two-three persons involved in the process, and 10% have four-five such persons. 26% of the surveyed HEIs (13 out of 50) have only one person to manage their social media platforms.

Polish HEIs use social media agency services very rarely. 74% of those surveyed do not work with any external entities, 18% of them speak of such collaboration as small (operational support), and only 8% refer to it as moderate or extensive (four such responses).

Social media are considered a very important channel of advertising communication (the purchase and publishing of adverts in social media). Even 68% of the respondents admitted that their budget for social media advertising activity amounted to 0-20% of the total promotion budget, and only 6% of them allocate 21-40% of their overall budget to such a type of advertising. Interestingly enough, 22% of the respondents could not specify the exact or even approximate value of their expenses on social media advertising. Thus, it seems that social media are still not seen as an important tool for communication worthwhile investing, despite previous research concluded that social media are supportive in the enrolment process (Constantinides & Zinck Stagno, 2011; Noel-Levitz, 2014; Wilson, 2013).

At the same time, almost half of the respondents (46%) expect these budgets to grow in the next one-three years, and 22% of them think they will stay at the same level. The uncertainty related to treating social media as means of advertising is proven by the fact that even 26% of the respondents have chosen 'hard to say' as their answer.

Polish HEIs do not regulate broadly defined activity of their employees in social media. 62% of the respondents declared that their institution does not have any code to determine the way their employees should use social media (a so-called social *media policy*). In addition to that, 6% of them claimed that even though they have developed such principles, they are not known or applied in practice. Only 12% of cases (6 HEIs) have *social media policies* that are not only formalised but also implemented. Which means that still social media utilisation is not a professionalised action, but rather an addition to traditional marketing tools.

The Scope and Purpose of the Use of Social Media at Polish Higher Education Institutions

All of the surveyed HEIs use Facebook as the primary social media communication channel (100% responses) and consider it the most important of them (90% responses naming FB as the most important channel). 92% of HEIs use YouTube, 76% use Instagram, and 72% claim to use Twitter. What is quite interesting is that the platform considered most popular among the youngest population of Internet users – Snapchat – is used by only 38% of the surveyed HEIs (19 positive responses). LinkedIn platform, which plays an important part in building the relationships with graduates, is used by 28 HEIs (56% positive responses). It is very rare to see the surveyed institutions use Vkontakte – with only four positive responses (8% of the respondents). When asked which social media platform would be most important for the pursued activity in five years, 50% of the respondents indicated Facebook, and 20% – YouTube. Snapchat was named by only four respondents (8%). Still, for HEIs Facebook seems to be the major social media platform for the contact with students. Despite of this, it still remains one of the largest platforms, its cultural importance for younger generations is declining (Sujon, Viney, & Toker- Turnalar, 2018). It seems that HEIs still lack knowledge which social media tools might be most interesting for their current and potential students. Our findings are consistent with previous findings, which concluded that HEIs are increasingly more active in various social media platforms (Pharr, 2016).

The surveyed HEIs were also asked about the target groups they interact with in social media. The definite number one answer was students (100% of such responses) and applicants (96% of such responses). Interestingly enough, the next most often named group were graduates (46% responses) and academics – with only 26% responses. The published content is very rarely addressed to foreign students (14% responses) or to the business environment (4% responses). 18% of the respondents named the media as a target group that is important to consider in their institution's communication through social media. Thus, unlike Carver (2014) concluded, it seems that Polish HEIs limit their target group to their current and potential students, in large part ignoring other important stakeholder groups (Zickar, Ron, & Arnold, 2018).

The main purposes of using social media include: building relationships with students and graduates (78% responses), brand building (76% responses), and publishing news about the events taking place at a given school/university (72% responses). Enrolment-related purposes rank fourth (64% responses). Thus, as Constantinides and Zinck Stagno

(2011) noticed, HEIs utilise social media to communicate the academic culture, atmosphere and attractions available for the students. While still, no HEI, according to the respondents' claims, uses social media for personal branding of members of their authorities or to establish relations with the business world. Only 6% of the respondents actually mentioned supporting the personal brand of their academics as the purpose of using social media. 6% also claimed that they have specific purpose in using social media.

As for the content published via HEIs' social media channels, this content is influenced to the greatest extent by institutional marketing/PR specialists – 44% responses. 34% of responses pointed to students, and 10% – to authorities. These results show that in the case of the content published in social media even in such hierarchical organisations as HEIs, a lot of trust is placed in employees and students, who shape the image of these institutions in the contemporary digital setting. What is surprising is the very slight contribution of academics in the creation or initiation of such a content – only 8% of the respondents named this group in their answers.

HEI marketing/PR specialists are in charge not only of the published content but also of the overall presence of their institutions in social media. In 68% of cases, it is the promotion/marketing department who is responsible for the said presence. Very few responses pointed to the press office or the rector's office.

When answering an additional question about the nature of the published content, the respondents named images and links (44%), images only (26%), and texts and links (18%). Video content has not been mentioned as published in HEIs' social media channels, although this format is a very effective attention drawer (Heinze, Fletcher, & Rashid, 2016). Therefore, despite HEIs utilise a range of social media (Mazurek, 2018), still the format of the communication is rather traditional and limited to images, texts and links.

Interesting answers were also given to the question concerning the subjects featured in the content published in social media. The first three most common subjects included: student achievements (88% responses), school/university events (68% responses), and information about the school/university (60% responses). Only 22% of this content covers findings and results of scientific research. 24% of the respondents say that the published content concerns the achievements of their institution's graduates. The decisions of a school/university authorities are virtually never announced through social media (only one positive answer).

Barriers to Using Social Media at Polish Higher Education Institutions

The study also intended to identify the main barriers to using social media at HEIs in Poland. The respondents named many potential factors, all presented in the table below.

The three most significant of them are:

- lack of understanding of the significance of social media in building the education institution's brand among academic and administrative staff (even 74% of such responses in total);
- insufficient budget (20% responses);
- no expert knowledge on how to implement and pursue certain activities (20% responses).

Interestingly, similar conclusions regarding individual use of social media of academics were withdrawn from study by Noorden (2014).

Table 3. The Respondents' Answers to the Following Question: Are There Any Barriers at Your Education Institution With Regard to Taking Advantage of Social Media? (Choose Max. 3 Most Important Ones)

No.	Insitutional barriers of utilizing social media	Percentage of respondents that agree in %	Number of respondents that agree
1	Lack of understanding of the significance of social media in building the education institution's position on the market among the education institution's academic staff	41.46	18
2	Lack of understanding of the significance of social media in building the education institution's position in the market among the education institution's administrative staff	26.83	12
3	No human resources (no budget to engage new specialists)	24.39	10
4	No knowledge about how to implement and develop new tools and activities	19.51	9
5	Resistance to change – too slow implementation of particular tools and solutions	19.51	9
6	The authorities' unwillingness to develop this form of communication	17.07	7
7	Poor coordination of activities pursued across social media	14.63	7
8	Fear of comments – and the necessity to respond to them	12.20	6
9	No content to be published	9.76	5
10	No human resources despite the possibility to engage specialists	4.88	2
11	Fear of losing control over the education institution's image	4.88	2

Source: own study.

Respondents' Attitudes to Selected Aspects of Social Media

In the study the respondents were also asked about their opinion on the social media activity of the institutions they represented. A compilation of the obtained answers is presented below.

The presented data can lead to at least several interesting conclusions. The vast majority of the respondents say that social media are an important area of marketing activity at their institutions (84% of such responses), which is consistent with previous studies (Constantinidez & Znick Stagno, 2011; Carver, 2014; Noel- Levitz, 2014; Wilson, 2013). Likewise, the majority of the respondents are satisfied with the activity their institutions pursue across social media (82% of such responses). Most of the surveyed respondents confirm that the budgets allocated to social media depend on the outcomes of activities pursued in social media. Over 64% say that they do analyse and monitor the rate of return on social media. At the same time, the respondents are divided when it comes to the opinion on the impact of social media activity on the results of enrolment (44% of positive responses). It is understandable if we consider the context of the answers to another question about the key target groups which schools/universities communicate with and about the expected outcomes of social media activity.

Most respondents follow and analyse the social media activity of other HEIs (68%). However, only 38% of them declare that their institution is experienced in marketing activities carried out with the use of social media. What is interesting is that the respondents are also not sure about the fact that their online activity may reduce the overall costs of their marketing efforts – only 34% of them support this opinion. Ques-

tions concerning the strategy and the engagement of students and graduates in the creation of the institution's brand do not offer a clear view, either. In both cases (question 12 and 13), we have an equal number of 'for' and 'against' answers, and the number of 'hard to say' answers appears to be also significant at the same time.

Table 4. Attitudes of the Surveyed Respondents to the Social Media Activity of the Institutions They Represent

No.	Questions	I definitely disagree in %	I rather disagree in %	Hard to say in %	I rather agree in %	I definitely agree in %	Weighted average
1	Social media are an important element of marketing at my education institution	6	4	6	18	66	4.34
2	I'm happy with my education institution's activity across social media	4	8	6	30	52	4.18
3	The budget on social media depends on the results achieved in previous periods of social media activity	2	2	14	44	38	4.14
4	We analyse the social media activity of other education institutions on an ongoing basis	6	8	18	36	32	3.8
5	The knowledge and information gained from social media are used by the education institution's decision-makers	4	12	22	34	28	3.7
6	We measure the ROI in social media	6	10	20	40	24	3.66
7	The education institution authorities get involved in social media activities	10	20	20	28	22	3.32
8	The education institution authorities understand the significance of social media for the education institution	6	12	44	22	16	3.3
9	The education institution is experienced in social media activities	16	16	30	18	20	3.1
10	The education institution's social media activities have an impact on the enrolment at the education institution	24	14	18	20	24	3.06
11	Our social media activities have reduced the costs of marketing activities	16	12	38	20	14	3.04
12	The education institution's social media activities are based on a coherent, well-thought-out strategy	18	18	24	26	14	3
13	We carry out activities that encourage our students and alumni to build and promote our brand across social media	16	26	22	22	14	2.92
14	The rector and vice-rectors are present in social media	16	32	26	20	6	2.68

Source: own study.

There are interesting insights in the answers to questions related to the attitudes of HEI authorities to social media marketing activity. First of all, the respondents say that the authorities of their institutions are absent from social media (48% of 'no' or 'definitely no' answers – question 14). At the same time, 50% of the respondents (question 7) say that the authorities of their institutions do get involved in the social media activity, which may mean that their engagement does not equal a willingness or necessity to promote oneself in social media. This somewhat distorts the answer to the question about the significance of social media for the education institution as perceived by the authorities of this institution (question 8). In the case of this question, we have a record-

breaking number of 'hard to say' answers, with 44% of the respondents choosing this answer. Finally, according to even 62% of the respondents, school/university authorities use the knowledge and information coming from social media to manage their institutions (question 5). The issue of the attitude of HEI authorities in Poland to social media certainly requires more in-depth analyses and additional research.

CONCLUSIONS

Social media are an extremely significant communication channel in the world of today, determining also changes in the way HEIs interact with their stakeholders (Carver, 2014).

The potential of social media should be taken advantage of especially in the area of marketing communications, including enrolment activities, communication with students, or the broadly defined brand building (Pharr, 2016). In order to find out how HEIs in Poland benefit from and utilise social media, we sent surveys to 90 marketing departments of the HEIs. The current study concerning the use of social media conducted in a group of representatives of 50 Polish HEIs have made it possible to draw at least several interesting conclusions. First, social media are considered 'youth' media, which is manifested both in the default target audience intended to be reached through these media (students, applicants) and the content published in these media (student achievements). Interestingly enough, in the case of Polish HEIs, social media are not utilised to promote the conducted science and research or schools and universities as thriving academic centres, as it was visible in other studies (Carver, 2014; Pharr, 2016). At the same time, according to the respondents taking part in the survey, the biggest obstacle to a more advanced adoption of social media in HEIs is the attitude of academics to social media.

As for the field of management, it is important to bear in mind that many Polish HEIs are quite experienced in the matter in question, taking advantage of contemporary means of communication for at least three years – as many as 45 out of 50 surveyed institutions. Over 60% of the surveyed institutions spend more than five hours per week using their social media platforms actively. A characteristic feature is that HEIs in Poland carry out their social media activities alone, with external entities providing them with occasional support – at an operational level if any. The question of whether it results from an insufficient amount of resources, from a lack of need for such support, or from consciously treating these activities as strategic – meaning carrying them out with the use of internal unique resources – remains still unanswered and requires further research. Working with social media at Polish HEIs is usually teamwork – only about 25% of the surveyed institutions have it carried out by one person, and the entities in charge of this sphere are mainly marketing departments.

Polish HEIs have not yet considered social media a key advertising communication channel – about 70% of the surveyed institutions allot approximately 0-20% of their promotion budget, proving how little advantage they take of social media for advertising purposes.

HEIs in Poland implement social media policies to a very limited extent. It is another research element worth being analysed in a more in-depth manner. Does it come from unawareness of the significance of such principles, or – quite the opposite – does it come from an assumption that employees do not need any special rules of communication via social media because they are fully aware of the risks inherent to such communication?

The value an organisation gains from utilising social media is inseparably determined by the specific platform taken advantage of. And therefore, when it comes to the scope

and the purpose of the utilisation of social media, it is necessary to stress that Polish HEIs tend to consider Facebook a social media platform of the biggest significance – both now and in the future, despite its importance among students is diminishing (Sujon, Viney, & Toker-Turnalar, 2018). Snapchat is rather disregarded, despite the fact that it is becoming even more popular than Facebook among those who are soon going to be applying for admission to higher schools and universities. The most important target audiences of social media activity are: students, applicants, and graduates. Polish HEIs tend to address their communication to academic and business environments rarely. The purposes of utilising social media include mainly: relationship building, brand building, information, and enrolment activities. The published content is created and managed by marketing specialists. It is created by students or representatives of school/university authorities to a limited extent. This content is usually visual and static (images), video formats were not mentioned, which is also interesting because video is actually the most engaging format as observed among social media users. The content published most often includes: student achievements, school/university news, and major events.

The main barriers to a more comprehensive adoption of social media at Polish HEIs are: lack of understanding of the significance of social media in building the education institution's brand among academic and administrative staff. Next on the list are the issue of financial resources (budget) and the sense of having not enough expert knowledge to carry out and manage these activities in a comprehensive way.

An interesting observation regarding the respondents' answers is the undecidedness concerning the impact of school/university authorities on social media activities and the scope of their own activity in the digital social setting, which is contradictory to the study conducted by van Noorden (2014), who found that academics are rather frequent users of social media, especially those dedicated to scholarly communication. The obtained responses offer a rather vague view of the situation. The respondents emphasize the significance of social media in the entirety of their institutions' marketing activities, and admit that they are very satisfied with the activities carried out.

To summarise, we can say that although Polish HEIs take advantage of social media keenly and extensively, they still view them mainly as the space for marketing operations, used to communicate with young people through 'youth' content. Social media are not used to promote schools and universities as serious academic/research centres, nor are they used to disseminate research findings or promote academics. They are not used by school and university authorities, researchers or teachers to build their personal brands either. It seems that HEIs in Poland still have to develop in this manner to use social media tools more comprehensively for communication not only with potential students but as well as with other stakeholders. Our main recommendation for practice is that HEIs in Poland should utilise social media in a more comprehensive manner on the one hand, while on the other hand they should develop a strategy on how to use social media effectively to achieve goals. Polish HEI still lack a consistent strategy on how to utilise social media for communication. Similarly, HEIs need to adjust the channels of communicating with their stakeholders, whereas alumni and graduate students still can be researched with Facebook, younger generation of potential students are more likely to be present on other social media platforms (Sujon, Viney, & Toker- Turnalar, 2018). Our study revealed how much there is still to be done by HEIs in Poland.

The major limitation of the study is the small sample, we were able to survey only 50 HEIs. Moreover, the survey was conducted on respondents with differing background and marketing position within the institution, which could influence the differences in answers between the HEIs.

It seems essential to repeat the research presented in this article and make it more in-depth in order to grasp the dynamics of the development of the utilisation of social media by Polish HEIs, and to juxtapose the findings with the results obtained from surveys filled in by students and academic staff members. It is also possible – and reasonable – to conduct comparative studies in other markets.

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Romanian Rural World Heritage Sites and Tourism Development

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ABSTRACT

Objective: The aim of this article is to investigate if Romanian rural localities hosting or situated within a natural WHS (World Heritage Site) have benefited from their situation and developed the local rural tourism.

Research Design & Methods: Since the topic of this article had not been previously investigated for Romania, the research was constructed as a case study, exploring the available secondary data on tourism supply and demand. Within the case study, a combination of empirical methods was used in order to investigate two ratios (the survival rate and continuity ratio) constructed to study the sustainability of the offer of local tourism.

Findings: Romanian rural localities hosting or being part of a WHS do not exploit properly their tourist potential. However, these localities are in a better position than common rural localities from the viewpoint of a sustainable tourism offer.

Implications & Recommendations: Further studies on tourism demand and tourism governance for WHS localities are needed in order to help local governments to develop authentic and sustainable tourism for these areas.

Contribution & Value Added: Given the sparse academic Romanian literature focusing on WHSs, this study contributes to this field and opens new avenues for research. Furthermore, the findings of this study add to the existing international literature by supporting the idea that simply the presence of a WHS in rural areas is not a panacea for promoting tourism.

Article type: research article

Keywords: World Heritage Sites; rural tourism; Romania

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INTRODUCTION

Heritage tourism has been considered an important and prosperous segment of the tourism industry since 1980s (Yang, Lin, & Han, 2010; Jimura, 2011; Altunel & Erkut, 2015; Santa-Cruz & Lopez-Guzman, 2017). While this phenomenon is associated mostly with developed countries (Yang *et al.*, 2010; Altunel & Erkut, 2015), emerging economies are also aware of the importance of promoting their respective heritage (Yang & Lin, 2014; Nicholas & Thapa, 2010). A range of studies consider the WHS designation as a catalyst for increasing the (international) tourist inflow toward the respective destination by drawing the world's attention to its significance (Reyes, 2014; Li, Wu, & Cai, 2008; Yang *et al*., 2010). WHS-related tourism can be viewed as a market niche of heritage tourism (Adie & Hall, 2017; Nguyen & Cheung, 2014) and WHS designations are more and more desired by the emerging economies for the expected increased tourist inflow and related tourism benefits (Nicholas & Thapa, 2010). Consequently, the presence of WHSs in rural areas can enhance the development of rural tourism, accompanied by potential economic and social benefits (Iorio & Corsale, 2010; Kastenholz & Sparrer, 2009). This situation is particularly important to the emerging economies with prominent rural regions and significant rural population. Romania is one of these countries, with 46.4% rural population inhabiting about 12 500 villages as of December 2016 (National Institute of Statistics via Tempo-online, 2018) and with a plethora of economic and social problems related to rural areas. Romanian rural tourism was identified as a major growth area by the Romanian Ministry of Tourism in 1995 (Hall, 2000). It is only natural to inquire if the presence of WHS within rural areas has enhanced the development of the local rural tourism.

The aim of this article is to investigate, through the case study methodology combined with empirical methods, if Romanian rural localities hosting a WHS or situated within the natural WHS, the Danube Delta, took advantage of this situation and developed the local rural tourism. For the present investigation the article combines information related to the accommodation offer, tourist activity, and the economic sustainability through the simple survival rate of economic entities owning accommodation units.

The remainder of the article is organised as follows: a presentation of literature review is followed by the data and methodology presentation, continued by the case study, followed by results, discussions and conclusions.

LITERATURE REVIEW

WHS Tourism and Rural Areas

The importance and the fast growth rate of heritage tourism since the 1980s has been revealed by a series of academic studies (e.g. Yang *et al*., 2010; Altunel & Erkut, 2015; Santa-Cruz & Lopez-Guzman, 2017). Initially associated with developed countries (Yang *et al*., 2010; Altunel & Erkut, 2015), the development of heritage tourism has been identified as beneficial for the emerging economies in terms of enhancing the national image and complementing the national identity and reputation (Li *et al*., 2008; Frey, Pamini, & Steiner, 2013; Ung & Vong, 2010), favouring economic development by attracting an increased number of tourists (Yang & Lin, 2014; Nicholas & Thapa, 2010).

WHS tourism can be considered a niche market of heritage tourism (Adie & Hall, 2017; Nguyen & Cheung, 2014). The presence of a national heritage site on the World Heritage List (WHL) is often perceived as a brand or an icon (Boyd & Timothy, 2006; Timothy, 2011), as a label (Yang *et al*., 2010) or as a 'magnet for visitors' (Fyall & Rakic, 2006). Therefore, WHSs are often regarded as a panacea in promoting the host country tourism (Yang *et al*., 2010; Yang & Lin, 2014) since a WHS designation increases the visibility of a destination and brings the world recognition of its special status (Chi, Cai, & Li, 2017; Santa-Cruz & Lopez-Guzman, 2017).

The body of studies investigating the WHS designation influence on tourist flow yielded controversial results. Several studies revealed positive effects of WHS-related tourism on a country's economic growth (Arezki, Piotrowski, & Cherif, 2009), reported a positive relationship between WHS designation and the tourist number (Yang *et al*., 2010; Breakey, 2012; Su & Lin, 2014) or showed a positive relation between tourists' willingness to revisit a country and WHS designation (Poria, Reichel, & Cohen, 2011). Nevertheless, another group of studies raised questions regarding this enhancing tourist effect of WHS designation. These studies are mainly focused on a specific location, region or country and show there is either no significant or a limited effect on tourist inflow from Barcelona to Italian regions, from Israel to Macau and Japan (Poria *et al*., 2011; Cellini, 2011; Huang, Tsaur, & Yang, 2012; Cuccia & Rizzo, 2013; Cuccia, Guccio, & Rizzo, 2016; Jones, Yang, & Yamamoto, 2017). Furthermore, several works indicated that a WHS designation *per se* is not a panacea for attracting tourists (Poria *et al*., 2011) since the visitors are looking for a good WHS management and authentic experience (Richards, 2011; Poria *et al*., 2013), the quality of cultural heritage counting more than quantity (Cuccia *et al*., 2016).

Despite the controversial results regarding the relationship between WHS designation and tourist inflow, the emerging countries are increasingly seeking to acquire the WHS brand (Nicholas & Thapa, 2010) due to the enhanced international visibility of the respective WHSs (Jimura, 2011; Chi *et al*., 2017; Santa-Cruz & Lopez-Guzman, 2017) and the potential for regional or local WHSs to act as a factor for tourism and, consequently, economic development (Richards, 2011; Jaafar *et al*., 2015). Furthermore, emerging economies have important rural regions where rural tourism can be considered as one of the tools that can assist in developing these territories by improving the economic and social conditions (Iorio & Corsale, 2010; Kastenholz & Sparrer, 2009; Cunha, Kastenholz, & Carneiro, 2018). At the rural level, more than in urban areas, WHS presence can act as an enhanced catalyst for the development of rural tourism and can become a powerful factor for the revitalisation of traditional local/regional industries through an increased awareness and promotion of local products, the preservation of local/regional heritage and cultural identity, job creation and new investments (Jimura, 2011; Jaafar *et al*., 2015; Cunha *et al*., 2018). Notwithstanding the identified benefits, the academic research shows that the relationship between WHS designation and tourism development is usually characterised by tensions (Su & Wall, 2014). Therefore, mainly in rural areas, the participation of local residents in WHS management, conservation and tourism development is essential for the sustainable development of respective rural localities as tourist destinations (Nicholas & Thapa, 2010; Rasoolimanesh, Jaafar, Ahmad, & Bairghi, 2017). Further research revealed that community participation in (WHS) tourism development is related to residents' perception on how this process

impacts their quality of life at individual and community levels (Latkova & Vogt, 2012; Jaafar *et al*., 2015). Nonetheless, the overpriotirisation of tourism in WHS locations, based on central and local authorities tendency to focus on economic gain (Su & Wall, 2014; Poria *et al*., 2011), can negatively affect or, in extremis, destroy the environmental and cultural integrity of the respective WHSs (Li *et al*., 2008; Yang *et al*., 2010; Jimura, 2011; Caust & Vecco, 2017). This situation is further enhanced by emerging countries' insufficient management skills and resources for effective site management of their WHSs (Caust & Vecco, 2017; Landorf, 2009).

Romanian Rural Tourism and WHSs

Romania, as an emerging economy since the 1990s, had to face the complex problems of the domestic rural areas still influenced by the poor decisions of the communist period. The series of studies by Turnock (1991, 1996, 1999) and Bordanc and Turnock (1997) discuss the early post-communist initiatives and projects for the Romanian rural tourism, with rural tourism identified as a major growth area by the Romanian Ministry of Tourism in 1995 (Hall, 2000). Although the modest rural tourism development took place 'rather despite of government actions' (Hall, 2004), many programmes and initiatives being abandoned mainly due to political instability and constant lack of financial resources.

Despite entering the WHL with the Danube Delta in 1991 and followed by three other WHSs in 1993 (details in Table 2), there was almost no focus in the academic literature on the Romanian rural WHSs and their role in tourism development. Only recently the series of studies by Iorio and Corsale (2010, 2014) and Corsale and Iorio (2014) focused mainly on the case of Viscri, a village hosting a WHS. The domestic academic literature on rural WHSs is also sparse, to the best of our knowledge only three studies chose to focus on this topic: Pop and Coros (2016) considering the accommodation offering of rural localities hosting WHS, Pop and Coros (2018) focusing on the effects of the Danube Delta WHS status on the region's rural tourism, and Iatu, Ibanescu, Stoleriu and Munteanu (2018) presenting the influence of rural WHSs on the growth of rural tourism. This article adds a new perspective on Romanian WHSs and rural tourism and complements the existing findings.

DATA AND METHODOLOGY

The data used in this study are from secondary sources: the official databases provided by the Romanian Authority for Tourism and the data supplied by the Romanian National Institute for Statistics (NIS) via Tempo-online database. The data were extracted for the years 2005 and 2016 at the level of every commune (the smallest administrative unit in Romania, found only in rural areas) that hosts at least one WHS or is situated within the natural WHS Danube Delta. Further, the data were grouped by rural WHS types based on the data at the commune level (available upon request).

This study does not include the communes related to the Romanian primeval beech forests since they were designated (for Romania) only in 2017.

The article also uses the simple survival rate (SSR) for lodgings and the continuity rate (CR) for the economic entities owning the lodgings as proposed by Pop and Coros (2018). These two measures are adapted to the data available in Romania. While the perspective offered by SSR and CR would have been complete if accompanied by the respective economic entities' financial performance, this is not possible for this study

given the dominance of individual enterprises for which no such information is publicly available via the Romanian Ministry of Finance.

The general methodology used was that of a case study, combining deductive and inductive approaches, and mixing a combination of empirical methods (OLS regression, principal component analysis (PCA) and index decomposition analysis (IDA) to confirm the regression results, given the small number of observations) for a better understanding of factors that influence the SSR and CR.

Appendix B presents the descriptive statistics. The correlation coefficients, their significance, and the variance inflation factors for the variables were taken into consideration. No multicollinearity was detected among any variables. The information is available upon request.

For IDA, this study uses the logarithmic mean divisia index (LMDI) as proposed by Balezentis, Krisciukaitiene, Balezentis and Garland (2012) based on the report of Ang (2005).

ROMANIAN RURAL WORLD HERITAGE SITES, THE LODGING SURVIVAL RATE AND THE OWNER CONTINUITY RATE

Romanian WHS: A General Presentation

Romania, with eight WHSs, of which six are cultural, is above the average number of WHS of 5.50, respectively 4.23 for cultural WHS, reported by Su and Lin (2014) for 66 countries between 2000 and 2009. Therefore, it is expected for Romania to have similar results as the neighbouring countries, Bulgaria and Hungary, with a comparable number of WHSs. However, the data in Table 1 show that Romania has the lowest rank regarding tourism competitiveness, the lowest international tourist receipts and the lowest tourism direct contribution to the Gross Domestic Product (GDP).

Romanian Rural WHSs: Accommodation Facilities, Tourist Activities and Tourist Potential

Table 2 presents the main characteristics of WHSs in Romania. The visualisation of their geographical distribution is presented in Appendix A. The WHSs are grouped in several clusters within the counties of Maramures (the wooden churches), Suceava (the churches of Moldavia), Hunedoara and Alba (the Dacian fortresses) and Tulcea (the Danube Delta). Moreover, the majority of these WHSs are located in rural areas.

The pre-accession development plans for Romanian (rural) tourism development are difficult to almost impossible to identify. Post-accession to the European Union (EU), two central documents include the rural tourism: the 2007-2016 Master Plan for National Tourism Development and the National Rural Development Program (NRDP) for 2007-2013 and 2014-2020. Although considered a priority, rural tourism is granted only a small space in the Master Plan. The mention of WHSs is sparse and briefly discusses the need for restoration of these monuments and the need to manage the expected large number of tourists within the localities hosting WHSs. The NRDP gives more attention to rural tourism since it provides most of the financing sources for its development. Nonetheless, the reference to WHSs is similar to the Master Plan. Neither of these central documents provides an integrated development strategy for the rural communes (or the component villages) where WHSs are located, nor consider the necessity to grant a special status to these localities in order to support sustainable and authentic rural tourism development based on their cultural and natural characteristics.

Table 1. Selected Data Concerning Romania's Position as a Tourism Destination

Country, WHSs number and type	World Economic Forum: Travel and Tourism Competitiveness Index rank						
	2007	2008	2009	2011	2013	2015	2017
Bulgaria; 10 WHSs (3 natural*); 7 cultural)	54	43	50	48	50	49	45
Hungary; 8 WHSs (1 natural; 6 cultural)	40	33	38	38	39	41	49
Romania; 8 WHSs (2 natural*); 6 cultural)	76	69	66	63	68	66	68
Country	**International tourist arrivals at frontiers (thousands persons)**						
	2007	**2008**	**2009**	**2011**	**2013**	**2015**	**2017**
Bulgaria	5 151	5 780	5 739	6 328	6 897	7 099	n/a
Hungary	8 638	8 814	9 058	10 250	10 675	14 316	n/a
Romania	7 772	8 862	7 575	7 611	8 019	9 331	n/a
Country	**International tourist receipts (USD millions)**						
	2007	**2008**	**2009**	**2011**	**2013**	**2015**	**2017**
Bulgaria	3 350	4 204	3 728	3 967	4 059	3 146	n/a
Hungary	4 721	5 935	5 631	5 580	5 366	5 326	n/a
Romania	1 610	1 990	1 234	1 418	1 590	1 711	n/a
Country	**Tourism direct contribution to GDP (%)**						
	2007	**2008**	**2009**	**2011**	**2013**	**2015**	**2017****
Bulgaria	3.57	3.35	3.15	2.90	3.07	2.77	3.06
Hungary	1.95	2.09	2.16	2.23	2.04	2.35	2.42
Romania	1.45	1.42	1.30	1.27	1.28	1.38	1.44

*) The primeval beech forest natural site spread across Europe, being also designated in Bulgaria and Romania in 2017, adding one new natural WHS within each country to the previously existing natural WHSs.

**) estimated by WTTC Data Gateway https://tool.wttc.org/

Source: World Economic Forum Reports (2007, 2008, 2009, 2011, 2013, 2015, 2017) and https://www.world-heritagesite.org/list; UNWTO Tourism Highlights 2008, 2009, 2011, 2013, 2015, 2017 and World Bank Open Data: https://data.worldbank.org, WTTC Data Gateway https://tool.wttc.org/

Table 3 and 4 show the modest position of WHSs accommodation offer (between 7% and 8% of rural lodgings and around 6.5% of rooms in rural areas), and the low number of incoming tourists (about 3.5% of total tourist arrivals).

Despite the modest position of WHS localities within the rural accommodation offer and tourist arrivals, the growth rates of lodgings and rooms in these localities, of 97.17% and respectively 125.63%, are higher than the lodging and room growth rates at the national rural level, of 75.28% and respectively 115.58%, based on the data in Table 3. The Dacian fortress localities registered the highest lodging and room growth rates of 433.33% and respectively 835.71%. The wooden churches localities are the only group which registered a decrease in the number of lodgings (-10.42%). All WHS localities recorded a growth of rooms. Also Table 3 shows a higher concentration of lodgings in the Danube Delta localities, followed by the churches of Moldavia localities.

While in 2005 the Danube Delta localities registered the highest number of tourists, by 2016 the churches of Moldavia localities became the most visited destinations. The cultural WHS localities registered a growth of 283.43% in tourist arrivals, compared to the

growth of tourists for 'other destinations' of 168.52%, with the highest growth rate of 2 536.07% for the fortified church localities (based on Table 4). The Danube Delta localities recorded the lowest growth rate of tourist arrivals (10.93%), however, well above the rate reported for the whole Danube Delta, including urban areas, of only 0.72%.

Table 2. Selected Characteristics of Rural WHSs

Description	Danube Delta	Dacian Fortresses	Fortified churches	Churches of Moldavia	Wooden churches	Sighisoara citadel and city center	Horezu Monastery	Primeval beech forests
WHS designation	1991	1999	1993	1993	1999	1999	1993	2017
No. of locations, county, map position in Appendix A	1 Tulcea (32)	6 Alba; Hunedoara (1 to 6)	7 Alba; Brasov; Harghita; Mures; Sibiu (9 to 15)	8 Suceava (24 to 31)	8 Maramures (16 to 23)	1 Mures (8)	1 Valcea (7)	12 n/a (33 to 44)
Of which in rural areas	1	6	7	5 (25 to 29)	7 (16, 18 to 23)	0	0	Not investigated
No. of communes covering the WHS locations	10	4	7	5	6	0	0	Not investigated
Communes' websites and languages	10 communes with websites; 2 only in Romanian.	4 communes with websites, only in Romanian	1 commune with no website; 2 communes offer Google Translate alternative	5 communes with websites, only in Romanian	2 communes with no websites; 1 commune offers Google Translate alternative	n/a	n/a	Not investigated
WHSs mentioning on websites	No direct mention of the WHSs	No mention of the WHSs	5 communes mention the respective WHS on their website/ dedicated page	2 communes mention their respective WHSs	6 communes mention the respective WHS on their website/ dedicated page	Not investigated	Not investigated	Not investigated
Tourism strategy on websites	8 communes icluded tourism in their overall strategy, of which 2 communes with better sections dedicated to tourism	No strategy for tourism available	2 communes included tourism in their overall strategy	No strategy for tourism available	No strategy for tourism available	Not investigated	Not investigated	Not investigated

Source: https://www.worldheritagesite.org/list; authors' compilations based on the communes' websites.

The occupancy rates remain low despite the increase in tourist arrivals. Only the Danube Delta localities register occupancy rates above 25%. This situation suggests the existence of informal accommodation units, mentioned by Radan-Gorska (2013) and the 2007-2026 Master Plan, and/or incomplete reporting of tourist arrivals and their overnight stays by the registered

lodgings. Furthermore, the length of stay decreased for all four cultural WHS localities indicating a scarcity of alternative entertainment facilities. The Danube Delta localities are the only group which recorded a one day increase in the length of stay between 2005 and 2016.

Table 3. Accommodation Capacity and their Owners in WHS Localities

Rural WHSs by types	No. of lodgings		No. of rooms		No. of lodging owners	
	2005	2016	2005	2016	2005	2016
The Danube Delta	74	226	944	2.264	58	166
The Dacian fortresses	3	16	14	131	3	13
The fortified churches	22	33	51	164	22	30
The churches of Moldavia	65	100	377	742	62	87
The wooden churches	48	43	194	264	45	38
Total rural WHSs	**212**	**418**	**1 580**	**3 565**	**190**	**334**
Total rural (national)	*3 054*	*5 353*	*25 427*	*54 816*	n/a	n/a

Source: The Authority for Tourism databases and Pop *et al.* (2017).

Table 4. Tourist Activities in WHS Localities

Rural WHSs by types	Tourist arrivals (persons)		Estimated foreign tourist arrivals*) (persons)		Occupancy rate (%)		Length of stay (days)	
	2005	2016	2005	2016	2005	2016	2005	2016
The Danube Delta	16 155	17 922	4 825	4 174	29.61	39.00	1.7	2.7
The Dacian fortresses	606	1 279	116	193	14.75	11.89	3.4	1.8
The fortified churches	244	6 432	47	970	2.28	17.26	2.0	1.6
The churches of Moldavia	8 490	26 338	1 630	3 972	11.59	19.41	1.9	1.8
The wooden churches	1 492	7 484	287	1 129	6.17	10.60	2.3	1.7
Total rural WHSs	**26 987**	**59 455**	**6 905**	**10 438**	**15.30**	**21.33**	**1.8**	**2.0**
*Total for the Danube Delta***)*	*72 592*	*73 114*	*16 566*	*17 367*	*28.40*	*24.70*	*2.0*	*2.0*
*Total for other destinations***)*	*666 650*	*1 790 082*	*129 305*	*269 750*	*20.50*	*19.10*	*2.2*	*2.0*

*) NIS does not report the foreign tourists at the commune level. This estimation is based on the data provided by NIS for the Danube Delta and for 'other destinations'. For more details see the two notes below.
**) The data for the Danube Delta reported by the NIS includes Tulcea, the county residence, and the town of Sulina
***) 'other destinations' include urban and the rural destinations not included under spa resorts, mountain resorts, littoral resorts, county residences and the Danube Delta.
Source: NIS via Tempo-online database and NIS Romanian Tourism in Figures (2005, 2016).

Table 5 combines the information regarding the population and the tourist potential of WHS localities as assessed by NPRD.

Compared with the decline in the rural population at the national level between 2005 and 2016, the population decline for WHS localities is insignificant. Moreover, for three of the cultural WHS localities groups, the overall population increased. The dominant workforce group, the population between 30 and 64 years, grew similar to the evolution at the national level. The unemployment rate decreased in all cases between 2010 and 2016, though only the Danube Delta localities and wooden churches localities have unemployment rates lower than the country average.

According to NPRD, the tourism potential of cultural WHS localities is very high, while for the Danube Delta localities is high. This assessment is not detailed by NPRD.

Table 5. Population, Unemployment Rate and Tourism Potential of WHS Localities

Rural WHSs by types	Population (persons)		Population between 30 and 64 years (persons)		Unemployment rate (%)		Average score of tourism potential (score and description)
	2005	2016	2005	2016	2010	2016	2012
The Danube Delta	20 964	19 300	8 196	8 913	4.97	3.80	26.66 (high)
The Dacian fortresses	11 694	11 734	5 012	5 437	9.45	6.55	47.89 very high
The fortified churches	21 639	22 970	10 248	12 079	9.57	8.07	46.23 very high
The churches of Moldavia	28 174	29 705	10 956	13 027	6.83	6.47	39.37 very high
The wooden churches	22 089	20 787	9 553	9 896	2.75	1.98	43.18 very high
Total rural WHSs	**104 543**	**104 496**	**43 965**	**49 352**	**6.42**	**5.19**	**39.08 very high**
Rural (national level)	*9 476 912*	*9 113 095*	*4 025 729*	*4 140 497*	*5.90*)*	*4.80*)*	*n/a*

Source: NIS via Tempo-online database and NPRD https://portal.afir.info/informatii_generale_pndr_pndr_2007_2013_masura_313_incurajarea_activitatilor_turistice

Simple Survival Rate (SSR) and Continuity Rate (CR) in Rural WHS Localities

SSR and CR offer a perspective regarding the economic sustainability of accommodation facilities and the related economic entities which, in Romania's case, are also the owners of the operated lodgings. The attempt to understand the economic sustainability of tourist lodgings is an important part of the overall process of sustainable tourism development.

Table 6 presents the number of communes included in the calculation of SSR and CR and the reasons why 11 communes were excluded. The SSR and CR used in this case study are adapted to the data available in Romania.

Table 7 presents the SSR by types of WHS localities, showing higher rates for the churches of Moldavia, under the influence of religious tourism, and the Danube Delta, confirming the higher attractiveness of natural WHSs as highlighted by Su and Lin (2014), supported also by the data regarding the tourist arrivals per 100 inhabitants. The lowest SSR is registered by the fortified church localities.

This is the second attempt to calculate the CR. The first was made by Pop and Coros (2018) only for WHS Danube Delta. The CR of the economic entities owning lodging facilities is lower that the SSR. This points toward the selling or transferring the lodgings to other economic entities[1]. The highest CR is, similar to SSR, within the churches of Moldavia localities, while the lowest is registered by the fortified churches localities.

[1] The CR might be higher if the transfer toward a new economic entity formed by a family member would be taken into consideration. However, there is no information available regarding the persons involved in individual enterprises and not always a similarity in the family name means there are involved members of the same family. Therefore, these similarities were ignored for the present study.

Table 6. The Number of Communes Included in the Study and the Reasons for the Exclusion

Rural WHSs by types	Number of communes in or hosting WHSs	Number of communes included in the study	Comments
The Danube Delta	10	7	For 3 communes SSR and CR could not be calculated due to the absence of lodgings in 2005
The Dacian fortresses	4	2	For 2 communes SSR and CR could not be calculated due to the absence of lodgings in 2005
The fortified churches	7	3	Two communes (Calnic, Alba county and Valea Viilor, Sibiu county) reported no lodgings for 2005 and 2016; For other 2 communes the SSR and CR could not be calculated due to the absence of lodgings in 2005
The churches of Moldavia	5	4	These 4 communes include Moldovita locality which is in the proximity of Moldovita Monastery. This inclusion was decided based on the study of Pop and Coros (2016); One commune (Arbore, Suceava county) reported no lodgings for 2005 and 2016; For one commune SSR and CR could not be calculated due to the absence of lodgings in 2005.
The wooden churches	6	6	–
Total rural WHSs	32	22	–

Source: authors' compilation.

The case of fortified churches needs further investigations in order to understand the low rates. Though, the data in Table 4 already indicate a poor start in 2005 (with an occupancy rate of 2.28%) and a decrease in the length of stay by 0.4 days that might be related to the lack of alternative entertainment facilities that can influence the tourist stay.

Table 7. Simple Survival Rate, Continuity Rate, Ownership Ratio and Carrying Capacity for WHS Localities

Rural WHSs by types	SSR (%) (simple survival rate)	CR (%) (continuity rate)	Ownership ratio		Carrying capacity*)			
					Bed places per 100 inhabitants		Tourist arrivals per 100 inhabitants	
			2005	2016	2005	2016	2005	2016
The Danube Delta	41.89	32.76	1.28	1.36	9	25	77	93
The Dacian fortresses	33.33	33.33	1.00	1.23	4	7	5	11
The fortified churches	27.27	18.18	1.00	1.10	0	2	1	28
The churches of Moldavia	46.15	33.87	1.05	1.15	5	5	30	89
The wooden churches	29.17	20.83	1.07	1.13	0	3	7	36
Total rural WHSs	**38.68**	**25.94**	**1.12**	**1.25**	**4**	**7**	**26**	**57**

*) calculated as suggested by Defining, measuring and evaluating carrying capacity in European tourism destinations, B4-3040/2000/294577/MAR/D2, http://ec.europa.eu/environment/iczm/pdf/tcca_en.pdf
Source: authors' calculations.

Table 8 presents the data regarding the structure of survivor lodgings and their respective owners. The results are similar to those reported by Pop and Balint (2017) for the rural localities with at least ten lodgings. However, by including all WHS localities in the

study, the stronger presence of rural pensions and individual enterprises in the localities with less than ten lodgings became evident.

Table 8. The Structure and Profile of Surviving Lodgings and the Structure of the Respective Owners/Operators in WHS Localities

Rural WHSs by types	Structure and profile of surviving lodgings			Structure of the respective owners/operators*)			
	Pensions (%)		Profile as of 2016 (all pensions)	Individual enterprises (%)		LLCs**) (%)	
	2005	2016		2005	2016	2005	2016
The Danube Delta	51.61	48.39	9 rooms; 2 stars; 66.67% no website	21.71	17.39	69.57	73.91
The Dacian fortresses	100.00	100.00	3 rooms; 3 stars; 100.00% no website	100.00	100.00	0.00	0.00
The fortified churches	100.00	100.00	5 rooms; 2 or 3 stars; 100.00% no website	83.33	100.00	16.67	0.00
The churches of Moldavia	86.67	80.00	7 rooms; 2 or 3 stars; 58.33% no website	74.07	66.67	25.93	33.33
The wooden churches	100.00	85.71	4 rooms; 2 stars; 66.67% no website	92.86	84.62	7.14	15.38
Total rural WHSs	**76.83**	**70.73**	**6 rooms; 2 or 3 stars; 78.33% no website**	**74.39**	**73.74**	**23.86**	**24.52**

*) It was not possible to sketch a profile for the owners/operators that continued their activity, due to the lack of information concerning equity capital, liabilities, number of employees and NACE codes of individual enterprises.
**) LLCs (Limited liability companies) is used for the Romanian SRLs (societati cu raspundere limitata)
Source: authors' calculations.

Factors Influencing SSR and CR in Rural WHS Localities

The general OLS regression equations for SSR and CR are:

$$SSR = b_0 + b_1POINT + b_2LODG + b_3ROOM + b_4ARRIV + + b_5OCCUP + b_6STAY + b_7OWNR + b_8POP + b_9POP2 + \varepsilon_i \quad (1)$$

$$CR = b_0 + b_1POINT + b_2LODG + b_3ROOM + b_4ARRIV + + b_5OCCUP + b_6STAY + b_7OWNR + b_8POP + b_9POP2 + \varepsilon_i \quad (2)$$

The meaning of each abbreviation is presented in Appendix B.

Using stepwise regression, the models in Tables 9 and 10 were extracted based on their significance (p-value). For SSR the most influential factors are: the ownership ratio and the tourist arrivals, followed by the total number of lodgings. For CR, the ownership ratio is less important. The introduction of the dummy variable, representing the existence of a local strategy for tourism development, decreases the model significance. When the workforce is also taken into consideration, the model significance decreases even further in both cases. The considered factors have a higher influence on the CR, explaining between 20% and 24.5% of this dependent variable.

Given the strong and significant correlation between SSR and CR, a new regression model was tested, including the CR among the independent variables. The new general regression equation for SSR, including CR as independent variable, is:

$$SSR_{new}=b_0+b_1CR+b_2POINT+b_3LODG+b_4ROOM+b_5ARRIV+b_6OCCUP+b_7STAY+ + b_8OWNR + b_9POP + b_{10}POP2+\varepsilon_i \quad (3)$$

Table 9. Selected Regression Models for SSR as Dependent Variable

Independent variables	Model 1		Model 3		Model 4	
	Estimate	T-statistic	Estimate	T-statistic	Estimate	T-statistic
b_0	0.3448	5.5424	0.3179	4.5651	0.3014	2.6874
LODG	0.0203	0.9731	0.0167	0.7791	0.0174	0.7781
ARRIV	-0.0050	-1.6331	-0.0043	-1.3610	-0.0043	-1.2881
OWNR	0.3196	1.6357	0.3166	1.6103	0.3244	1.5711
POP2	–	–	–	–	0.1102	0.1917
DUMMY	–	–	0.0845	0.8821	0.0788	0.7657
Adjusted R^2 (%)	19.23		18.22		13.31	
p-value	0.0788		0.1162		0.2050	

Source: authors' calculations.

Table 10. Selected Regression Models for CR as Dependent Variable

Independent variables	Model 1		Model 3		Model 4	
	Estimate	T-statistic	Estimate	T-statistic	Estimate	T-statistic
b_0	0.2856	5.3474	0.2629	4.3940	0.2234	2.3362
LODG	0.0273	1.5230	0.0242	1.3172	0.0260	1.3614
ARRIV	-0.0054	-2.0341	-0.0048	-1.7499	-0.0046	-1.6334
OWNR	0.0905	0.5395	0.0880	0.5209	0.1066	0.6057
POP2	–	–	–	–	0.2637	0.5380
DUMMY	–	–	0.0713	0.8667	0.0578	0.6583
Adjusted R^2 (%)	24.51		23.45		20.11	
p-value	0.0452		0.0725		0.1247	

Source: authors' calculations.

Using the stepwise regression, the models in Table 11 were selected based on their significance and similarity with the models in Tables 9 and 10. The explanatory power of the models increased to over 60%, influenced mainly by the CR, while the influence of the other factors, with the exception of the ownership ratio, became insignificant. The introduction of the dummy variable and workforce continue to decrease the model significance.

Table 11. Selected Regression Models for Ssrnew as Dependent Variable

Independent variables	Model 1		Model 3		Model 4	
	Estimate	T-statistic	Estimate	T-statistic	Estimate	T-statistic
b_0	0.0837	1.3118	0.0807	1.2181	0.0979	1.1587
CR	0.9140	5.2204	0.9021	4.9066	0.9108	4.7729
LODG	-0.0046	-0.3277	-0.0052	-0.3537	-0.0062	-0.4058
ARRIV	-0.0001	-0.0521	-0.0001	-0.0067	-0.0001	-0.0282
OWNR	0.2369	1.8857	0.2373	1.8379	0.2273	1.6725
POP2	–	–	–	–	-0.1300	-0.3443
DUMMY	–	–	0.0201	0.3161	0.0262	0.3860
Adjusted R^2 (%)	67.15		65.31		63.29	
p-value	0.0001		0.0003		0.0010	

Source: authors' calculations.

Table 12 presents the results for PCA while taking into consideration the same variables as those included in the selected models based on the stepwise regression. The PCA results confirm the decreasing explanatory power of the dummy variable (representing the existence or the absence of a tourism strategy) and of the workforce. PCA results further reveal that the influence of these two variables, mainly the workforce influence, is rather indirect through the second component. This suggests that the working population rather chooses to establish new economic entities (mainly individual enterprises) and relates through them with the existing entities, than to become directly employed by these. This situation further supports the idea of lifestyle enterprises owning the surviving lodgings.

Table 12. PCA Results for the Selected Variables as Resulted from Stepwise Regression

PCA for 5 variables: 2 components extracted			**Component weights**		
Component	**Eigenvalue**	**Cumulative percentage**	**Variables**	**PC1**	**PC2**
1	2.4917	49.83	SSR	0.5557	0.1670
2	1.1158	**72.15**	CR	0.5575	-0.0895
3	0.7121	86.39	LODG	0.4086	0.0163
4	0.5419	97.23	ARRIV	-0.3983	0.5109
5	0.1385	100.00	OWNR	0.1855	0.8384
PCA for 6 variables: 2 component extracted			**Component weights**		
Component	**Eigenvalue**	**Cumulative percentage**	**Variables**	**PC1**	**PC2**
1	2.7242	45.40	SSR	0.5168	0.2262
2	1.1429	**64.45**	CR	0.5410	-0.0188
3	0.7481	76.92	LODG	0.3858	0.0523
4	0.7049	88.66	ARRIV	-0.3852	0.4468
5	0.5419	97.69	OWNR	0.3453	-0.2396
6	0.1385	100.00	DUMMY	0.1542	0.8299
PCA for 7 variables: 2 components extracted			**Component weights**		
Component	**Eigenvalue**	**Cumulative percentage**	**Variables**	**PC1**	**PC2**
1	2.7532	39.33	SSR	0.5075	-0.2016
2	1.4154	**59.55**	CR	0.5388	-0.0195
3	0.8639	71.89	LODG	0.3714	-0.2105
4	0.7435	82.52	ARRIV	-0.3905	-0.2544
5	0.5581	90.49	OWNR	0.1318	-0.6254
6	0.5299	98.06	POP2	0.1308	0.6261
7	0.1360	100.00	DUMMY	0.3567	0.2584

Source: authors' calculations.

To complete the analysis performed through stepwise regression and PCA, which might have been influenced by the small number of observations (22), the IDA was introduced to investigate the processes influencing the number of bed places in surviving lodgings (SBP)[2]. The following effects were defined:

1. BP_i = the total number of bed places in each commune (an extensive factor);
2. $I_i = A_i/BP_i$ – intensity effect; where A represents the tourist arrivals in each commune;

[2] Since SSR was calculated for the first time for 2016, and the number of surviving lodgings did not change between 2005 and 2016, the IDA was applied to the changes in bed places of the surviving lodgings.

3. $S_i = OS_i/A_i$ – the length of stay; where OS represents the overnight stays in the respective commune lodgings (also an intensive factor);
4. $OR_i = NO_i/OWN_i$ – the ownership ratio; where NO represents the total number of lodgings, and OWN represents the respective owners in each commune;
5. $IOc_i = OWN_i/OS_i$ – the inverse of a modified occupancy ratio;
6. $ICc_i = P_i/NO_i$ – the inverse of a modified carrying capacity, where P represents the population between 30 and 64 years in each commune;
7. $E_i = SBP_i/P_i$ – the employment opportunities for the population between 30 and 64 years; where SBP is the number of bed places in surviving lodgings in each commune.

The following equation describes the changes in the number of bed places in surviving lodgings:

$$SBP = \sum_{i=1}^{n} BP_i \frac{A_i}{BP_i}\frac{OS_i}{A_i}\frac{N_i}{OWN_i}\frac{OWN_i}{OS_i}\frac{P_i}{N_i}\frac{SBP_i}{P_i} = \sum_i BP_i I_i S_i OR_i IOc_i ICc_i E_i \quad (4)$$

The following formula describes the changes in the number of bed places in surviving lodgings:

$$\Delta SBP = SBP^{2016} - SBP^{2005} = \Delta SBF_{BP} + \Delta SBP_I + \Delta SBP_S + \Delta SBP_{OR} + \Delta SBP_{IOc} + \Delta SBP_{ICc} + \Delta SBP_E \quad (5)$$

The effects ΔSBP_{BP}, ΔSBP_I, ΔSBP_S, ΔSBP_{OR}, ΔSBP_{IOc}, ΔSBP_{ICc}, ΔSBP_E are estimated using the following formulas:

$$\Delta SBP_{BP} = \sum_i \overline{SBP_i} \ln(BP_i^{2016}/BP_i^{2005}) \quad (6)$$

$$\Delta SBP_{BP} = \sum_i \overline{SBP_i} \ln(BP_i^{2016}/BP_i^{2005}) \quad (7)$$

$$\Delta SBP_S = \sum_i \overline{SBP_i} \ln(S_i^{2016}/S_i^{2005}) \quad (8)$$

$$\Delta SBP_{OR} = \sum_i \overline{SBP_i} \ln(OR_i^{2016}/OR_i^{2005}) \quad (9)$$

$$\Delta SBP_{IOc} = \sum_i \overline{SBP_i} \ln(IOc_i^{2016}/IOc_i^{2005}) \quad (10)$$

$$\Delta SBP_{ICc} = \sum_i \overline{SBP_i} \ln(ICc_i^{2016}/ICc_i^{2005}) \quad (11)$$

$$\Delta SBP_E = \sum_i \overline{SBP_i} \ln(E_i^{2016}/E_i^{2005}) \quad (12)$$

where:

$$\overline{SBP_i} = \frac{SBP_i^{2016} - SBP_i^{2005}}{\ln SBP_i^{2016} - \ln SBP_i^{2005}} \quad (13)$$

The following formula describes the changes in multiplicative form:

$$R = SBP^{2016}/SBP^{2005} = R_{BP} R_I R_S R_{OR} R_{IOc} R_{ICc} R_E \quad (14)$$

where the effects are calculated based on the following formulas:

$$R_{BP} = \exp\left(\sum_i (\overline{SBP_i}/\overline{SBP}) \ln(BP_i^{2016}/BP_i^{2005})\right) \quad (15)$$

$$R_I = \exp\left(\sum_i (\overline{SBP_i}/\overline{SBP}) \ln(I_i^{2016}/I_i^{2005})\right) \quad (16)$$

$$R_S = \exp\left(\sum_i (\overline{SBP_i}/\overline{SBP}) \ln(S_i^{2016}/S_i^{2005})\right) \quad (17)$$

$$R_{OR} = \exp\left(\sum_i (\overline{SBP_i}/\overline{SBP}) \ln(OR_i^{2016}/OR_i^{2005})\right) \quad (18)$$

$$R_{IOc} = \exp\left(\sum_i (\overline{SBP_i}/\overline{SBP}) \ln(IOc_i^{2016}/IOc_i^{2005})\right) \quad (19)$$

$$R_{ICc} = \exp\left(\sum_i (\overline{SBP_i}/\overline{SBP}) \ln(ICc_i^{2016}/ICc_i^{2005})\right) \quad (20)$$

$$R_E = \exp\left(\sum_i (\overline{SBP_i}/\overline{SBP}) \ln(E_i^{2016}/E_i^{2005})\right) \quad (21)$$

The results of the decompositions are presented in Tables 13 (additive) and 14 (multiplicative). The data confirm the influence on the changes of surviving bed places of the total lodgings via total bed places (BP), the negative influence of tourist arrivals via the intensity effect (I) and the low influences of ownership ratio (OR) and workforce via the employment opportunities (E).

Table 13. Additive Decomposition for the Changes in the Surviving Bed Places Between 2005 and 2016

Changes in additive form	The Danube Delta	The Dacian fortresses	The fortified churches	The churches of Moldavia	The wooden churches	Total rural WHSs (based on data by communes)
ΔSBP	*297*	*n/a*	*9*	*-409*	*37*	***-66***
ΔSBP_{BP}	877	n/a	38	35	13	**962**
ΔSBP_{I}	-562	n/a	93	664	288	**481**
ΔSBP_{S}	311	n/a	-20	-65	-92	**133**
ΔSBP_{OR}	180	n/a	12	115	6	**313**
ΔSBP_{IOc}	257	n/a	-112	-549	-245	**-649**
ΔSBP_{ICc}	-1018	n/a	-4	-46	29	**-1036**
ΔSBP_{E}	252	n/a	2	-561	39	**-270**

Source: authors' calculations.

Table 14. Multiplicative Decomposition for the Changes in the Surviving Bed Places Between 2005 and 2016

Changes in multiplicative form	The Danube Delta	The Dacian fortresses	The fortified churches	The churches of Moldavia	The wooden churches	Total rural WHSs (based on data by communes)
R	*1.3644*	*n/a*	*1.2500*	*0.5583*	*1.3978*	***0.9647***
R_{BP}	0.9176	n/a	0.9608	0.0502	0.1170	**0.5237**
R_{I}	-0.5877	n/a	2.3083	0.9459	2.6022	**0.2620**
R_{S}	0.3257	n/a	-0.4925	-0.0946	-0.8327	**0.0726**
R_{OR}	0.1883	n/a	0.2978	0.1642	0.0564	**0.1706**
R_{IOc}	0.2693	n/a	-2.7859	-0.7830	-2.2194	**-0.3534**
R_{ICc}	-1.0654	n/a	-0.1031	-0.0659	0.2647	**-0.5645**
R_{E}	0.2637	n/a	0.0378	-0.7996	0.3467	**-0.1469**

Source: authors' calculations.

RESULTS AND DISCUSSION

According to Table 1, Romania appears unable to capitalize on the presence of 8 WHSs. This situation is contradicting the ideas regarding the power of WHSs to promote the host country and to attract an increased number of tourists. The recent study of Iatu *et al*. (2018) confirms Romania's position and its low ability to use WHSs in developing tourism. The only positive aspect is that Romanian rural WHSs are not plagued by excessive visitation and still have the time to envisage proper site management in order to avoid this problem.

Table 2 shows the relative lack of information describing the WHSs and the absence of links to the UNESCO pages related to the respective WHSs, 19 of 32 communes not mentioning the presence of WHSs on their websites. This situation is in line with the findings of Poria *et al*. (2011) which consider that the local awareness regarding the meaning of WHS designation is, at best, low to moderate.

The data in Table 3 appear to confirm the idea that the tourist attractions represented by WHSs seem to have an influence on the lodging growth rate. Overall, it seems that WHSs enhance the attractiveness of their host localities. However, the low growth rate for the Danube Delta, the low occupancy rates for the majority of cultural WHS localities and the decrease in the length of stay suggest that the accommodation facilities should be supplemented by various entertainment offers in order to increase the number of tourists and their length of stay.

The data regarding the population indicate that the rural economies of these WHS localities can support the local population and there was less migration toward domestic urban areas or foreign countries. There are not enough data to assess the tourism contribution to these local rural economies, though an educated guess indicated that a contribution exists, the unknown being the size of this contribution.

The SSR for the rural WHS localities included in this study is of 38.68% (Table 7), lower than the SSR reported by Pop and Balint (2017) for the rural WHSs hosting at least ten lodgings. This was due to the inclusion of localities with less than ten lodgings, where the SSR is generally smaller due to low tourist flows. Nonetheless, it should be pointed out that the overall SSR for the rural WHS localities is slightly higher that the SSR reported by Pop and Balint (2017) for all the rural localities with at least ten lodgings, of 38.21%.

The surviving lodging profile in Table 8 shows that the accommodation units are of small capacity, providing services for budget and mid-market tourists and most of them have no websites, selling their services mostly via various booking websites.

Table 8 also shows the lack of diversification or a low diversification of lodging facilities, with the exception of rural Danube Delta localities. The dominance of individual enterprises is also high, with the exception of the Danube Delta.

The information in Table 8 and Table 4 suggests that the economic entities owning the surviving lodgings are rather lifestyle enterprises, operating the respective accommodation facilities to complement other (economic) activities.

The results in Tables 9, 10 and 11 suggest that SSR is mainly influenced by the continuity rate (CR) and the ownership ratio. Through CR, SSR is indirectly influenced by the number of lodgings (representing the overall competition) and tourist arrivals.

It is interesting to mention that tourist arrivals have a negative influence on SSR, indicating a decrease when the number of arrivals increases. This odd situation suggests two aspects: the fact that relatively small surviving lodgings are not prepared to receive constantly a high number of tourists without decreasing the quality of their services and/or the existence of informal accommodation facilities which by attracting tourists have a negative impact on the SSR of registered accommodation.

It is also worth mentioning that the tourist potential (expressed in points) has no influence on CR and, therefore on SSR, while the existence or the absence of a local strategy for tourism development decreased the explanatory power of any selected model.

These findings extracted from regression models confirm the suggestion expressed based on Table 8 and Table 4 data, that the economic entities operating lodgings in WHS localities are rather lifestyle enterprises. Not being influenced by the existing workforce indicates that these entities do not create many employment opportunities. Since the ownership ratio is close to 1, this suggests that for the respective entities is important to own and operate one accommodation facility.

Not being influenced either by the tourist potential or by the existence of a strategy, the initiative of owning and operating a tourist lodging appears to be an individual decision based on the personal assessment of the local economic environment. Furthermore, this lack of influence combined with the absence of significant information on the WHS localities websites regarding the presence of WHSs and their attractivity, seems to confirm the suggestions of international research regarding the lack of awareness regarding the importance of WHSs (Poria *et al*. 2011) among the local community or at least among their representatives.

PCA results (Table 12) confirm the negative direct influence of tourist arrivals, revealed through the regression models. Additionally, PCA results endorse the findings in Tables 9 and 10 regarding the strong relationship between SSR, CR, and the number of lodgings, tourist arrivals and ownership ratio. PCA results also support the idea of lifestyle enterprises owning the surviving lodgings.

The results of IDA (Table 13 and 14) support the results of regression analysis and PCA analysis.

CONCLUSIONS

This article investigated the role of rural WHSs in local rural tourism development in Romania, adding to the existing body of literature the idea that the presence of a WHS in rural areas is not a panacea for promoting tourism.

A positive influence was identified, Romanian rural localities hosting WHSs appear to have an advantage over regular communes since they experienced a higher lodging and room growth rates and also attracted more tourists (mostly domestic) compared to similar domestic destinations. Also, the retention of the population within these localities is higher compared to an overall decrease in Romanian rural population. Furthermore, the SSR within these rural WHS localities is similar to the overall SSR reported by Pop and Balint (2017) for the rural localities with at least ten lodging facilities and 10% higher than for the rural localities with no well-known tourist attractions. Therefore, a SSR over 35% for a decade (2005-2016) can be considered satisfactory and encouraging within the intricate Romanian business environment. The levels of SSR and CR point out that there exist an economic sustainability of the accommodation and the respective economic entities.

However, at a closer look, the low level of occupancy rates and length of stays, combined with a low carrying capacity indicate there is a long way ahead for further tourism development within Romanian rural WHS localities. Most of them are far from achieving their tourism potential and do not experience overcrowding. What these localities lack are: a) a more diverse offer of accommodation facilities catering for various types of tourists; b) a varied range of alternative entertainment facilities, including packages presenting the intangible, cultural heritage (local apparel, art, historical reenactments, as suggested by Yi *et al*. (2018)) which might increase the length of stay and the occupancy rate. The scarcity of entertainment facilities in WHS localities was also highlighted by Pop and Coros (2016).

Given this situation, the factors influencing the SSR and CR were investigated. The ownership ratio (close to 1) and the number of other lodgings have a positive influence suggesting that to those operating the lodging facilities it is important to own the respective lodging, while the presence of other competitors stimulate their efforts to survive. On the other hand, tourist arrivals have a negative influence, indicating two problems:

a) the surviving lodgings low capacity to deal with a constant flow of tourism; b) the presence of a hidden competition represented by informal lodgings, discussed by Radan-Gorska (2013). It is worth mentioning the low relationship with the existing workforce, combined with the low ownership rate, low occupancy rate, the absence of websites and the dominance of individual enterprises. These point toward lifestyle enterprises, creating few employment opportunities. This situation has already been confirmed for WHS Danube Delta by Pop and Coros (2018). Therefore, the population retention within WHS localities is little influenced by the survival of the lodging facilities.

It is also interesting to mention that the existence or absence of a local strategy for tourism development decreased the explanatory power of the models and have rather an indirect influence on SSR and CR. This situation points toward two outcomes: a) that the tourism developments between 2005 and 2016 in WHS localities was based mainly on individual decisions which later on became modest local initiatives; b) combined with the modest amount of information regarding their respective WHSs on the communes websites and the amateurish way this information is presented, it can be safely said that there is a low to moderate awareness level (at least at the levels of local authorities) regarding the tourist potential of WHSs.

While some exceptions exist, like the case of Viscri presented by Iorio and Corsale (2014), the majority of Romanian WHS localities do not properly exploit their tourist potential, a situation confirmed by Iatu *et al*. (2018). In the cases of three communes (out of the 32 investigated), the local communities appear not to be willing to host tourists, having no registered lodging in 2005 and 2016, situation also pointed out by Pop and Coros (2016).

Nonetheless, the current low development of tourism in most of Romanian rural WHS localities can be the base for further sustainable tourism development which might avoid excessive visitations and the deterioration of the cultural and natural environment. Though, at the central level, the authorities must recognize the special status of rural WHS localities and create a general framework that will encourage the local initiatives (including, as discussed by Jimura (2011), local tourist associations involved in WHS site management) for a sustainable and authentic tourism development, preserving the cultural and natural heritage.

The limitations of this study are caused by a relative short series of data and by the absence of more comprehensive information regarding the presence of informal accommodation facilities in rural areas.

The presented research opens the door for further studies on tourism demand and tourism governance for the WHS localities in order to help the local governments to develop authentic and sustainable tourism for these areas.

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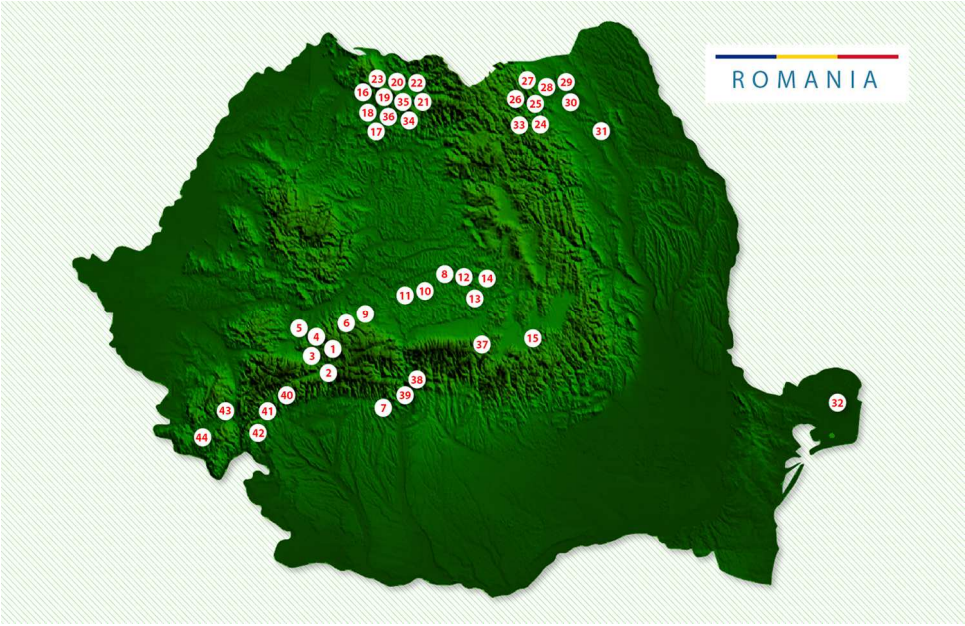
Appendix A: Map of Romanian WHSs



Map legend

1. Sarmisegetusa Regia Dacian site (rural)
2. Banita Dacian site (rural)
3. Piatra Rosie Dacian site (rural)
4. Costesti Dacian site (rural)
5. Blidaru Dacian site (rural)
6. Capalna Dacian site (rural)
7. *Horezu Monastery (urban)*
8. *Sighisoara citadel and city center (urban)*
9. Calnic village – fortified church (rural)
10. Biertan village – fortified church (rural)
11. Valea Viilor village – fortified church (rural)
12. Saschiz village – fortified church (rural)
13. Viscri village – fortified church (rural)
14. Darjiu village – fortified church (rural)
15. Prejmer village – fortified church (rural)
16. Surdesti wooden church (rural)
17. *Rogoz wooden church (urban)*
18. Plopis wooden church (rural)
19. Budesti wooden church (rural)
20. Poienile Izei wooden church (rural)
21. Deal Ieud wooden church (rural)
22. Barsana wooden church (rural)
23. Desesti wooden church (rural)
24. Voronet monastery (urban)
25. Humor monastery (rural)
26. Moldovita monastery (rural)
27. Sucevita monastery (rural)
28. Arbore monastery (rural)
29. Patrauti church (rural)
30. *Probota monastery (urban)*
31. *Suceava St.George church (urban)*
32. Danube Delta (rural)

33-44. Ancient and primeval beech forest (rural)

Source: www.uncover-romania.com/attractions/unesco-heritage-romania/

Appendix B: Descriptive Statistics of Variables Under Analysis

Variables	Average	Median	St.deviation	Minimum	Maximum	Count
SSR	37.18	34.41	21.59	0.00	81.82	22
CR	29.17	31.29	19.17	0.00	66.67	22
POINT	38.45	37.90	9.90	22.54	54.53	22
LODG	144.75	77.78	217.03	-72.73	733.33	22
ROOM	267.52	112.84	504.05	-45.83	1,900.00	22
ARRIV	830.72	156.69	146.13	-81.26	4,608.16	22
OCCUP	130.71	46.56	238.52	-56.54	1,044.13	22
STAY	-27.27	0.00	47.35	-85.00	26.19	22
OWNR	12.30	6.71	22.23	-24.81	75.00	22
POP	-3.73	-5.03	7.52	-16.93	11.00	22
POP2	14.23	12.22	8.33	4.93	41.36	22

SSR is the simple survival rate (%); CR is the continuity rate for the owners/operators (%); POINT is the number of points representing the tourist potential according to PNDR; LODG is the change in the number of lodgings between 2005 and 2016 (%); ROOM is the change in the number of rooms between 2005 and 2016 (%); ARRIV is the change in the number of arrivals between 2005 and 2016 (%); OCCUP is the change in the occupancy rate between 2005 and 2016 (%); STAY is the change in the length of stay between 2005 and 2016 (%); OWNR is the change in the ownership ratio between 2005 and 2016 (%); POP is the change in total population between 2005 and 2016 (%); POP2 is the change in the percentage of the population of 30 to 64 years between 2005 and 2016 (%). There is a dummy variable introduced for the existence (1) or the absence (0) of a strategy including tourism at the commune level.

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Is There Social or Monetary Dumping in the European Union? Manufacturing Competitiveness in Central and Eastern Europe

Andrea Ricci

ABSTRACT

Objective: The aim of this article is to define and estimate the extent of different possible forms of macroeconomic dumping in the manufacturing industry within the European single market, performed by five major Central Eastern European countries (Bulgaria, Czech Republic, Hungary, Poland and Romania; CEE-5) in the aftermath of the Eastern EU enlargement (2004-2016).

Research Design & Methods: Based on the appropriate definition and decomposition of Nominal Unit Labour Cost in Purchasing Power Parity, CEE-5 social and monetary dumping has been analysed by panel data econometrics and descriptive statistics methods.

Findings: Macroeconomic dumping is a determinant driver of CEE-5 manufacturing cost comparative advantages, but it has a negative relation to progress in labour productivity. The analysis highlights two distinct competitive strategies, one performed by the Czech Republic and Poland mainly based on social dumping, while the other, performed by Hungary, Bulgaria and Romania, primarily focused on monetary dumping.

Implications & Recommendations: Macroeconomic dumping could represent only a temporary measure to promote structural convergence, failing which it becomes an obstacle to economic modernisation.

Contribution & Value Added: The article presents an accurate overview of macroeconomic dumping within the EU by using an original methodology able to differentiate between different forms of macroeconomic dumping.

Article type: research article

Keywords: Manufacturing Competitiveness; Unit Labour Cost; social and monetary dumping; European Union; Central Eastern Europe; PPP

JEL codes: F15, J31, L60, C23

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INTRODUCTION

Since the two rounds of Eastern enlargement of the European Union (EU) in 2004 and 2007, a process of change in the spatial distribution of European manufacturing production has been currently taking place because of diversified trends across countries. In the Euro Area (EA), recurring cases of delocalisation of industrial firms in Central and Eastern Europe (CEE), and the related loss of thousands of jobs have been a cause of great popular concern contributing to the rise of anti-European sentiment in large sections of population. This sentiment was reflected in several recent political elections with the rise of populist parties, for example in France, Germany and Italy. In the political and popular debate, the matter of controversy relates to suspected practices of unfair competition arising from dumping policies implemented by the CEE countries within the European single market. As Rodrik (2018) points out, indeed, social dumping is one of the most relevant economic roots of 'populism' in the actual globalised world.

Compared to the intensive political and popular discussion, in economic literature relatively little attention is devoted to assessing the real dimension of dumping practices in determining relative cost advantages within the European single market. The article aims at filling the gap by detecting the size of macroeconomic dumping in the EU manufacturing industry, and the different forms in which it is carried out in the five major CEE countries (CEE-5: Bulgaria, Czech Republic, Hungary, Poland and Romania) not belonging to the EA. The hypotheses under examination, through panel data econometrics and descriptive statistic tools, concern the relevance of macroeconomic dumping in determining the performance of the CEE-5 manufacturing industry, and the different strategies performed by the CEE-5 to gain cost-price competitiveness.

The article is organised as follows. The first part discusses the controversial definition of macroeconomic dumping with various forms that it can assume, and presents a critical review of the significance of Nominal Unit Labour Cost (NULC) in international comparisons of relative industrial competitiveness. The second part is devoted to the methodology and data used in the empirical research, and the discussion of its results. An original decomposition of the Unit Labour Cost is presented to allow for different forms of dumping, representing the basis for subsequent econometric and statistical analysis. Finally, the article ends with some concluding remarks, whose general implications are that macroeconomic dumping could represent only a temporary measure to promote structural convergence, failing which it becomes an obstacle to economic modernisation.

LITERATURE REVIEW AND THEORY DEVELOPMENT

Recent Trends in the EU Manufacturing Production

In the period of 2004-2016, the share in volume of the CEE-5 in total EU manufacturing production significantly increased from 5.6% in 2004 to 8.9% in 2016, in the face of a declining share of the production localised in the Euro Area countries (EA -0.8%,)[1]. Similar trends are occurring in manufacturing employment too, with an increase of 137 000 employed persons

[1] Source Eurostat database: National accounts aggregates by industry [nama_10_a64], NACE Rev. 2 C Manufacturing, chain linked volumes (2005), million euro.

in the CEE-5 and a loss of 2 750.000 employed persons in the EA. The corresponding shares in total EU manufacturing employment has increased from 21.6% to 24.5% in the CEE-5, and fallen from 66% to 64% in the EA, respectively[2]. These divergent trends are clearly reflected in the cumulated growth in the volume of production and intra-EU exports of manufactured goods, which have been considerably higher in each of the CEE-5 countries than in the EA (Figure 1). In this period the main driver of CEE export competitiveness has been the expansion of market share within the European single market (Gilbert & Muchová, 2018).

The growth in the manufacturing sector in CEE is, among other things, a consequence of the delocalisation of production by foreign European and non European firms (Labrianidis, 2016; Totev & Sariisk 2010). During the period of 2005-2013, the per capita inward stock of foreign direct investment in the CEE-5 continued to grow (Jantoń-Drozdowska & Majewska, 2016), albeit at a slower rate after the crisis of 2008 (Voicu, Sen, & Martinez-Zarzoso, 2018). As a result of this trend, the value added produced by foreign controlled enterprises is significantly higher in the CEE-5 than in the rest of the EU (Myant, 2018). In total business economy, except financial and insurance activities, in 2014 the value added at factor cost produced by foreign firms was 33.1% in Bulgaria, 42.3% in Czech Republic, 52.7% in Hungary, 35.4% in Poland and 43.9% in Romania, in the face of a EU average of 24.3%[3]. Because of this high level of foreign ownership and control by multi-national companies, the CEE economies has been recognised as forms of 'dependent market economies', in which the comparative advantage derives primarily from the relatively low labour cost of their skilled workers (Nölke & Vliegenthart, 2009; Myant & Drahokoupil, 2012; Drahokoupil & Myant, 2017).

The relative performance of CEE-5 manufacturing production and exports indicates the presence of a sectoral cost-price competitive advantage. Although technological and institutional competitiveness are other important non-price components (Benkovskis & Wörz, 2012; Bierut & Kuziemska-Pawlak, 2017), cost advantages are of paramount importance in the actual global competitive environment. The unit labour cost, in particular, represents a major determinant of foreign domestic investment (FDI) flows in CEE's countries (Bellak, Leibrecht, & Riedl, 2008). Since capital mobility in the form of FDI by multinational companies is a crucial mechanism of dumping within the EU (Adnett, 1995; Aspinwall, 1996; Meardi, Strohmer, & Traxler, 2013; Krzywdzinski, 2014), the question of dumping practices within the European single market has become increasingly relevant in the political and institutional debate (Kiss, 2017). However, if at the microeconomic level the concept of dumping is well established, the same cannot be said at the macroeconomic level. The next section is devoted to clarification of this point.

The concept of dumping originates in the microeconomic theory to indicate the price discrimination behaviour of monopolistic firms within segmented markets, in which the prices of two similar goods are in different ratios to marginal costs (Varian, 1989). This notion has been applied in the microeconomic international trade theory to describe the ability of oligopolistic firms to discriminate between foreign and domestic markets because of different demand elasticities, and used to explain intra-industry trade in identical products (Brander & Krugman, 1983; Krugman, 1995). The macroeconomic definition of dumping is, however,

[2] Source Eurostat database: Employment by A*10 industry breakdowns [nama_10_a10_e], NACE Rev. 2 C Manufacturing, Thousand persons, Total employment domestic concept.

[3] Source Eurostat database: Value Added in Foreign Controlled Enterprises [egi_va1].

more problematic because it refers to the structural characteristics of a national economy, and it is strongly influenced by state policy issues (Maslauskaitė, 2013; Bernaciak, 2015).

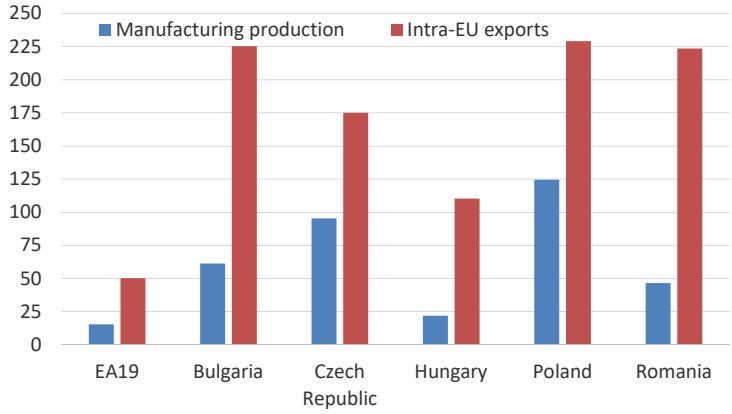

Figure 1. Manufacturing production (volume) and intra EU exports: 2004-2016, total % change
Source: own calculations from Eurostat database.

In literature, we can find different forms of macroeconomic dumping (Larsson, 1996). The first form relates to lower regulating labour legal standards with respect to other countries competing in the same integrated market. In this situation, commonly referred to as social dumping (Albert & Standing, 2000), the unfair advantage consists in a downward competition on the worker's conditions aimed at reducing labour costs. Social dumping includes three different practices of unfair competition. The first two (Sinn, 2008) relate to welfare dumping deriving from lower monetary and in kind social benefits to workers, and wage dumping from lower net wages. The third practice is fiscal dumping deriving from lower taxes paid on labour (Andersen, 2003; Merlevede, Rayp, Van Parys, & Verbeke, 2011).

In the debate concerning social dumping in Europe, two different positions have been expressed. According to some authors (Vaughan-Whitehead, 2003; Scharpf, 2010; Höpner & Schäfer, 2012; Crespy & Menz, 2015; Meardi, 2017; Hyman, 2018), the market-oriented European integration process has led to a race to the bottom in wages and welfare conditions, so undermining the salient features of the social compromise reached in Western Europe after the Second World War. In this contest of market deregulation, the Eastern EU's enlargement to countries with a poor tradition in 'social modelling' of industrial relations would amplify the problem (Cremers, 2016). This view is supported by the empirical evidence of a slow or null wage convergence among neighbouring regions across international borders within the EU (Naz, Ahmad, & Naveed, 2017). Other authors (Caporaso & Tarrow, 2009; Rubery, 2011; Vaughan-Whitehead, 2015; Athanasenas, Chapsa, & Michailidis, 2015), in contrast, pointed out the gradual convergence process in the definition of common social standards, resulting from the transition to an economic and monetary union equipped with regulatory powers valid for all Member States.

The second form of macroeconomic dumping refers to monetary dumping deriving from systematic real undervaluation of the domestic currency with respect to its long run equilibrium position, defined as the purchasing power parity (PPP) exchange rate. Monetary dumping is a consequence of direct and indirect government interventions on exchange markets

(currency manipulation), or distortions in the international monetary and financial system (Auboin & Ruta, 2013). With regard to the monetary regimes of the CEE-5, according to the IMF classification (International Monetary Fund, 2018), three of them (Hungary, Poland and Romania) are adopting a floating exchange rate, Bulgaria has had a currency board since 1997 and the Czech Republic maintains an exchange rate anchor to EUR. Notwithstanding these differences, the actual exchange rate of all of them can be statistically well approximated by a soft peg to a currency basket dominated by EUR (Slavov, 2017). This occurs to an extent which cannot be explained by inflation targeting or economic and financial integration, thereby leaving the question of the real goals of their exchange rate policy open.

Both forms of dumping, social and monetary, have the same effect on domestic industrial competitiveness, reducing the labour cost per unit of product by policy manipulations, and not through improvements in labour productivity and technological efficiency. There are, however, important differences between the two forms of dumping. Social dumping directly deteriorates the living and working conditions of a large section of domestic labour force, while monetary dumping acts primarily on the competitor countries, having a down pressure on the foreign living and working conditions. Furthermore, the blame of social dumping lies entirely with domestic economic policies, while, for countries with convertible currency, monetary dumping is a consequence of bilateral exchange rate policies and objective conditions of international financial markets.

The Unit Labour Cost and Industrial Competitiveness

The Unit Labour Cost (ULC) is defined as the ratio between labour compensation per unit of labour and labour productivity. Normally, the measure of total labour is differentiated between numerator and denominator because labour cost is divided by a measure of labour employed, while output by a measure of total labour comprising self-employment to take into account differences in employment structures (Hinze, 1998). In this form, the ULC shows that the cost competitiveness of an industry can be improved by a decrease in unit wage or by an increase in total labour productivity (Van Ark, Stuivenwold, & Ypma, 2005).

In international comparisons, the ULC is often preferred over other indicators of competitiveness[4] because the labour cost is the greater non tradable component of the cost of production, slightly sensitive to short run erratic fluctuations in imported input prices (Turner & Van't dack, 1993; Turner & Golub, 1997). As evidenced by the European Commission (2009, p. 29), in the presence of integrated labour markets wherein wages reflect the average national productivity level, a sectoral ULC lower than average is a good indicator of comparative advantages in the international trade, notably in the manufacturing industry in which tariff and non tariff barriers are usually lower than other sectors.

At national level, the ULC can be calculated by different methods. The method used by Eurostat considers nominal values for both variables of the ratio (the so-called Real Unit Labour Cost or RULC), indicating the wage share in total value added. In recent literature, some authors (Borbély & Neumann, 2015; Popovici, 2015; Botrić & Broz, 2016; Artner, 2017) have taken this approach to examine CEE competitiveness. RULC, however, expresses the functional distribution of income between labour and capital, and its relation

[4] For a review of international competitiveness indicators see Ca'Zorzi and Schnatz (2007); Siggel (2010); Siudek and Zavojska (2014).

to industrial competitiveness is ambiguous (Felipe & Kumar, 2011; Kyrkilis, Makris, & Hazakis, 2016), because of the possible presence of the Kaldor's paradox (Kaldor, 1978), according to which an increasing wage share could be a factor enhancing the long term rate of growth and international trade share of an economy. Furthermore, changes in relative RULC can be caused by changes in prices rather than in production efficiency, as is the case of different wage indexation between industries or countries (ILO, 2013).

The method used by most of the international institutions (European Central Bank, Organisation for Economic Cooperation and Development, European Commission) to avoid these problems relates nominal unit labour compensation to real labour productivity, by expressing labour cost in current nominal terms and output in constant price terms. This indicator, called Nominal Unit Labour Cost in national currency ($NULC_{nc}$), can be represented by the following equation:

$$NULC_{nc} = \left(\frac{W_{nc}}{L_e} / \frac{Y_{nc}}{L_{tot}}\right) \quad (1)$$

where:

W_{nc} - total labour compensation in national currency;
L_e - labour of employees;
Y_{nc} - value added at constant price in national currency;
L_{tot} - total labour.

In this way, $NULC_{nc}$ shows the inflationary pressure deriving from nominal wages growth, which deteriorates the cost competitiveness of an industry or an economy. A lower $NULC_{nc}$ is thus an index of comparative cost advantage of a firm or an industry. The issue which arises in international comparisons is how to express $NULC_{nc}$ of different countries in a common and equivalent unit of account (Felipe, 2007). $NULC_{nc}$, indeed, can be used to analyse the evolution of the competitiveness of a country during a given period of time, due to the relative dynamics of wages and productivity, but not between different countries because of the different units of accounts in calculating labour cost. A common method to bypass this problem is to convert labour cost in a common currency (i.e. dollar or EUR) by applying current nominal exchange rates. Recently, some authors (Honkapohja & Korhonen, 2013; Rozmahel, Grochová, & Litzman, 2016; Dautović, Orszaghova, & Schudel, 2017) used this indicator to analyse relative industrial competitiveness of CEE economies.

This solution, however, makes it possible to compare the change in relative competitiveness between countries during an interval of time, but not the absolute levels of competitiveness, which represents the key variable determining the comparative advantage of a national industry (Oulton, 1994). In order to internationally compare the absolute level of cost competitiveness, it is necessary to convert labour productivity in a common currency, too. In this matter, the use of current nominal exchange rates clashes with the problem of the systematic misalignment of current exchange rates with respect to their long run equilibrium position, the so called purchasing power puzzle (Rogoff, 1996). By applying this method, real labour productivities would be distorted by different price levels between countries, not cancelled by the short run equilibrium of exchange rates in currency markets. For this reason, it is preferable to use the purchasing power parity (PPP) exchange rates to measure real labour productivity of different countries (Van Ark & Monnikhof, 2000).

The indicator which better approximates the level of international competitiveness of an industry is therefore the ratio between nominal unit labour compensation converted in current exchange rates and real productivity measured in PPP exchange rates ($NULC_{PPP}$), expressed by the following formula:

$$NULC_{PPP} = \left(\frac{E\ W_{nc}}{L_e} / \frac{E_{PPP}\ Y_{nc}}{L_{tot}}\right) \quad (2)$$

where:

E - current exchange rate;

E_{PPP} - PPP exchange rate.

Expression (2) has been used by some authors to compare the absolute levels of national industrial competitiveness (see, among others, Hooper and Vranlovich, 1995; Vecernik, 2001; Felipe and Sipin, 2004; Havlik, 2005; He, You and Mo, 2009; Author, 2015) and by Erickson and Kuruvilla (1994) to analyse the size of social dumping within the EU. An appropriate decomposition of $NULC_{PPP}$ will be the basis of the empirical analysis described below.

MATERIAL AND METHODS

Defining unit labour cost as the ratio between total labour compensation and labour of employees, and labour productivity as the ratio between value added in constant price and total labour, expression (2) can be rewritten as follows:

$$NULC_{PPP} = \frac{E\ lc_{nc}}{E_{PPP}\ lp_{nc}} \quad (3)$$

where:

lc_{nc} - unit labour cost in national currency;

lp_{nc} - labour productivity in national currency.

By defining the ratio between current and PPP exchange rate as Exchange Rate Deviation Index ($ERDI$), expression (3) becomes the following:

$$NULC_{PPP} = NULC_{nc}\ ERDI \quad (4)$$

where:

$$ERDI = \frac{E}{E_{PPP}}$$

Expression (4) shows that $NULC_{PPP}$ can be divided into two components, the first ($NULC_{nc}$) representing the domestic factors of competitiveness (national wages and labour productivity), while the second ($ERDI$) the monetary factor relating to the difference between current and long run equilibrium exchange rate. In the case of actual currency undervaluation with respect to long run equilibrium ($ERDI < 1$), the monetary factor reinforces the international competitiveness of a country by reducing $NULC_{PPP}$, and vice versa in the case of actual currency overvaluation ($ERDI > 1$).

Since total labour compensation paid by employers to employees is the sum of social contributions for welfare benefits of workers (*sc*), taxes on labour (*tl*) and net wages (*nw*), $NULC_{nc}$ in turn it can be decomposed into different factors, as follows:

$$NULC_{PPP} = (NULC_{nc}^{sc} + NULC_{nc}^{tl} + NULC_{nc}^{nw})\ ERDI \quad (5)$$

In expression (5), the international competitiveness index has been decomposed into four factors, of which the first three (welfare, fiscal and net wage factors) represent the

domestic social component of the international competitiveness of a country, while the fourth its monetary component related to the exchange rate policy.

To compare the levels of $NULC_{PPP}$ between CEE-5 and EA, the PPP exchange rates have been normalised to EUR in its actual composition at 19 countries, so that:

$$ERDI_{EA} = 1 \tag{6}$$

and

$$NULC_{PPPEA} = NULC_{ncEA} = NULC_{EA} \tag{7}$$

For each CEE-5, the indicator of relative competitiveness with respect to the EA manufacturing industry is the following:

$$NULC_{PPP} - NULC_{EA} = ERDI\ NULC_{nc} - NULC_{EA} \tag{8}$$

By adding and subtracting $NULC_{nc}$ from the second member of the equation, we obtain the following expression:

$$NULC_{PPP} - NULC_{EA} = (NULC_{nc} - NULC_{EA}) + (ERDI - 1)\ NULC_{nc} \tag{9}$$

The first factor of the right-side of equation (9), that is the difference between *NULC*s in national currency, represents the domestic social component of the CEE-5 relative competitiveness, while the second factor represents the monetary component of the exchange rate misalignment.

We define a situation of dumping if the relative cost advantage expressed by expression (9) is associated with a domestic PPP labour productivity lower than foreign labour productivity, depending entirely on lower labour cost. In this case, decomposing $NULC_{nc}$ and $NULC_{EA}$ into their different social components helps to discriminate between different sources of dumping (welfare, fiscal and wage dumping), as in the following expression:

$$\begin{aligned} NULC_{PPP} - NULC_{EA} = {} & (NULC_{nc}^{sc} - NULC_{EA}^{sc}) + (NULC_{nc}^{tl} - NULC_{EA}^{tl}) + \\ & + (NULC_{nc}^{nw} - NULC_{EA}^{nw}) + (ERDI - 1)\ NULC_{nc} \end{aligned} \tag{10}$$

The empirical analysis is carried out in two steps. The first step tests, by a panel regression analysis, the significance of $NULC_{PPP}$ and its decomposition in the CEE-5 manufacturing competitiveness. In the second step, descriptive comparative analysis is used to evaluate the different competitive strategies adopted by the CEE-5.

Data

Eurostat Database[5] was the source of the following data:

- Value added in Manufacturing at current prices in million units of national currency and million EUR [nama_10_a64];
- Value added in Manufacturing, chain linked volume (2005) in million units of national currency and million EUR [nama_10_a64];
- Compensation of employees in Manufacturing, current prices in million units of national currency and million EUR [nama_10_a64];
- Wages and salaries in Manufacturing, current prices in million units of national currency and million EUR [nama_10_a64];
- Thousand hours worked in Manufacturing, Total employment domestic concept [nama_10_a10_e];

[5] See http://ec.europa.eu/eurostat/data/database

- Thousand hours worked in Manufacturing, Employees domestic concept [nama_10_a10_e];
- Thousand hours worked in Manufacturing, Self-employed domestic concept [nama_10_a10_e];
- EUR/ECU exchange rates – annual data, average [ert_bil_eur_a];
- Purchasing power parities, Total goods[6] [prc_ppp_ind]:
- Intra and Extra-EU trade by Member State and by product group [ext_lt_intratrd]. Exports in million of EUR.

The European Commission[7] was the source of data on taxes on labour.

The data used have an annual frequency and the period considered is between 2004, the year of the first major Eastern EU enlargement, and 2016.

RESULTS AND DISCUSSION

As discussed previously, there is macroeconomic dumping when a lower $NULC_{ppp}$ is associated with a lower PPP labour productivity, the higher competitiveness being entirely determined by lower labour cost. As Tables 1 and 2 show, this condition occurs for each of the CEE-5 countries with respect to the EA. In dynamic terms, we can divide the five CEE countries into two distinct groups characterised by different temporal trends. In the first group, including the Czech Republic and Poland, the relative level of $NULC_{PPP}$ remains stable or decreases during the period, while in the second group, including Hungary, Bulgaria and Romania, it increases, whilst continuing to be significantly lower than the EA. These trends are reflected in relative labour productivity position too, with the first group experiencing a significant improvement, and the second group a stagnation.

Table 1. Manufacturing PPP labour productivity level 2004-2016. Euro Area = 100

Area	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Euro area	100	100	100	100	100	100	100	100	100	100	100	100	100
Bulgaria	15	15	15	15	13	13	16	16	15	16	16	16	16
Czech Republic	40	44	52	52	55	49	63	63	57	56	59	58	58
Hungary	37	38	39	39	38	30	42	39	36	37	37	39	37
Poland	30	28	30	30	30	29	40	39	38	39	40	41	40
Romania	20	20	21	20	22	20	25	23	20	21	22	23	23

Source: own elaboration based on Eurostat Database.

NULCppp and Social and Monetary Dumping as Indicators of Competitiveness

The hypotheses under test concern the existence of a systematic causal relation between the economic performance of the CEE-5 manufacturing industry and the level and composition of $NULC_{ppp}$. The dependent variables are: a) CEE-5 gross industry value added measured in EUR at constant prices 2005 (*Y_CEE5*); b) CEE-5 intra-EU exports measured in EUR at current prices (*EXEU_CEE5*); c) share of Y_CEE5 in total EU gross manufacturing value

[6] PPP exchange rates were calculated on total goods, with the exclusion of services, because they better approximate price differences in manufacturing industry.

[7] See https://ec.europa.eu/taxation_customs/business/economic-analysis-taxation/data-taxation_en

Table 2. Level of NULCppp in Manufacturing 2004-2016. Euro Area = 100

Area	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Euro area	100	100	100	100	100	100	100	100	100	100	100	100	100
Bulgaria	39	44	45	47	55	60	55	56	63	63	64	68	73
Czech Republic	58	55	52	56	56	65	48	51	56	55	52	50	52
Hungary	51	56	56	56	66	75	54	64	68	66	64	61	68
Poland	46	46	48	51	58	61	42	46	47	46	44	45	47
Romania	34	41	51	60	78	52	43	47	60	51	53	55	59

Source: own elaboration based on Eurostat Database.

added (*SHY_CEE5*); d) ratio between CEE-5 and EA PPP labour productivity (LP_{ppp}). The independent variables are the level of $NULC_{ppp}$ for the first two regressions, and the two components of macroeconomic dumping, social (*SOC_DUMP*) and monetary (*MON_DUMP*) as defined by expression (9), for the last two regressions. The models tested are the following:

$$Y\_CEE5_t = a + b\ NULCppp_t + c\ T_t + \varepsilon_t \quad (11)$$

$$EXEU\_CEE5_t = a + b\ NULCppp_t + c\ T_t + \varepsilon_t \quad (12)$$

$$SHY\_CEE5_t = a + b\ SOC\_DUMP_t + c\ MON\_DUMP_t + \varepsilon_t \quad (13)$$

$$LPppp_t = a + b\ SOC\_DUMP_t + c\ MON\_DUMP_t + \varepsilon_t \quad (14)$$

In the first two models, a constant and time trend variable (T) are inserted to assess for systematic and cyclical macroeconomic components. The panel dataset consists of 65 observations, including 5 cross-sectional units observed over 13 periods for each of the CEE-5 countries. The econometric package used for the estimation is *GRETL* (see Baiocchi & Distaso, 2003; Cottrell & Lucchetti, 2012).

For each of the four models, panel Ordinary least square (OLS) estimations with fixed effects have high positive autocorrelation and group-wise heteroskedasticity in the residuals, as showed in Table 3 by Durbin-Watson statistics smaller than 1, and modified Wald tests with p-values close to 0. These problems are common in panel regression analysis with a small time interval and interdependence between variables. In that case, OLS method is no longer efficient.

Table 3. OLS Fixed Effects Regressions. Tests For Autocorrelation and Group-Wise Heteroskedasticity in the Residuals

Model	D-W statistic	Wald test: null hypothesis homoskedasticity
Model (11)	0.38338	Chi2 (5) = 4792.21 with p-value = 0
Model (12)	0.892684	Chi2 (5)= 75.7071, with p-value = 9.98178e-19
Model (13)	0.148566	Chi2 (5) = 903.298 with p-value= 5.14389e-193
Model (14)	0.609577	Chi2 (5) = 19.9887 with p-value = 0.00125587

Source: own study.

In the presence of heteroskedasticity and autocorrelation in the errors, a more efficient method of estimation than OLS is the Weighted least squares, WLS (Romano & Wolf, 2017; Sterchi & Wolf, 2017; DiCiccio, Romano, & Wolf, 2018). WLS with weights based on

per-unit error variances is, therefore, used to estimate our models. In model (13) estimation, the constant is removed to ensure a significantly better R-squared[8].

The signs of the coefficients are expected as negative, indicating that a lower $NULC_{PPP}$ increases net product and intra-EU exports of the CEE-5, and a higher negative difference between $NULC_{PPP}$ and $NULC_{EA}$, both in the social and monetary components, increases the CEE-5 share in total EU manufacturing production and PPP labour productivity.

Table 4. WLS, Using 65 Observations, Included 5 Cross-Sectional Units. Weights Based on Per-Unit Error Variances

Model (11). Dependent variable: Y_CEE5. R-squared = 0.404339				
Statistics	*coefficient*	*std. error*	*t-ratio*	*p-value*
const	76840.30	9523.350	8.069	3.01e-11 ***
NULCppp	-156107.00	24846.100	24846.100	3.68e-08 ***
time	1306.34	261.094	5.003	4.93e-06 ***
Model (12). Dependent variable: *EXEU_CEE5*. R-squared = 0.337226				
Statistics	*coefficient*	*std. error*	*t-ratio*	*p-value*
const	109311.00	23954.600	4.563	2.44e-05 ***
NULCppp	-201888.00	62967.500	-3.206	0.0021 ***
time	4644.93	841.736	5.518	7.13e-07 ***
Model (13). Dependent variable: *SHY_CEE5*. Centered R-squared = 0.623609				
Statistics	*coefficient*	*std. error*	*t-ratio*	*p-value*
SOC_DUMP	-0.0757130	0.00569934	-13.280	6.26e-20 ***
MON_DUMP	-0.0113392	0.00662332	-1.712	0.0918 *
Model (14). Dependent variable: LPppp. R-squared = 0.723849				
Statistics	*coefficient*	*std. error*	*t-ratio*	*p-value*
const	0.729053	0.0593933	12.280	3.03e-18 ***
SOC_DUMP	0.150244	0.1391440	1.080	0.2844
MON_DUMP	2.34260	0.2395360	9.780	3.50e-14 ***

Source: own study.

As showed in Table 4, in the first three regressions the coefficients have the expected sign with a 99% confidence interval, with the exception of monetary dumping coefficient in the third regression, for which confidence interval is 90%. On the contrary, in the fourth regression the signs of coefficients are the opposite of what was expected, even if the social dumping coefficient is not statistically significant, meaning that an increase in social and monetary dumping corresponds to an increase in PPP labour productivity gap relative to the EA.

Table 5 shows the correlation values between the dependent variables of the models, from which we can see that $NULC_{ppp}$ of the CEE-5 has a growing temporal trend, and there is an inverse relation between the two forms of dumping.

The conclusions that can be drawn are the following: a) the absolute level of PPP unit labour cost is a good indicator of the competitiveness in the CEE-5 manufacturing industry, despite its increase during the period; b) the suggested decomposition into social and monetary dumping is pertinent; c) both social and monetary dumping contribute to explaining the gain in relative CEE-5 competitiveness; d) there is a trade-off

[8] In WLS estimation with the constant, R-squared is 0.569277.

between the two forms of dumping; e) social, and particularly monetary dumping have a negative effect on the CEE-5 labour productivity.

Table 5. Correlations Between Dependent Variables

Statistics	Correlation coefficient
corr(NULCppp, time)	0.33455171 Under the null hypothesis of no correlation: t(63) = 2.81779, with two-tailed p-value 0.0065
corr(SOCDUMP, MONDUMP)	-0.72417109 Under the null hypothesis of no correlation: t(63) = -8.33492, with two-tailed p-value 0.0000

Source: own study.

Different Competitive Strategies in the CEE-5 Countries

Decomposing $NULC_{PPP}$ into monetary and social dumping, by applying expressions (10) and (11), we obtain the results showed in Figures from 2 to 6. Both monetary dumping and social dumping are factors determining manufacturing cost competitiveness advantage in each of the CEE-5.

As regards the different components of social dumping, we can observe that: a) welfare dumping deriving from lower social contributions is a common feature of all CEE-5; b) fiscal dumping deriving from lower taxes on labour is of limited scale; and c) wage dumping deriving from lower net wages share in net product is present only in the Czech Republic and Poland. Turning to a dynamic overview, the descriptive analysis confirms and clarifies the meaning of the general trade-off between social and monetary dumping revealed in the previous paragraph. The size of monetary dumping has increased from the outbreak of the economic and financial crisis in 2008-2009, following an initial period of monetary convergence within the EU. There are, however, substantial differences between countries. The first group (Czech Republic and Poland) experimented a significant reduction in monetary dumping, in contrast to the second group (Hungary, Bulgaria and Romania) for which the monetary factor has assumed an ever more important role in underpinning manufacturing competitiveness. The picture that emerges from the analysis of social dumping is very different. The increasing role of social dumping represents the principal factor of manufacturing competitive advantage for the first group, while for the second group the importance of social dumping is declining or even disappearing, as is the case of Bulgaria.

The different competitive strategies adopted by the CEE-5 are clearly highlighted in Table (6). This shows the Spearman rank correlation coefficients between time and the CEE-5 cost advantage and various form of dumping, as defined above, to detect the temporal trend of the variables. In contrast to other parametric technique, like the more usual Pearson's product-moment correlation, Spearman's non parametric correlation test does not require normal distribution of the data and a large sample size (Gauthier, 2001; Bishara & Hitter, 2012), and therefore it is more suitable for our analysis. A negative sign of coefficients indicates an increasing CEE-5 cost advantage and dumping during the period, while a positive sign a decrease in them. Although it is impossible for some variables to reject the null hypothesis of no temporal trend, the results are still a meaningful source of information for a descriptive analysis.

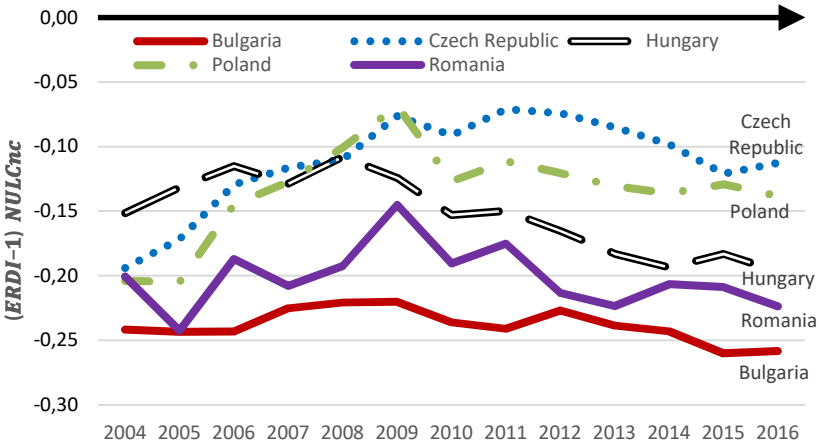

Figure 2. Monetary dumping in the EU manufacturing industry, 2004-2016
Source: own elaboration based on Eurostat Database.

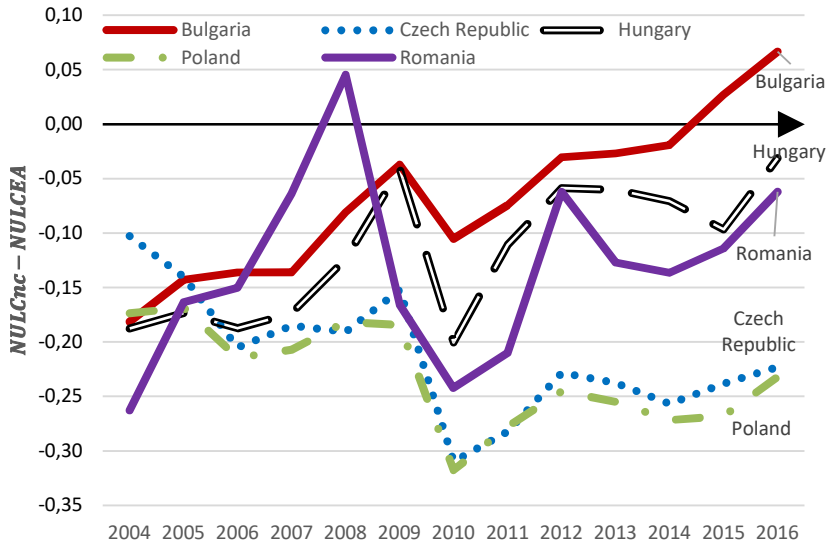

Figure 3. Social dumping in the EU manufacturing industry, 2004-2016
Source: own elaboration based on Eurostat Database and the European Commission.

The competitive temporal dynamic of the two groups is exactly the opposite during the period. The Czech Republic and Poland gain manufacturing cost-competitiveness by a process of real currency appreciation and a widening wage gap, in all its three dimensions, with respect to the EA. On the contrary, Bulgaria, Hungary and Romania lose manufacturing cost-competitiveness because their real currency depreciation is unable to compensate for the narrowing gross wage gap with respect to the EA.

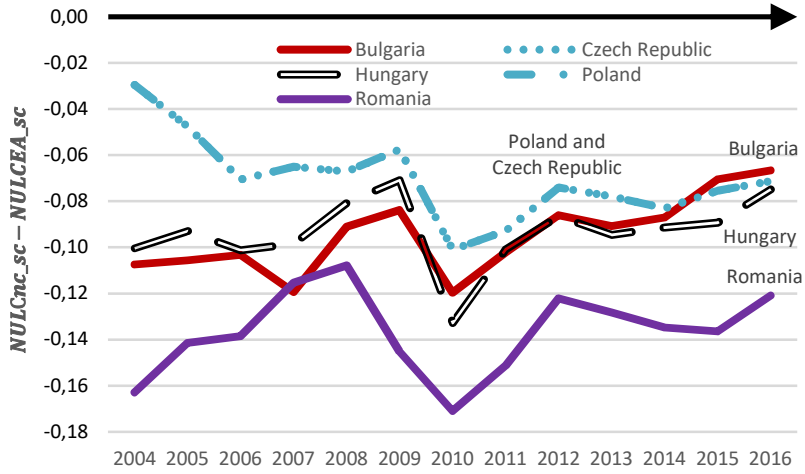

Figure 4. Welfare dumping in the EU manufacturing industry, 2004-2016
Source: own elaboration based on Eurostat Database and the European Commission.

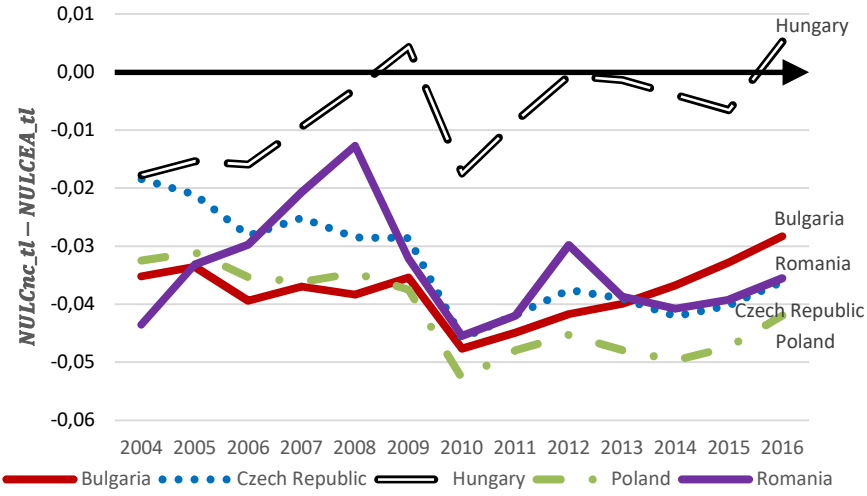

Figure 5. Fiscal dumping in the EU manufacturing industry, 2004-2016
Source: own elaboration based on Eurostat Database and the European Commission.

We can sum up the different competitive strategies adopted by the CEE-5 within the European single market as monetary convergence and wage divergence versus monetary divergence and wage convergence, as shown in Table 7. The strategy that has proven more effective in improving the manufacturing cost-competitiveness is the first, performed by the Czech Republic and Poland, based on limiting labour costs and a relative strong exchange rate policy.

A similar clustering of countries has been found by Noja (2018), on the basis of the features of structural labour market policies in the CEE economies. Lauzadyte-Tutliene,

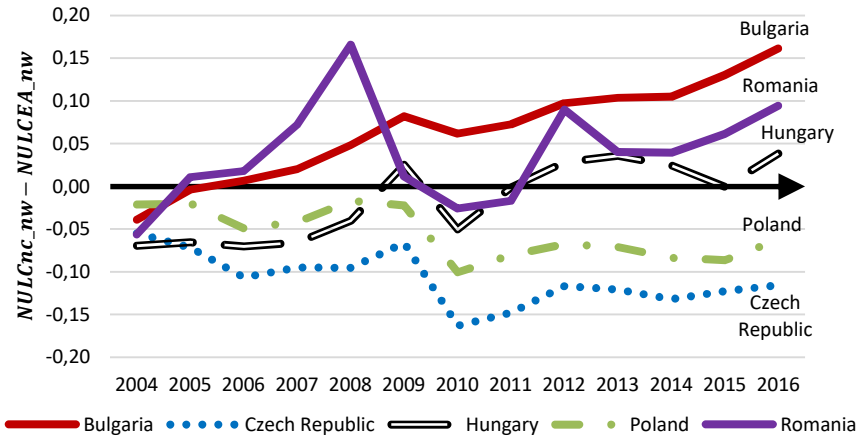

Figure 6. Wage dumping in the EU manufacturing industry, 2004-2016
Source: own elaboration based on Eurostat Database and the European Commission.

Balezentis and Goculenko (2018), instead, categorise Hungary in the first group, alongside the Czech Republic and Poland, by clustering the CEE welfare state models. Regarding wage trends, these results are consistent with Oblath, Palócz, Popper and Valentinyi (2015), showing that in the CEE countries the annual rates of changes in real and nominal labour costs are negatively correlated with their initial levels, lower in the second group of the CEE-5, although the decelerating wage convergence after the crisis of 2008 (Galgóczi, 2017). A possible explanation of the different competitive strategies could refer to the different wage level in the two groups of the CEE-5. As shown by Drahokoupil and Piasna (2018), indeed, Bulgaria, Hungary and Romania have the lowest levels of PPP gross and net wages within the EU, significantly below that of Czech Republic and Poland, notably in manufacturing industry. In these countries, therefore, there would be no room for further wage divergence relative to the EU level.

Table 6. Spearman Rank Temporal Correlation Coefficients of CEE-5 Cost Advantage and Various Form of Dumping

Country	*Cost advantage*	*Welfare dumping*	*Fiscal dumping*	*Wage dumping*	*Monetary dumping*	*Social dumping*
Group 1						
Czech Republic	-0.5824 *(0.0436)*	-0.6813 *(0.0183)*	-0.7527 *(0.0091)*	-0.6703 *(0.0202)*	0.4780 *(0.0977)*	-0.6923 *(0.0165)*
Poland	-0.4010 *(0.1647)*	-0.5384 *(0.0621)*	-0.7252 *(0.0120)*	-0.6923 *(0.0165)*	0.2087 *(0.4695)*	-0.6868 *(0.0174)*
Group 2						
Bulgaria	0.8736 *(0.0025)*	0.7417 *(0.0102)*	0.0714 *(0.8046)*	0.9835 *(0.0007)*	-0.2692 *(0.3510)*	0.9670 *(0.0008)*
Hungary	0.5054 *(0.0799)*	0.4010 *(0.1647)*	0.6593 *(0.0224)*	0.8351 *(0.0038)*	-0.7857 *(0.0065)*	0.7032 *(0.0148)*
Romania	0.2472 *(0.3917)*	0.3076 *(0.2865)*	-0.2362 *(0.4131)*	0.4560 *(0.1142)*	-0.2857 *(0.3223)*	0.4340 *(0.1327)*

In parenthesis the two-tailed p-value of the null hypothesis of no correlation is shown.
Source: own study.

Table 7. Competitive Strategies of CEE-5 Countries

Competitive strategy	**Wage divergence**	**Monetary divergence**
Wage convergence	–	Bulgaria, Hungary, Romania
Monetary convergence	Poland, Czech Republic	–

Source: own study.

CONCLUSIONS

In recent years, within the EU, the spatial distribution of the manufacturing production has been characterised by a process of relocation from Western countries towards the new CEE member states. This trend has raised much popular and political debate about suspected practices of unfair competition within the European single market, in the form of macroeconomic dumping by the CEE countries. The aim of this article has been to define and estimate the extent of different possible forms of macroeconomic dumping performed by five CEE countries (Bulgaria, Czech Republic, Hungary, Poland and Romania) in the manufacturing industry in the aftermath of the Eastern EU enlargement (2004-2016). In particular, social dumping, deriving from lower welfare benefits, net wages and taxes on labour, and monetary dumping, deriving from real currency undervaluation with respect to EUR, has been analysed. The methodology relied on panel data econometrics and descriptive statistical analysis based on an appropriate decomposition of Nominal Unit Labour Cost expressed in PPP, in order to assess for different forms of dumping. The main limitations concern the small size of data set, reducing the statistical significance of estimation. Further research could extend the period under observations to obtain more consistent estimations, and apply the methodology to another situation within and outside the EU, to compare the relevance of macroeconomic dumping in the current world economy.

The main results can be summarised as follows: a) each of the five CEE countries has a cost competitiveness advantage in the manufacturing industry relative to the EA; b) during the period considered (2004-2016), the Czech Republic and Poland increased their relative cost competitiveness, while in Hungary, Bulgaria and Romania the cost competitiveness decreased; c) for each of the CEE countries, the relative cost advantage derives from lower labour costs, so denoting the presence of macroeconomic dumping; d) both forms of dumping, social and monetary, are relevant in explaining CEE-5 production and exports performance in the manufacturing industry; e) social, and particularly monetary dumping are factors hindering progress in CEE-5 labour productivity; e) CEE countries are distinguished by two different competitive strategies since the Czech Republic and Poland manufacturing cost advantage relies essentially on social dumping, while Hungary, Bulgaria and Romania on monetary dumping; e) with regard to forms of social dumping, welfare dumping is present in each of the CEE countries, fiscal dumping plays a very limited role, and wage dumping is present only in the Czech Republic and Poland; f) the competitive strategy based on social dumping has achieved better results, in terms of manufacturing cost-competitiveness, than monetary dumping strategy.

In conclusion, in the early stages of the economic integration of the CEE countries within the institutional framework of the EU, the presence of competitive advantage deriving from lower labour cost, as a consequence of some form of macroeconomic dumping,

cannot be deemed as a practice of unfair competition incompatible with the common market. Account must be taken of the initial differences in economic development between the transitional CEE economies and the mature market economies of Western member states. This fact, however, should be regarded as a temporary situation required to promote a process of convergence of technological, organisational and structural efficiency in industrial production, as well as of social and labour conditions. If this does not occur, dumping practices represent an obstacle to the development and modernisation of the economies.

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Why Do Companies Go Public? Evidence from the Prague Stock Exchange

Martina Skalická, Marek Zinecker, Adam P. Balcerzak, Tomáš Meluzín

ABSTRACT

Objective: In this article, we intend to contribute evidence in regard to going public motivation on a sample of companies that launched an IPO at the Prague Stock Exchange between 2004 and 2017.

Research Design & Methods: In order to evaluate the prevailing motives for the IPO launch, we design and apply a set of composite indicators the values of which may be understood as an indication of the extent to which IPO launch motives originate in the zone of the issuing company's needs or in the zone of interest of its owner (owners).

Findings: Our main conclusion is that the dominant going public motivation is to allow current shareholders to cash out and to enhance the company´s publicity and image.

Implications & Recommendations: Since the study disclosed that the prevailing motive of primary issues at the Prague Stock Exchange was the exit of investors and enhancing publicity and image we suggest that companies launching the Prague Stock Exchange in recent years were predominantly determined by non-financial aspects. Thus, the research findings represent substantial implications for issuers, investment bankers, the stock exchange, and macroeconomic policy makers when the concept of incentive schemes how to increase the attractiveness of the local capital market will be proposed.

Contribution & Value Added: Our set of composite indicators allows to assess not only the predominant IPO motive zone, but also measure the intensity of the motives. This helps to understand better the urgency of the needs of the issuing companies satisfied by the IPO implementation.

Article type: research article

Keywords: Financial Economics; IPO; Prague Stock Exchange; IPO motivation

JEL codes: G32, G29

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INTRODUCTION

There is a generally shared definition that an initial public offering (IPO) is the very first sale of stocks to the public to raise capital, which allows the corporation to conduct a substantial expansion of its business activities. IPO implementation in its nature means raising external financing that is very often seen as a manner how to reduce leverage and thus bankruptcy risk as going public increases the equity ratio (e.g. Myers, 1984; Breinlinger & Glogova, 2002; Kljucnikov & Belas, 2016; Michalak, 2016; Ivanová, 2017; Valaskova, Kliestik, & Kovacova, 2018; Mackevičius, Šneidere, & Tamulevičienė, 2018; Zemguliene & Valukonis, 2018).

Even after almost thirty years after the beginning of the economic transformation, the Czech capital market has remained underdeveloped compared to its well-developed counterparts in the European Union (Berk & Peterle, 2016; Lyócsa, 2014). The financial market has been dominated by banks and the Prague Stock Exchange (PSE) has failed to fulfil one of the primary tasks the stock markets traditionally play, i.e. it fails to function as a place where companies would launch primary issues to raise equity (Meluzín, Zinecker, & Lace, 2016; Balcerzak, Kliestik, Streimikiene, & Smrčka, 2017).

The issue of external IPO drivers in the context of the Prague Stock Exchange (PSE) has been addressed, for instance, by Meluzín *et al.* (2017, 2018 a, b), Peterle and Berk (2016), Meluzín and Zinecker (2014), Lyócsa (2014) and Roženský (2008). These studies have emphasized that a small number of primary issues at the PSE is caused by the low liquidity of the domestic capital market as only a small volume of issues has been actively traded. Moreover, the current excess of liquidity in the banking sector resulting in accessible and cheap loans and financing provided by foreign parent companies have been discussed. Firm-specific factors represent another category of factors that might motivate a company to go public or deter it from launching public equity markets (Skalická Dušátková, Zinecker, & Meluzín, 2017). The phenomena of information asymmetry, information disclosure, losing control over the company or IPO failure risk have received fairly substantial support in the academic studies (Myers, 1984; Myers & Majluf, 1984; Chemmanur & Fulghiery, 1999; Fontinelle, 2015; Isniawati, Rahmawati, & Gunardi, 2018). In a survey based study, Meluzín, Zinecker and Lace (2016) deliver evidence that the most important IPO motivations among Czech companies include enhanced publicity and reputation and establishment of the firm´s market value. Surprisingly, Czech companies do not feel motivated by raising external equity capital.

In this article we aim to contribute evidence in regard to going public motivation on a sample of companies that launched an IPO at the Prague Stock Exchange between 2004 and 2017 (initially, 2004 is the year when the first IPO was carried out at the PSE). This article differs from previous studies by the chosen research methodology consisting in designing and applying an original decision tree and a set of composite indicators, which serve as a tool for identifying whether the reason for the IPO launch is located in the investor's or the issuer's zone and whether the motives of the surveyed entities are of a financial or non-financial nature.

The research questions of this study are based on the motives of the IPO discussed in the academic literature and their insufficient mapping in the context of the Czech capital market. The research questions are as follows: *In the case of the companies carrying out the IPO in the context of the Czech capital market, have there been predominant motives*

on the side of the issuer or its owner (owners)? Were the IPOs primarily motivated by raising capital or by reasons of non-financial nature?

We believe that the research results presented in this study will be of particular benefit to the stock exchange when formulating a strategy to increase the attractiveness of the organised capital market for issuers and investors. For the same reason, the results are inspiring for legislative and executive institutions, as a functioning capital market is undoubtedly a tool for increasing the country's economic potential, as stated in the 'Entrepreneurship 2020 Action Plan', approved by the European Commission (2012).

The rest of this article proceeds as follows. First, we provide an overview of the methodological approach. Next, we calculate financial ratios and interpret research findings. The final sections discuss and summarise the main conclusions.

LITERATURE REVIEW

Recently published studies on external factors that may have influence on IPO decision making examine explanatory power of GDP and industrial production growth, interest rates, sentiments on financial markets and regulatory constraints (e.g. Rydqvist & Högholm, 1995; Ljungqvist, 1995; Ritter, 2011). Detailed academic research on IPO drivers on firm-specific level suggests that the decision to go public arises from corporate characteristics (size, age, the industry market-to-book ratio), as well as from the consequences public offerings have for investment and financial behaviour (Pagano Panetta, & Zingales, 1998; Breinlinger & Glogova, 2002). It should be remembered that these factors can differ depending on the region according to the degree of knowledge and information, as well as the efficiency of communication for the existing financing methods, as mentioned by Nicolescu and Tudorache (2017). In this context, the issue of financing or raising capital for projects through different strategies is one of the basic problems of corporate financial management (Vasilescu, Dima, & Vasilache, 2009).

According to the pecking-order theory (Myers, 1984; Myers & Majluf, 1984), raising capital via IPO comes into consideration when retained earnings, the financial resource with the lowest cost of capital and zero adverse-selection problems, and external capital in the form of bank loans have been exhausted. Thus, going public is interpreted as the last option how to raise capital as the cost of equity including IPO funds has been considered to be higher than the cost of debt financing (e.g. Pratt & Grabowski, 2008).

The range of motives for the IPO launch may be, however, much broader than just 'merely' securing capital resources for further development. IPO objectives may not be of immediate financial nature. Helwege and Liang (2004) report that the IPO might also represent a form of the full or partial exit of the current owners who invested in the company at an early stage of its development, e.g. in the role of business angels or venture capitalists. A number of other studies indicate that the motives for the IPO launch may consist of trying to build public relations; this includes, for instance, the company's visibility in the media, the formation of the desired perception of the company in the public eye, or influencing the perception of the business sector in relation to its viability and risk (Brau, Francis, & Kohers, 2003; Maksimovic & Pichler, 2001; Mentel, Brożyna, & Szetela, 2017). A possible IPO motive may consist in optimising the assets portfolio of the existing owners who retain control in the company, yet selling part of their shares allows them to release their capital tied up in the shares of the issuing company and subsequently used for other investments,

repayment of debt, paying off the minority shareholders, etc. (Paeglis & Veeren, 2013). As one of the motives of the IPO launch, Sullivan (1965) also mentions the possibility of using the issue proceeds for future mergers and acquisitions, extending the options to obtain additional financing in the future or increasing the attractiveness of the company when recruiting managerial talent through share options. From the perspective of the existing shareholders, the creation of a market with the shares of the issuing company serves as an important motive, resulting in increased liquidity (Kim & Weisbach, 2008).

A number of studies emphasise the fact that IPOs are more common in fast growth sectors (Helvege & Liang, 2004). The reason for the IPO launch may thus consist in the urgent need to make the necessary investments (or acquisitions) to maintain a position in the growing market and at the same time to reduce the risk carried by the current owners, as the rapid development of the industry / business usually reduces the capacity to predict further developments with sufficient precision.

Pagano *et al.* (1998) believe that the reason for the IPO does not simply lie in the financing of development investments; the primary motive is seen particularly in the effort to rebalance the capital structure of the company following a period of high investment and dynamic development. Pagano *et al.* (1998) further emphasise that going public improves the bargaining position towards banks and reduces debt costs as well as the share of bank finance in the capital structure. Auret and Britten (2008) emphasise that IPO yields are often used to repay existing debts.

Among other things, Brau, Francis and Kohers (2003) assume that the reason for the IPO launch may also include a fragmented ownership structure increasing the premium when taking over the company. Pagano *et al.* (1998), Brau and Fawcett (2006), Meluzín and Zinecker (2014), and Meluzín *et al.* (2016, 2018a,b) summarise the motives for the IPO launch as follows: they consider the financial motive to be the most frequent one, i.e. obtaining the funds for the purposes of development investments, acquisitions or financial restructuring. What is also equally important are non-financial motives stemming from the efforts to strengthen the bargaining position towards banks, increase the visibility of the company and raise the liquidity of the company shares.

The novelty of this study is twofold. On the one hand, it presents empirical evidence in regard to going public motivation on a sample of companies that launched an IPO at the Prague Stock Exchange in the last two decades. On the other hand, in this article we adjust and complement existing methodological approaches how to asses IPO motives by designing an original decision tree and a set of composite indicators.

MATERIAL AND METHODS

The research sample consists of IPOs carried out by private-sector business entities at the PSE in the period of 2004-2017. The year 2004 serves as the starting point of the research, as no primary issue was carried out at the PSE until 2004. The total number of IPOs realised at the PSE reached 11. Appendix A summarises the key characteristics of the conducted IPOs.

The source of data for analysis includes, in particular, the prospectuses of the issuers and their financial statements in the period before and after implementing the IPO. The data was taken from the Bloomberg database (2018). In addition to the methods specified below, the applied analytical methods include the content analysis of the documents, the analysis of the selected financial indicators, and the comparison method.

Based on the literature dealing with the factors influencing the IPO implementation (e.g. Röell, 1996; Rydqvist & Högholm, 1995) and the results of the previous empirical studies in the context of the Czech Republic (Meluzín, Zinecker, & Lace, 2016), we defined a set of variables serving as a tool for identifying the reasons for the IPO launch using a sample of the examined companies. The results are subject to comparison with the officially declared prospectuses of individual issuers.

The development of selected variables (financial indicators) was examined up to two years before and two years after the IPO launch. Specifically, this includes the variables of '*Leverage*', reflecting the development of the balance sheet total to equity, '*Size*', reflecting the development of the balance sheet sum, '*Investment*', expressing the development of long-term fixed assets, '*Currencies*', expressing cash development, '*Loans*', reflecting the development of interest-bearing debt, and '*Growth*', expressing the development of sales. Table 1 summarises the examined variables and their calculation.

Table 1. Summary of examined variables and their calculation

Variable	Definition/Calculation
$Leverage_{(t-1)}$	$assets_{(t-1)}$/book value of $equity_{(t-1)}$
$Leverage_{(t+1)}$	$assets_{(t+1)}$/book value of $equity_{(t+1)}$
Size	$assets_{(t+1)}/assets_{(t-1)}$
Investment	fixed $assets_{(t+1)}$/fixed $assets_{(t-1)}$
Currencies	$currencies_{(t+1)}/currencies_{(t-1)}$
Bank	$loans_{(t+1)}/loans_{(t-1)}$
$Growth_{(t-1)}$	$revenues_{(t-1)}/revenues_{(t-2)}$
Growth	$revenues_{(t+1)}/revenues_{(t-1)}$
$Growth_{(t+1)}$	$revenues_{(t+2)}/revenues_{(t+1)}$

Source: own study.

The low index *(t)* in the previous table indicates the moment (year) of the IPO launch; the index *(t-1)* indicates the time of the last financial statements prior to the IPO implementation, and the index *(t+1)* indicates the time of the financial statements immediately following the IPO launch. By analogy, the low indexes *(t-2)* and *(t+2)* indicate the dates of the second annual financial statements prior to / following the IPO implementation.

However, the size of the change in these indicators is not always a tool for identifying real motives on the part of the issuers. These are cases where actual intentions on the part of the issuers have not been fulfilled (see, for example, the lack of interest in the issue of Pivovary Lobkowicz Group or a sharp change in market conditions in the case of AAA AUTO Group N.V.). Thus, the intentions of issuers often face up to the constraints imposed by the development of external conditions. Therefore, for the purposes of assessing the IPO launch motives, we did not limit ourselves only to the parameters of the IPOs, but we also focused on the parameters defined in the issuer's prospectuses (which may not have always been completely fulfilled).

For this reason, the scope of our interest also includes studying the issuers' declarations (included in the prospectus) on the expected use of the capital raised by selling the shares. The evaluated information for assessing the reasons for the IPO launch included the issue structure (planned and actual), i.e. the portion of the offer of primary or secondary shares in the total offer.

In the first phase, we focused on the question whether the motive for the IPO launch lay primarily in the issuer's zone or in the zone of its owner (having an influence on the issuer). On the basis of relevant literature and interviews with experts, the set of indicators shown in Table 1 was supplemented with the indicators evaluating the issue structure (Table 2). The assumed values of the indicators (at this stage expressed only by the range of assumed values) were assigned the source of the motive (in the issuer's zone or in the zone of its owner).

Table 2. IPO structure indicators

Indicator	Indicator value	Related motive
Share of secondary stocks in the IPO value	High	Motive in the owner's zone
	Low or zero	Motive in the issuer's zone
Share of secondary stocks held by current shareholders before the IPO launch	High	Motive in the owner's zone
	Low	Motive in the issuer's zone
IPO offer reduction in the section of primary stocks	–	Motive in the owner's zone
IPO offer reduction in the section of secondary stocks	–	Motive in the issuer's zone
Increasing the number of stocks after the IPO	High	Motive in the issuer's zone

Source: own study.

In order to assess the prevailing motives of the IPO launch, we proceeded using the following decision-making tree (Figure 1).

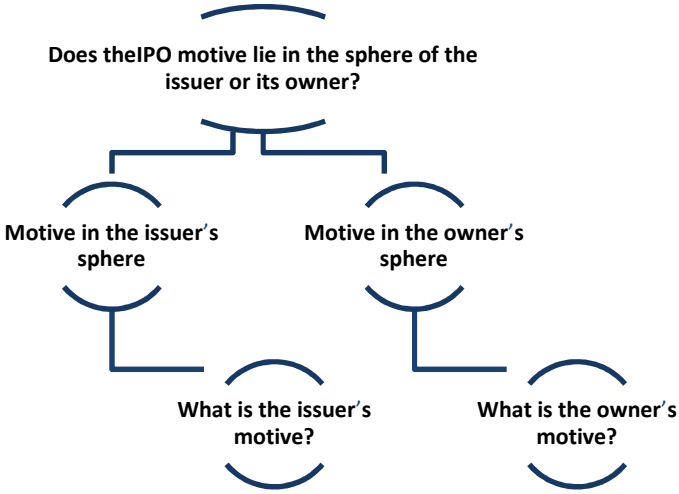

Figure 1. Decision-making tree for determining the prevailing motive of the IPO launch
Source: own elaboration.

In order to answer the question on the first level of the decision-making tree, the composite indicators were defined combining three partial indicators as follows:

$$Zone\ motive\ importance = (\text{IPO Share}) * (\text{IPO Size}) * (\text{IPO Reduction}) \quad (1)$$

The first indicator is the portion of primary and secondary shares in the IPO value (IPO Share). The indicator may acquire the values in the interval of <0;1>. The portion of secondary shares in the total offer is calculated as follows:

$$IPO\ Share = offer_p/(offer_p + offer_s) \quad (2)$$

where:

$offer_p$ - the number of primary shares;

$offer_s$ - the number of secondary shares.

The second indicator represents the importance of the offer of primary or secondary shares. The basic measure consists in the number of shares already issued, to which the number of new shares in the primary offer and the number of shares sold by the investor are measured. The portion of secondary shares in the total offer may acquire the values from the interval <0;1>. The ratio between the number of primary shares and the number of shares already issued may acquire the values higher than one. Since realising the offer of primary shares also implies the abandonment of part of the control over the company by the original owners but to a lesser extent (a primary offer of 100% of the original shares means a loss of control of 50% of the voting rights; 200% of the original shares represents a loss of 2/3 of the voting rights), the intended size of the portion of the primary shares offer is normalised with respect to the number of shares before the IPO at the interval <0;1). The loss of control is expressed as follows:

$$IPO\ Size = s_p/(s_p + 1) \quad (3)$$

where:

$IPO\ Size$ - the normalised size of the offer of primary shares in relation to the original number of shares before the IPO;

s_p - the portion of the offer of primary shares in the total number of shares before the IPO.

The third indicator used for determining the IPO importance in terms of the existing owner or issuer is the manner of reducing the issue volume in the case of insufficient demand of subscribing investors. The level of insufficient interest may be expressed as the share of the actually sold shares within the IPO and the maximum intended number of sold shares within the IPO. This total level of insufficient interest in the IPO by subscribing investors may then be compared with the allocation of the subscription between the offer of primary and secondary shares (a higher reduction share in one part of the offer expresses a higher interest in the realisation in the second part of the offer). The share of the reduction in the part of the offer of primary shares and the total IPO offer may acquire the value in the interval <0;∞):

$$Reduction\ ratio\ of\ primary\ offer = r_p/r_T \quad (4)$$

where:

r_p - the ratio of the actually subscribed primary shares in the total offer;

r_T - the ratio of the actually subscribed shares in the total offer.

The value 1 corresponds to the balanced reduction (in the same ratio) in the offer of primary shares and in the total IPO offer. Normalising this ratio to the interval <0;1) corresponding to other indicators will be reached by dividing the value of the indicator with itself and adding the value 1 in the denominator. The value 0.5 corresponds to the fact that satisfying the offer of primary (or secondary) shares is the same as satisfying the offer within the whole IPO; the values under 0.5 correspond to a lower allocation in the segment of the primary shares offer, while the values above 0.5 correspond to a higher allocation

in the segment of the primary shares offer. Following the adjustments, the normalised indicator may be recorded as follows:

$$IPO\ Reduction = r_p/(r_p + r_T) \tag{5}$$

The combination of the three parameters specified above indicates whether the motivation for the IPO launch lies on the side of the issuing company or on the side of the selling investor. Offers of primary and secondary shares compete with each other. Increasing the number of shares in one of the offers jeopardises the successful implementation in the second part of the offer. Therefore, the share of individual offers in the total offer was monitored. The importance of the offer of the primary shares for the issuing company and the offer of the secondary shares for the existing owner is evaluated on the basis of the size of the existing owner's share before the IPO and the size of the issue. The ratio of offers to the size of the issue is used for this purpose. In the event that the issuer faces a limited interest in the offer, they decide which parts of the offer of shares (primary or secondary) should be given priority. In this case, it is an ex post indicator of the 'IPO importance'. Reducing the offer satisfaction in one of the segments indicates the importance of the IPO to satisfy the interests in the second segment.

We define the indicator of the power of interest on the issuer's side (I_p) as follows:

$$I_p = \frac{offer_p}{offer_p + offer_s} * \frac{s_p}{s_p + 1} * \frac{r_p}{r_p + r_T} \tag{6}$$

By analogy, we define the indicator of the power of interest on the investor's side I_s on the basis of the following formula:

$$I_S = \frac{offer_s}{offer_p + offer_s} * s_p * \frac{r_s}{r_s + r_T} \tag{7}$$

Following the identification of the prevailing zone of the motive for the IPO launch (in the sphere of the issuer or the owner), the assessment focuses on the development of selected financial indicators of the issuing company (Table 1). This results in identifying the prevailing motive for the IPO launch, i.e. whether it is related to the issuing company or its owner. More specifically, attribution of motives is based on the ex post analysis of financial indicators and on the assumption that the indicators that changed significantly after the IPO launch could have been affected by the IPO or vice versa, their pre-IPO values led to the decision to carry out a primary share issue.

RESULTS AND DISCUSSION

In order to assess the primary motive of the IPO launch, i.e. whether it is located in the zone of the existing owners or the issuing company, we assessed the share of the planned offer of primary and secondary shares in the total issue. Table 3 (line 5) shows the ratio of the offer of primary shares. The table also contains further information on planned and actual parameters of the examined IPOs.

On the basis of the values of the indicators specified in Table 4, we assess whether the motives of the IPO implementation at the PSE in 2004-2017 prevailed in the zone of the issuing company or in the zone of the investor.

The results specified in Tables 3 and 4 imply that the motive to offer primary shares was the strongest in the case of the following companies: ECM, AAA and VGP. On the

other hand, the motive to offer secondary shares was the strongest in the case of the following companies: companies Moneta, E4U, Fortuna and NWR. The balance of the motives may be identified in the case of: Pegas or Lobkowicz and Zentiva. A weak motive of the IPO implementation both on the side of the issuer and the existing owner may be identified in the case of the Kofola Company.

Table 3. Research results – IPO parameters at the PSE (plan vs. reality, in per cent)

	Issuing Company	Moneta	E4U	Lobkowic	Pegas	NWR	Fortuna	Zentiva	ECM	Kofola	VGP	AAA
	IPO year (20..)	16	10	14	06	08	10	04	06	15	07	07
Parameter:												
Plan	Sale of the owner's share	51	49	36	35	28	28	19	13	4	0	0
Plan	Sale of the share in the overallotment	59	49	45	44	33	32	25	13	9	0	0
Plan	Ratio of the primary shares offer in the issue value	0	0	40	44	16	13	43	80	25	100	100
Plan	Ratio of the primary shares offer in the issue value in the overallotment	0	0	35	62	14	11	38	82	13	100	100
Plan	Increase in the number of shares	0	0	25	27	5	4	15	52	1	22	36
Plan	Increase in the number of shares in the overallotment	0	0	25	27	5	4	15	57	1	25	39
Reality	Sale of the owner's share	59	49	2	44	33	32	25	13	6	0	36
Reality	Ratio of the primary shares offer in the IPO value	0	0	91	36	14	11	38	82	18	100	100
Reality	Increase in the number of shares	0	0	25	24	5	4	15	52	1	24	36
Reality	Share of the original shareholders in the registered capital after the issue	41	51	78	45	64	65	66	57	93	81	74
Reality	Fulfilling the IPO intention (Yes/No)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y

Source: own study.

Table 4. Zone of the IPO motive at the PSE (plan vs. reality)

Indicator	Moneta	E4U	Lobkowicz	Pegas	NWR	Fortuna	Zentiva	ECM	Kofola	VGP	AAA
I_p – issuer's interest	0	0	0.06	0.08	0	0	0.03	0.23	0	0.13	0.20
I_s – owner's interest	0.29	0.25	0.04	0.09	0.14	0.14	0.08	0.01	0.04	0	0
I_p-I_s	-0.29	-0.25	0.02	-0.01	-0.14	-0.14	-0.05	0.22	-0.04	0.13	0.20

Source: own study.

In the case of Moneta and E4U, the ratios of the planned offer of primary and secondary shares obviously indicate that the primary motive of the IPO launch was in the zone of the existing owner (shareholder). In the first case, 51% share of the original owner is sold, and in the second case 49% share of the original owner is sold without offering any primary shares. On the contrary, the primary IPO motive in the issuer's sphere may

be unambiguously identified in the case of the VGP and AAA Companies. Within these IPOs, the offer of secondary shares was not realised (or even planned) and all the IPO proceeds (after deducing transaction costs) served to increase the registered capital of the issuing company. A similar result (91% of the offer of primary shares) may be identified in the case of Pivovary Lobkowicz, where the actual result, however, does not correspond to the intention. According to the prospectus, the intended ratio of the primary shares offer in the IPO value amounted to mere 35% (in the overallotment). Owing to the insufficient demand for shares, however, the issuing company and the owner preferred the interest of the company. In the case of the remaining issues, the motives of the IPO launch may be seen both in the zone of the issuer and its owners.

If we consider the IPO motives from the perspective of the existing shareholders who wish to sell their share, the criterion for assessing the fulfilment of this intention consists in the size of the sold share in the registered capital. If we consider the IPO importance from the issuer's perspective, where raising capital is perceived as a key motive, the assessment criterion includes the size of the offer of primary shares in relation to the number of shares before the IPO (other measures, such as the financial effect of the IPO in relation to the registered capital of the issuing company or the balance sheet sum of the issuer after the IPO, may also be considered).

Table 3 shows the IPOs ranked in the descending ratio of the offer of secondary shares in the ownership interest of the existing shareholders. In the case of Moneta and E4U, the results imply high ratios of the offer of secondary shares in the IPO value. In the case of the Pivovary Lobkowicz and Pegas Companies, the ratio of the secondary shares offer in the ownership of the existing shareholders also reaches high values (under the overallotment of 45% or 44% respectively), nevertheless, these cases are marked with the combination with the interest in the issuer's zone (the ratio of the primary shares offer in the IPO amounts to 35% and 62% respectively under the overallotment). The intended increase in the number of shares as a result of the primary shares offer reaches high values (Table 3, line 6) in comparison with the IPOs consisting only of the offer of primary shares (VGP or AAA). The intention was not completely fulfilled even in the case of Pivovary Lobkowicz and Pegas. In the case of Pegas, the plan was fulfilled at 95%, while it was reduced mainly in relation to the target in the issuer's zone. In the case of Pivovary Lobkowicz, however, the plan was fulfilled at merely 39%, whereas the target in the issuer's zone was fully preferred. The indicators shown in Table 6 serve to specify the IPO motives (the zone of the issuer or the existing owner – shareholder).

Using the values of the financial indicators and their changes (Table 5), we may draw inferences on the likely IPO motives. In the case of Pegas and Pivovary Lobkowicz, the likely motive seems to be the efforts to change the financial structure. In the case of Pegas, the leverage value reached 18.3 before the IPO. Pivovary Lobkowicz even had the negative equity. Following the IPO, neither company saw an increase in the assets (size) or a substantial increase in revenues (in the case of Pivovary Lobkowicz, revenues were stagnating, while in the case of Pegas, the growth rate weakened). In the case of these issuers, the primary IPO motive may be seen as stabilising the financing structure.

The third IPO group with common features includes the issues of NWR and Fortuna. For both IPOs, the offer of secondary shares represents approximately 1/3 of the ownership interest of the existing shareholders and an increase in the number of shares in the

post-implementation phase is only 4% or 5%, respectively. The ratio of primary shares in the IPO value is limited in both cases (11% and 14% respectively under the overallotment). The IPO for NWR seems to have served to reduce leverage. However, the IPO yields were not used to reduce indebtedness, but for operating purposes (the growth of long-term assets lags behind an increase in the balance sheet sum). Although the company's sales were growing at a high pace, the physical volume of production did not change significantly (the sales growth was influenced by rising coal prices).

Table 5. Development of selected financial indicators of the issuing companies in the period before and after the IPO at the PSE

Issuing Company	IPO year	Leverage (t-1)	Leverage(t+1)	Size	Investment	Currencies	Bank	Growth(t-1)	Growth	Growth(t+1)
Zentiva	2004	3.2	1.3	9%	10%	-19%	-93%	27%	N/A	6%
Pegas (2006)	2006	18.3	3.2	-1%	2%	-22%	-19%	50%	10%	1%
Pegas (2007)			2.8	4.8%	17%	-98%	-26%			
ECM	2006	N/A	3.8							
AAA (2007)	2007	5.6	4.1	57%	69%	85%	33%	29%	35%	-23%
AAA (2008)			9.8	0%	20%	6%	5%			
VGP	2007	1.8	3.1	42%	76%	-92%	53%			
NWR	2008	5.4	3.5	11%	2%	43%	-4%	11%	49%	-45%
Fortuna	2010	3.0	1.8	-21%	-29%	17%	-26%	-6%	-7%	9%
Pivovary Lobkowicz	2014	-2.6	1.4	-9%	-10%	11%	-57%	0%	-1%	0%
Kofola (2015)	2015	2.9	3.0	-0%	2%	241%	121%	14%	-2%	-2%
Kofola (2016)			2.9	35%	18%	150%	115%			

Source: own study.

In the case of Fortuna, there were significant changes in the structure of assets and liabilities due to accompanying transactions related to the IPO preparation. The impact of the IPO on the capital structure may thus be assessed as limited. The company did not record a significant sales growth, either. Similarly to NWR, even in this case, the offer of primary shares may be perceived as complementary to the secondary shares offer. The investor's exit seems to be the decisive motive of the IPO implementation. In such a case, the IPO may be affected by the attempts to act on prospective buyers in the sense of future plans and perspective of the issuer; however, the owner makes use of the benefits owing to the information asymmetry and sells overpriced shares (Ritter, 1991; Loughran & Ritter, 1995).

With its ratio of the offer of primary and secondary shares, the IPO of the Zentiva Company corresponds to the IPOs of Pivovary Lobkowicz and Pegas. The IPO appears to be insignificant, both from the point of view of the issuing company and the existing owner. The intention of the existing shareholder was to sell not more than 25% of its stake in the issuer's company (vs. 44-45% in the case of Pegas and Pivovary Lobkowicz) and the expected maximum increase in the number of shares amounted to 15% (vs. 25-27% for Pegas and Pivovary Lobkowicz). The motives for IPO implementation can therefore be considered less intense in the case of Zentiva, albeit similar. The investor pursued a partial exit and, in the case of the

issuer, the main reason consisted in the change in the financial structure (reduction of financial leverage and repayment of interest-bearing debt), as well as the need for the growth of the company (reflected in assets growth, fixed assets growth and sales growth).

In the case of ECM, the intended ratio of the primary shares offer reached up to 82% under the overallotment. This makes the issue unequivocally different from other combined offers, thus approaching the IPOs with the offer of primary shares (VGP or AAA). The investor intended to sell 13% of their original shareholding, while the primary offer could reach up to 57% of the increase in the number of shares (the highest out of the examined values). It may thus be stated that the primary motive for the IPO implementation lay in the issuer's sphere (which is also reflected in the value of the Ip-Is indicator). The issuing company recorded a significant increase in the balance sheet sum. The proceeds from the issue thus served to ensure the possibility of further growth and sustaining the size of the leverage.

In the case of AAA and VGP issues, they exclusively included the offer of primary shares. The IPO motive may thus be identified in the issuer's zone. Both issuers needed to finance their long-term growth. In the case of VGP (developer), the assets in the after-IPO stage grew by 42.4%, whereas the fixed assets grew by 76% and there was also an increase in the volume of loans (+53%) and strengthening the leverage. Raising capital for the expansion purposes may also be considered as a primary motive in the case of AAA. The sales in the period before the IPO and in the year of implementing the IPO reached the growth rate of approx. 30% per year, while in the phase following the IPO, the fixed assets grew by 69%. Even though there was a certain reduction in the leverage, it may be observed that in the period following the IPO, there was a further growth in the received loans (Table 5). In comparison with other IPOs, the need to finance further growth is reflected in the high values of the planned increase in the number of shares (25% or 39% respectively under the overallotment).

The IPO of the Kofola Company differs from all the IPO groups above. Owing to the amount of the intended sale of the interest of the existing owners (mere 3.7%), it is among the issues where the motive to implement the IPO was found solely in the issuer's zone (VGP and AAA). However, the intended increase in the number of shares after performing the IPO in the amount of 1% ranks it among the issues where the IPO motive was found exclusively in the owner's zone (Moneta or E4U). The intended ratio of the offer of primary shares reached 13%, including overallotment. This implies that the prevailing motive was found in the shareholder's sphere. In the case of insufficient interest, however, preference was given to the full satisfaction of the offer of primary shares. Nevertheless, the IPO had a negligible impact on the examined financial indicators. The leverage, the balance sheet sum, and the value of fixed assets remained unchanged following the IPO, yet bank loans increased after the IPO. There was a slight decline in sales in the IPO year and in the immediately following period. The offer of primary shares (even though the intention was completely satisfied in this respect) did not significantly affect the financial and property structure of the issuing company. The IPO volume could not have a more substantial impact. The reasons for implementing the IPO may thus be seen in the non-financial area. The issuer (in this case, a manufacturer of goods intended for end consumers) could strive for raising the visibility in the public eye in this manner (listing the company on a public stock market), and then form one of the possible channels of a future exit.

Table 6 summarises the primary (and other) motives of the IPOs carried out at the PSE in 2004-2017.

The research results show that the prevailing motive of primary issue was the exit of the owner (the IPOs concerned were also the largest in terms of financial volumes). The IPO was usually carried out by companies with an international investor in their ownership structure, carrying out their business activities outside the territory of the Czech Republic. In many cases, these were entities that used the capital market in the past to obtain financial resources. In several cases, the IPO was launched in the form of a dual listing of shares on the domestic and foreign stock market.

The majority of the initial public offerings had the character of a combined IPO (a total of seven cases), in which investors were offered both primary, as well as secondary shares. Only two IPOs may be considered to be purely primary shares offers (AAA Auto and VGP), and only two were purely secondary offerings (E4U and Moneta). In the case of combined IPOs, the ratio of primary shares in the total offer differed significantly. It may be labelled as very low in the case of NWR, Fortuna and Kofola, while a medium ratio of primary shares was achieved in the case of Zentiva and Pegas, and there was a high ratio of primary shares in the case of ECM. The prevailing motive of the offer of secondary shares consisted in the exit of the venture capital fund, valuation of the investment by selling the shares on the stock exchange and publicity of the company due to the subsequent issue of other shares.

Table 6. Primary motive zone and primary and other IPO motives at the PSE

Issuer	Primary motive zone	Primary IPO motive	Other IPO motives
Moneta	Owner	Exit (subsequently overall)	–
E4U	Owner	Substantial exit (release of funds while maintaining control)	–
Pivovary Lobkowicz	Issuer	Financial stability: debt repayment, reducing the financial leverage	Exit
Pegas	Owner	Substantial exit	Financial stability: reducing the financial leverage; growth financing
NWR	Owner	Substantial exit (at the stage of a sharp rise in prices)	Strengthening the financial stability
Fortuna	Owner	Substantial exit (release of funds while maintaining control)	Publicity and strengthening the financial stability
Zentiva	Owner	Partial exit following an acquisition	Financial stability: debt repayment, reducing the financial lever; ensuring further growth
ECM	Issuer	Ensuring further growth	Partial exit
Kofola	Issuer	IPO-related publicity	Possible path to future exist or funds
VGP	Issuer	Ensuring further growth	–
AAA	Issuer	Ensuring further growth	–

Source: own study.

It is also important that the planned intentions of the issue were not always satisfied. This applies in particular to the insufficient demand in the case of the IPO of Pivovary

Lobkowicz. The results were also affected by the share options granted to issuers' managers. The decision on which part of the offer was preferred in the absence of investor interest represents another result indicating the IPO motive zone.

In accordance with financial theories and empirical findings that view an IPO not only as a source of financing but also as channel allowing shareholders to cash out and as a tool how to enhance the company's publicity (Pagano *et al.*, 1998; Maksimovic & Pichler, 2001; Helwege & Liang, 2004), we suggest that companies launching the Prague Stock Exchange in recent years were predominantly determined by non-financial aspects. These findings are also consistent with the survey carried out by Meluzín and Zinecker (2014) and Meluzín *et al.* (2016), who report that one of the main IPO motivation perceived by Polish managers was to enhance 'publicity and corporate image', to increase attractiveness of the company as an employer and to establish the company market value.

CONCLUSIONS

In order to evaluate the prevailing motives for the IPO launch at the PSE in the period 2004-2017, we designed and applied a set of composite indicators the values of which may be understood as an indication of the extent to which IPO launch motives originate in the zone of the issuing company's needs or in the zone of interest of its owner (owners).

We believe that our composite indicators allow to assess not only the predominant IPO motive zone, but also measure the intensity of the motives. This allows better assessment of the urgency of the needs of the issuing companies satisfied by the IPO implementation. The open question remains whether the prevailing IPO motives on the part of the issuing company cannot serve as a precursor of possible future risks for potential investors. Research results show that companies with the prevailing intensity of the motive on the issuer's side (ECM or AAA) faced a significant decline in the value of the issued shares in the future.

In conclusion, it may be stated that in the last decade, the IPOs carried out at the PSE mainly served for the exit of investors, usually selling minority stakes through the IPO, while maintaining control over the issuers (with the exception of Moneta). Raising capital for further development of the company as the primary motive of the IPO implementation was minor, with the tendency of being applied in smaller issuers. However, even in the case of these IPOs, the principle of maintaining control of the original owner over the issuer was applied.

Although the survey methodology proposed and used here reveals new insights into going public motivation, it is also undoubtedly a source of some limitations. Because the sample size is too small, we cannot apply statistical tests to identify whether significant relationships within data set exist. We analysed enterprises operating in a specific macroeconomic and institutional environment, which might have affected the going public motivation.

In follow-up research, we aim to test the proposed methodological approach within a longitudinal research study; thus, the data for upcoming IPOs will be gathered and the methodological tools will be applied and refined if necessary. Using panel data involving more countries might represent another direction for a future research.

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Appendix A: Main characteristics of the IPOs carried out at the PSE in 2004-2017

IPO characteristics	Issuing companies										
	Zentiva	**ECM**	**Pegas**	**AAA**	**VGP**	**NWR**	**Fortuna**	**E4U**	**Lobkowicz**	**Kofola**	**Monet a**
IPO date	28/06/2004	07/12/2006	18/12/2006	24/09/2007	07/12/2007	06/05/2008	22/10/2010	25/08/2011	28/05/2014	02/12/2015	6/5/2016
Offer character	Combined	Combined	Combined	Primary	Primary	Combined	Combined	Secondary	Combined	Combined	Secondary
IPO structure (subscriptions of shares in thousands)											
Primary shares	4,329.90	1,275.00	1,810.00	17,757.8	3,278.69	13,500.0	2,000.00	0.00	2,300.00	275.0	0.00
Increase option	0.00	127.50	0.00	0.00	304.36	0.00	0.00	0.00	110.00	0.00	0.00
Secondary shares	5,670.10	315.03	2,575.00	0.00	0.00	69,513.3	13,830.0	1,171.90	0.00	825.0	260,610
Increase option	1,500.00	0.00	657.75	0.00	0.00	12,452.0	1,194.67	0.00	0.00	400.0	33,113
Subscribed shares (total)	11,500.0	1,717.53	5,042.75	17,758	3,583.05	95,465.4	17,024.7	1,171.90	2,410.00	1,500	293,723
No of shares before the IPO	33,806.3	2,460.00	7,419.40	50,000.0	15,000.0	250,240	52,000	2,391.64	9,388.00	22,020	511,000
No of shares after the IPO	38,136.2	3,862.50	9,229.40	67,757.9	18,583.1	263,740	54,000	2,391.64	11,797.5	22,295	511,000
Free float (%)	30.16	44.47	54.64	26.21	3.28	36.20	35.00	49.00	20.62	6.72	51.00
Structure of investors(%), IPO costs and underpricing											
Institutional	100.00	90.00	90.00	61.00	-	90.00	90.00	-	44.00	83.00	96.70
Retail	0.00	10.00	10.00	39.00	17.00	10.00	10.00	-	56.00	17.00	3.30
Issue price (€/share)	15.21	47.00	27.00	2.00	15.25	16.56	4.29	3.30	5.83	19.83	2.52
Issue size (thousands €)	174,915	80,723.9	136,154	35,515.7	54,641.5	1,580,906	72,952	3,868.45	14,052.5	29,737	739.199
Direct IPO costs (%)	6.60	6.86	7.28	6.76	9.00	5.61	2.74	1.28	5.03	4.87	0.32
Underpricing (%)	4.01	11.70	4.52	0.05	2.30	7.55	0.45	8.00	1.75	0.98	0.07

Source: own elaboration based on prospectus reports.

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An Impact of the Euro Adoption on the International Trade of New EMU Members: the Lithuanian Case

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ABSTRACT

Objective: This article aims to assess the impact of the euro on the Lithuanian international trade by detecting the changes of the relevant economic indicators before and after the country's entry into the Eurozone.

Research Design & Methods: The research is based on the gravity model of trade. The parameters of the model show elasticity of trade in respect of the determinants that are incorporated. The parameters of the model are estimated by the panel least square method.

Findings: The results obtained using the gravity model showed that the euro has significantly increased the Lithuanian intra-Eurozone trade, with an effect of 23-44%. The size of effect depends on the model specification.

Implications & Recommendations: The results can be used to discuss the positive impact of a common currency on the economics of a country. It is important for those EU members which still have not adopted the euro.

Contribution & Value Added: Previous studies showed a different impact of the common currency on trade volumes, and the results depend on many factors, i.e. country, period, method and so on. This research supplements previous studies and reveals that the euro adoption has a positive impact on specifically Lithuanian trade volumes.

Article type: research article

Keywords: economic integration; trade flows; gravity; euro; international trade theory; Lithuania

JEL codes: F15, F33

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INTRODUCTION

Although scientific literature is rich in research on the advantages and possible threats of monetary unions, the benefit provided by the common currency to the economies of different countries still remains a topical issue. Introduction of the common currency in Europe was an important step towards further integration and development of the economies of the EU member states. After the entry into the EU in 2004, Lithuania started the processes of integration in the common Economic and Monetary Union. The first attempt to introduce the euro in 2007 failed due to incompliance with one of the criteria of the convergence (in particular, inflation rate). Later on, the economic recession in Lithuania over the period of the global financial crisis delayed the plans of the common currency introduction. Nevertheless, Lithuania was able to introduce the common European currency on 1 January 2015 and became the nineteenth member of the Eurozone. As already mentioned, participation in a monetary union may have both positive and negative effects. Hence, it is purposeful to assess which economic changes are brought about by adoption of a common currency in each of the countries-participants.

The majority of the studies on the plausible impact of the euro on economies were carried out before the adoption of the common currency in particular countries, and only a small part of the studies focused on the assessment of the effects of the common currency after its introduction. The advantages and disadvantages of the euro adoption in different countries, as well as the impact of the euro on the main directions of national economies were analysed by Borowski *et al*. (2004), Bitans and Kaužens (2004), Šuster *et al*. (2006), Levišauskaitė and Samys (2012) and others. In the case of Lithuania, a plausible impact of the euro on the Lithuanian economy was researched by Kuodis (2005), Kropas and Kropienė (2005), Davulis (2012), The Bank of Lithuania (2013) and others. The aim of the article is to assess the impact of the euro on the Lithuanian international trade by detecting changes of relevant economic indicators before and after the country's entry into the Eurozone.

The article is divided into the following sections. It starts with the theoretical aspects of pros and cons of the common currency, as well as the review of the previous research based on the impact of common currency on trade. Then, we present data and methods of our research. This research is based on the gravity model of trade which is estimated by the panel least squares method. Afterwards, the results of the estimated gravity model are presented and discussed. The conclusions are formulated in the last part of the article.

LITERATURE REVIEW

Scientific studies on the creation of monetary unions are mostly based on the optimum currency area theory (OCA) developed by Robert Mundell in 1961. Mundell (1961) argues that the adoption of a common currency is not economically beneficial to countries. He also defines OCA as a geographical area where a common currency could generate maximum economic benefits. The classical theory of OCA was also researched and further developed by McKinnon (1963), Kenen (1969), Ingram (1973), Corden (1972) and Ishiyama (1975). New attitudes towards the theory of OCA together with the results of the empirical research were presented by Tavlas (1993), Frankel and Rose (1998), Bayoumi and Eichen-

green (1997), Alesina, Barro and Tenreyro (2002), Fidrmuc (2004), Horváth and Komárek (2002), Broz (2005), Mongelli (2008) and others.

The majority of scholars consider lower transaction costs as the main advantage of a common currency (Mundell, 1961; Broz, 2005; Mongelli, 2008; Silva & Tenreyro, 2010; Svrtinov, Trajkovska, & Temjanovski, 2014). Reduction of transaction costs is, in principle, linked to the growth of international trade among the member countries of a monetary union. According to Mongelli (2008) and Alesina, Barro and Tenreyro (2002), growing trade inside a monetary union determines lower transaction costs, which, in turn, strengthens the domestic market of goods and services, reduces the risk of investment, raises the scope of FDI and ensures better allocation of resources.

In addition to lower transaction costs, elimination of currency exchange uncertainty is considered to be another direct advantage of a common currency (Svrtinov, Trajkovska, & Temjanovski, 2014). Growth of international trade is to the largest extent promoted by elimination of currency exchange uncertainty, which, in turn, determines reduction of transaction, currency exchange, insurance and other types of costs, diminishes the risk of trade transactions and decreases price volatility.

The empirical research proposes that the volumes of trade among the member countries, which initiated the creation of a monetary union or later joined it, tend to increase. Nevertheless, some empirical studies show that the rates of trade growth may vary, and the overall volumes of trade much depend on the period under analysis, the group of the countries involved and the statistical model employed for the research. Although a large number of studies are based on the gravity model of trade, employment of different variables may lead to different research results.

The first attempts to assess the impact of a common currency on international trade were made by Rose (2000). By employing the gravity model of trade, the author assessed the impact of exchange rate fluctuations and a monetary union on international trade in 186 countries. The results of the research revealed that the countries with a common currency trade with each other more actively (approximately three times) in comparison to the countries with different currencies. The studies carried out by other authors did not disclose any significant growth of trade among the countries with a common currency. The largest part of the studies was conducted based on the experience of the Eurozone member countries, i.e. the researchers attempted to assess the impact of the newly-adopted common currency on international trade of the member countries in 1999 (Table 1).

Referring to the study conducted by Rose (2000), Rose and Wincoop (2001) note that the establishment of the European Monetary Union (EMU) has reduced trade barriers and has led to an increase in EMU's trade volumes by over 50%. By employing the data of the Eurozone domestic trade for 1965-2001, Bun and Klaassen (2002) estimated that the adoption of the euro contributed to an increase in the Eurozone's domestic trade by 3.9% over the first year, and by 9.6% over the third year; in the long run, the Eurozone's domestic trade was expected to increase by 40%. Glick and Rose (2002) used a large annual panel data set covering 217 countries that participated in and left currency unions from 1948 through 1997 and estimated that 'a pair of countries that starts to use a common currency experiences a near doubling in bilateral trade' (Glick & Rose, 2002, p. 1125).

On the other hand, the inclusion of the time trend in the model of the research revealed that the impact of the euro on the Eurozone's domestic trade constituted only 3% over the

period under research (Bun & Klaasen, 2007). A slightly higher impact was obtained by De Nardis and Vicarelli (2003) who noted that the adoption of the euro had a positive, although not very significant, impact on bilateral trade between the European countries. While analysing the data of 11 Eurozone member countries and 21 other countries for 1980-2000, the authors estimated that after the establishment of the EMU, an increase in its domestic trade composed 8.9% to 9.7%, considering the relevant terms of the model. These results reveal a short-term impact of the common currency on the intra-EMU trade, meanwhile the long-term impact is more significant and amounts to 16.0-18.7%.

Table 1. Summary of the Empirical Research on the Impact of a Common Currency on Bilateral Trade

Authors	Period under research	Effect of common currency/euro on bilateral trade
Rose, Wincoop (2001)	1970-1995	58%
Bun, Klaassen (2002)	1965-2001	3.9-9.6%; 37.8%
Glick, Rose (2002)	1948-1997	90%
Bun, Klaassen (2007)	1967-2002	3%
De Nardis, Vicarelli (2003)	1980-2000	8.9-9.7%
Flam, Nordström (2003)	1989-2002	15%
Flam, Nordström (2007)	1995-2005	26%
Micco, Stein, Ordoñez (2003)	1992-2002	4-16%
Baldwin, Skudelny, Taglioni (2005)	1991-2002	70-112%
Berger, Nitsch (2008)	1948-2003	about 15%
Maliszewska (2004)	1992-2002	26.5%
Brouwer, Paap, Viaene (2007)	1990-2004	7%
Pareja, Vivero, Serrano (2008)	1950-2004	38-71%
Camarero, Gomez, Tamarit (2013)	1967-2008	13-16%
Sadeh (2014)	1991-2011	84-107%
Glick, Rose (2016)	1948-2013	50%

Source: own study.

Flam and Nordström (2003) found that introduction of the euro earlier than in 2002 contributed to an increase in the overall volumes of trade among the Eurozone member countries by 15%, while the volumes of trade with non-Eurozone countries grew by 8%. Later research disclosed that the common currency increased the Eurozone's domestic trade by 26% over the period 2002-2005 in comparison to the period 1995-1998, while the volumes of trade with non-Eurozone countries increased by 12% (Flam & Nordström, 2007).

One of the most comprehensive studies on the impact of the euro on the volumes of trade was conducted by Micco, Stein and Ordoñez (2003) who employed several gravity models on trade under different conditions. Using the data of 22 countries (including 11 countries of the Eurozone), the authors estimated that the volumes of bilateral trade between the countries of the Eurozone grew by nearly 4%-10% in comparison to the volumes of bilateral trade between non-Eurozone countries; the overall growth of the volumes of trade among the countries of the Eurozone constituted nearly 9%-16% in comparison to the overall growth of the volumes of trade among non-Eurozone countries.

Baldwin, Skudelny and Taglioni (2005) proved that elimination of relatively insignificant trade barriers might have an extremely significant impact on the volumes of trade. The results of their research revealed that only the establishment of the EMU increased

the volumes of the Eurozone's domestic trade by 70%-112% in accordance with the defined terms of the research, while the volumes of trade between third countries and the countries of the Eurozone grew by 27%.

By employing the data of 22 industrial countries for 1948-2003, Berger and Nitsch (2008) found that trade intensity among European countries had been gradually increasing even before introduction of the common currency. Nevertheless, the authors also estimate that the volumes of trade between the EMU member countries have increased by about 15% after the adoption of the euro (while other factors remain constant). Authors argue that '…the finding of a sizable increase in trade after the introduction of the euro are very sensitive to the analyzed time period and the regression specification' (Berger & Nitsch, 2008, p. 1248).

Maliszewska (2004) researched the flows of trade between the EU member countries and the countries of Central and Eastern Europe. The results of the research revealed that the impact of the euro on the overall volumes of trade amounted to 26.5%. In addition, it was established that the common currency should determine an increase in the volumes of trade in all new Eurozone member countries, especially in the ones (e.g. Poland, Latvia, Lithuania) which have not yet reached the level of trade integration typical of the EU old-timers. Using the data of 29 countries (including 25 EU member countries) for the period 1990-2004, Brouwer, Paap and Viaene (2007) estimated that the impact of the EMU on the direct exports of the Union members accounted for nearly 7%. However, the authors noted that the impact of the euro on the volumes of trade in each of the countries might vary from 0.84% in Lithuania to 13.3% in Malta.

Pareja, Vivero and Serrano (2008) analysed the impact of monetary unions on the intensity of trade flows. By employing the gravity model of trade and the data of 25 countries for the period 1950-2004, the authors found that monetary unions promoted domestic trade among the countries-participants, and the impact of the euro on the volumes of the Eurozone's domestic trade grew from 38% to 71% over the period under research. It was also established that regional trade unions had an economically significant positive impact on the volumes of domestic trade inside the union: for instance, the volumes of domestic trade grew by 48% in the EU member countries and by 30% in EFTA and NAFTA member countries over the period under research.

Camarero, Gomez and Tamarit (2013) analysed the long-run effect of the euro on trade for the twelve initial EMU countries for the period 1967-2008. The results show that the euro has had a positive though small effect on trade, but the effect of the EMU is not equal in all countries. The study accomplished by Sadeh (2014) encompasses 145 countries; however, the research excludes transition economies and includes just 11 euro area member states. This study argues that the euro area more than doubled trade among its members, but this process was delayed and fitful.

Glick and Rose repeated the study in 2016. The authors used a variety of models and a panel of annual data that covers more than 200 countries between 1948 and 2013, including fifteen years of EMU. The authors found that different econometric methodologies deliver different results. At the same time, the authors stated that the most appropriate methodology they used (a panel approach which included country-pair fixed effects on the largest possible span of data across countries and time) indicated that the EMU had boosted exports by around 50%.

Some scientific articles propose that the new members of the EMU do not obtain such significant trade benefits as the countries that joined the union at the beginning of its formation. Aristovnik and Meze (2010), who researched the trends of trade growth in Slovenia over the period 1996-2006, found that after the establishment of the EMU, Slovenian exports to the countries of the Eurozone increased by 10.6% in the short run, while the imports from the countries of the Eurozone dropped by 6.6%. However, no positive long-term effects of the EMU on the volumes of Slovenian trade had been observed. Similar results were reported by Cieślik, Michałek and Mycielski (2012) who employed the data of Slovakian and Slovenian trade for 1992-2009 and estimated that neither the membership in the EMU nor adoption of the euro contributed to an increase in the exports of the countries under research. Based on the research results, the authors state that introduction of the euro in the future should not significantly contribute to the development of trade in other new EU member countries from Central and Eastern Europe. Jagelka (2013) investigated four new member states of the EMU (Slovakia, Slovenia, Malta and Cyprus) and concluded that their trade with other countries of the euro area had risen by 9%.

On balance, the analysis of the scientific literature on plausible impact of a common currency on international trade (considering the case of the EMU in particular) proposes that scientific studies report rather different results concerning the impact of the euro on the volumes of the Eurozone's domestic trade and the impact of the common currency on the volumes of trade between the members of the monetary union and third countries. The differences in the results might have been determined by dissimilar periods under research, the variety of groups of countries and the differences in the statistical methods employed. In addition, previous studies reveal that the impact of the euro on the volumes of trade in the new EMU member countries may also differ from that in the old-timers; in some cases, the results may vary for short- and long-term research because trade gains its highest intensity only in the long run after introduction of a common currency.

MATERIAL AND METHODS

Based on the analysis of previous research, the hypothesis that the euro adoption has a positive and significant impact on the trade volumes of Lithuania is tested. Previous empirical research on international trade was mostly based on the gravity model of trade. The classical gravity model enables to assess bilateral trade between the countries, when trade depends on the size of trade partners' economies (commonly measured in GDP) and distance between the countries. According to Micco, Stein and Ordoñez (2003) and Flam (2009), the gravity model of trade is one of the most successful methods developed for the empirical research of international trade as well as for explanation of the flows of bilateral trade between countries. The variables of the model in economic research are commonly presented as logarithms, and a double logarithm (log-log) regression model has been developed (Rose, 2000; Bun & Klaassen, 2007):

$$\ln(F_{ijt}) = \beta_0 + \beta_1 \ln(M_{it}) + \beta_2 \ln(M_{jt}) + \beta_3 \ln(D_{ij}) + \varepsilon_{ijt} \quad (1)$$

where:

F_{ijt} - volumes of trade between countries *i* and *j* at time moment *t*;

M_{it}, M_{jt} - size of economy (GDP) in countries *i* and *j*, respectively, at time moment *t*;

D_{ij} - distance between countries *i* and *j*;

$\beta_0, \beta_1, \beta_2, \beta_3$ - coefficients of the model;
ε_{ijt} - random errors.

Coefficients of the variables in the model show elasticity of trade in respect of the determinants that are incorporated, i.e. the model reveals a one-percent change in trade when the values of GDP or distance between the countries vary.

In some empirical studies, authors additionally incorporate other types of variables that may have the impact on the flows of trade between the countries under research, for instance, GDP per capita, exchange rates or their fluctuations, rates of economic growth etc. What is more, with a view to assessing the impact of additional variables on the flows of trade, the gravity model can be complemented with dummy variables, which reveal the significance of the common language and border (in the case of regional trade unions) as well as influence of the common currency and other determinants on bilateral trade (Rose, 2000; Micco, Stein, & Ordoñez, 2003; Flam & Nordström, 2003; Bun & Klaassen, 2007).

Hence, with reference to the analysis of previous empirical studies, the gravity model of trade is employed to assess the impact of the euro on trade volumes between Lithuania and other countries (Formula 2). It incorporates standard variables, i.e. GDP and distance between trading countries, and a dummy variable, i.e. the euro.

$$\ln(TRADE_{LTjt}) = \beta_0 + \beta_1 \ln(GDP_{LTt}) + \beta_2 \ln(GDP_{jt}) + \\ +\beta_3 \ln(DISTANCE_{LTj}) + \beta_4 EUR_{LTjt} + \varepsilon \quad (2)$$

where:

$TRADE_{LTjt}$ - value of trade (sum of exports and imports) between Lithuania (*LT*) and a foreign country *j* at time moment *t*;
GDP_{LTt} - Lithuanian GDP at time moment *t*;
GDP_{jt} - GDP of a foreign country *j* at time moment *t*;
$DISTANCE_{LTj}$ - distance between Lithuania and a foreign country *j*;
EUR_{LTjt} - dummy variable that gains value 1 if Lithuania and a foreign country *j* have the same currency, i.e. the euro at time moment *t*, and value 0 otherwise.

The coefficient β_4 reveals the impact of the euro adoption on the Lithuanian trade. Since dependent variable TRADE is expressed as a logarithm, the variation of trade induced by having common currency $(EUR_{LTjt} = 1)$ with respect to the case of not having common currency $(EUR_{LTjt} = 0)$ is given by

$$\left(e^{\beta_4 \cdot 1} / e^{\beta_4 \cdot 0} - 1\right) \cdot 100\% = \left(e^{\beta_4} - 1\right) \cdot 100\% \quad (3)$$

The analysis includes 40 foreign countries (trade partners) and estimation of the model is carried out on data for the period 2002-2016. The research covers the annual volumes of the Lithuanian trade (exports and imports of goods) with 40 main trade partners that accounts for nearly 95% of the total volume of the Lithuanian international trade. The countries under investigation are 27 EU member countries (17 members of the Eurozone) and 13 other countries, i.e. China, Canada, USA, Russia, Belarus, India, Japan, Kazakhstan, Norway, South Korea, Turkey, Ukraine and Switzerland.

The data on exports and imports of the countries were extracted from the United Nations (UN) Comtrade Database, and the data of GDP were obtained from the National Accounts Main Aggregates Database. The values of exports, imports and GDP are expressed

in US dollars; the distance between the countries is measured as a distance between the capitals in kilometres, based on World Distance Calculator. The statistical analysis of the data is performed and the gravity model is estimated using software EViews.

RESULTS AND DISCUSSION

The gravity model of trade, presented by equation (2), is employed to assess the impact of the euro adoption on the Lithuanian international trade. Descriptive statistics of the analysed variables is presented in Table 2. The largest trade partners of Lithuania are Russia, Germany and Poland, meanwhile the least trade volumes are observed with small countries such as Malta, Cyprus and Luxembourg.

Table 2. Descriptive Statistics of the Variables

Statistics	$TRADE_{LT}$, billion USD	GDP_{LT}, at current prices, billion USD	GDP, at current prices, billion USD	DISTANCE
Mean	1.0414	35.9938	1 223.087	2 148.675
Median	0.3741	39.7316	303.1172	1 391.905
Maximum	16.2513	48.5572	18 624.48	8 185.700
Minimum	0.0024	14.2754	4.4671	171.7300
Standard deviation	1.8888	10.5965	2 639.758	2 117.125
Observations	600	600	600	600

Source: own study.

Table 3 presents correlation coefficients between variables. As none of the variable is distributed by normal distribution because of strong outlier effect (great differences among countries) Spearman rank-order correlation coefficient is used. Trade significantly correlates with distance, Lithuanian GDP and GDP of foreign countries, but this relation is not strong.

Table 3. Correlation Analysis

Correlation Probability	$TRADE_{LT}$	GDP_{LT}	GDP	DISTANCE	EUR
$TRADE_{LT}$	1.0000 –				
GDP_{LT}	0.2343 0.0000	1.0000 –			
GDP	0.3938 0.0000	0.1381 0.0007	1.0000 –		
DISTANCE	-0.4780 0.0000	0.0000 1.0000	0.4167 0.0000	1.0000 –	
EUR	0.0478 0.2423	0.0877 0.0317	-0.0592 0.1475	-0.0061 0.8819	1.0000 –

Source: own study.

All correlation coefficients between trade and other indicators are positive except distance, which means that trade volumes are higher with large, adjacent economies and countries with the same currency (EUR). Correlation coefficients between independent variables are also quite low, so multicollinearity problem does not exist. The panel least

squares method is used to estimate the parameters of the model. Estimates of parameters and other characteristics of the model are presented in Table 4.

Table 4. Results of the Gravity Model of Trade

Variable	Coefficient	Prob.
C	-1.4885	0.5619
$\ln(GDP_{LT})$	0.4676	0.0000
ln(GDP)	0.8031	0.0000
ln(DISTANCE)	-1.5807	0.0000
EUR	0.3631	0.0235
Adj-R2	0.7088	
Prob(F-statistic)	0.0000	

Source: own study.

All parameters are significant at the significance level of 0.05, and the adjusted coefficient of determination amounts to 0.7088, which proposes that independent variables in the regression model explain variations of the dependent variable (i.e. the Lithuanian international trade) by 70.88%. One-percent increase in the value of GDP of a foreign country determines an increase in the Lithuanian international trade by 0.80%; one-percent increase in Lithuanian GDP determines an increase in the Lithuanian international trade by 0.47%.

The analysis of the dummy variables proposes that the euro has a positive impact on the volumes of the Lithuanian international trade. The impact of the euro on the Lithuanian international trade is estimated by formula (3):

$$(e^{0.3631} - 1) \cdot 100\% = 0.4378 \cdot 100\% = 43.78\% \quad (4)$$

Hence, the impact of the euro adoption on the Lithuanian international trade accounts for about 44%, while the other conditions remain stable. Comparing these results with the ones obtained in previous scientific studies, it can be stated that similar results were reported by Pareja, Vivero and Serrano (2008), Glick and Rose (2016), who established that the impact of the euro introduction on international trade makes up 50%.

The analysis of effects shows that random cross-sections and time effects are significant. The Hausman test accepts the null hypothesis that there is no misspecification see (Table 5). So, the errors are not correlated with the regressors.

Table 5. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.5436	3	0.6722
Period random	0.0000	3	1.0000
Cross-section and period random	5.1302	2	0.0769

Correlated Random Effects – Hausman Test; Test cross-section and period random effects.
Source: own study.

However, effects do not improve the model as its precision is even lower comparing with the model without effects (Table 6). The results of panel regression with random cross-sections and time effects show that effect of the euro is lower, i.e. 23.32%. Similar results were reported by Maliszewska (2004), Flam and Nordström (2007) (Table 1).

Table 6. Panel Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.8315	2.2163	-0.8263	0.4089
ln(GDP_{LT})	0.5397	0.0939	5.7493	0.0000
ln(GDP)	0.7303	0.0648	11.2622	0.0000
ln(DISTANCE)	-1.5079	0.1685	-8.9480	0.0000
EUR	0.2096	0.0833	2.5161	0.0121
Effects Specification			**S.D.**	**Rho**
Cross-section random			0.8582	0.8270
Period random			0.0904	0.0092
Idiosyncratic random			0.3820	0.1638
Weighted Statistics				
R-squared	0.3789	F-statistic		90.7279
Adjusted R-squared	0.3747	Prob(F-statistic)		0.0000
Sum squared resid	86.9089	Durbin-Watson stat		0.8721
Unweighted Statistics				
R-squared	0.7064	Durbin-Watson stat		0.1611
Sum squared resid	506.5064			

Dependent variable: ln( ); Method: Panel EGLS (Two-way random effects); Sample: 2002-2016.
Source: own study.

Since the current research covers only the two-year period after the adoption of the euro in Lithuania, it should be noted that the results of the estimations do not reflect a plausible long-term impact of the common currency on the Lithuanian international trade. In the long term, the country's international trade can be affected by a variety of economic and political factors. In comparison to 2014, the Lithuanian international trade in 2015 decreased due to significantly lower volumes of trade with the Commonwealth of Independent States (CIS), for instance, Russia, Belarus and Kazakhstan. The results of the research show that the share of the Lithuanian trade of goods with the countries of the Eurozone compared with the entire volume of trade grew from 39.0% to 42.2% (i.e. by 3.2 percentage points) in 2015, while the share of the Lithuanian trade with the rest of the EU member countries grew by 1.9 percentage points (Figure 1).

Summarising the results of the empirical research, it can be concluded that the adoption of the euro in Lithuania has a positive impact on the country's trade volume.

CONCLUSIONS

The analysis of the Lithuanian international trade before and after introduction of the euro revealed that the common currency had a positive impact on the changes of trade. The impact of the euro adoption on the Lithuanian international trade, assessed employing the gravity model, amounts to 23-44% and depends on the model used, i.e. whether random cross-sections and time effects are included or not. Comparing the results of the estimations with the ones obtained in previous scientific studies, it was observed that similar results were reported by Maliszewska (2004), Flam and Nordström (2007), Pareja, Vivero and Serrano (2008), Glick and Rose (2016). On balance, it can be stated that the adoption of the common currency contributed to an increase in the Lithuanian trade with the main partners.

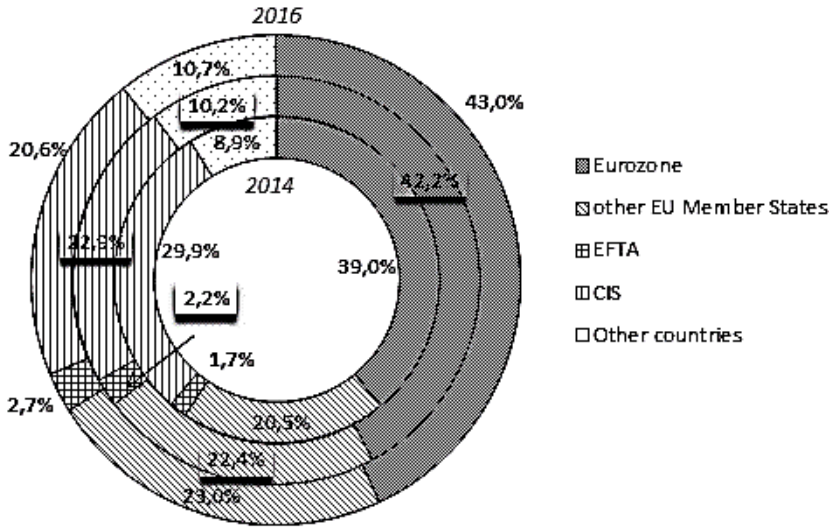

Figure 1. The structure of the Lithuanian trade of goods by trade partners
Source: compiled by the authors with reference to the data of UN Comtrade.

Berger and Nitsch (2008) discuss the importance of monetary integration achieved before the adoption of the euro to the development of trade among the Eurozone countries. Lithuania has been participating in the Exchange Rate Mechanism II (ERM II) since the middle of 2004. It was one of the first new EU Member States to join ERM II and it unilaterally committed to maintaining a fixed exchange rate regime (3.4528 litas per 1 euro). A relatively large impact of the euro introduction in Lithuania on trade with the euro area countries can also be influenced by the country's long stay in ERM II.

Studies of other researchers showed that different impacts of the common currency on trade volumes and results depend on many factors, i.e. country, period, method and so on. This research supplements previous studies and reveals that the euro adoption has a positive impact on specifically Lithuanian trade volumes. The results can be used to discuss the positive impact of the common currency on a country's economy. It is important for those EU members which still have not adopted the euro.

Since this research covers only a two-year period after adoption of the euro in Lithuania, it should be noted that the results of the estimations do not reflect a long-term impact of the common currency on the Lithuanian international trade. As a consequence, the study should be repeated in several years to refine the results.

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Cluster Analysis of Per Capita Gross Domestic Products[1]

Michael C. Thrun

ABSTRACT

Objective: The purpose of this article is to show the value of exploratory data analysis performed on the multivariate time series dataset of gross domestic products per capita (GDP) of 160 countries for the years 1970-2010. New knowledge can be derived by applying cluster analysis to the time series of GDP to show how patterns in GDP can be explained in a data-driven way.

Research Design & Methods: Patterns characterised by distance and density based structures were found in a topographic map by using dynamic time warping distances with the Databionic swarm (DBS) [1]. The topographic map represents a 3D landscape of data structures. Looking at the topographic map, the number of clusters was derived. Then, a DBS clustering was performed and the quality of the clustering was verified.

Findings: Two clusters are identified in the topographic map. The rules deduced from classification and regression tree (CART) show that the clusters are defined by an event occurring in 2001 at which time the world economy was experiencing its first synchronised global recession in a quarter-century. Geographically, the first cluster mostly of African and Asian countries and the second cluster consists mostly of European and American countries.

Implications & Recommendations: DBS can be used even by non-professionals in the field of data mining and knowledge discovery. DBS is the first swarm-based clustering technique that shows emergent properties while exploiting concepts of swarm intelligence, self-organisation, and game theory.

Contribution & Value Added: To the knowledge of the author it is the first time that worldwide similarities between 160 countries in GDP time series for the years 1970-2010 have been investigated in a topical context.

Article type:	research article
Keywords:	machine learning; cluster analysis; swarm intelligence; visualisation, self-organisation; gross domestic product
JEL codes:	O47, F01, C380

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[1] It should be noted that on page 129, (Thrun, 2018) the dataset was used as one out of twenty examples to indicate that DBS is able to find structures in a variety of cases.

INTRODUCTION

The multivariate time series inspected in this work covers repeated measures of the gross domestic product (GDP) of 190 countries published in Heston, Summers and Aten (2012) but not every time series could be used for cluster analysis. 'GDP measures the monetary value of final goods and services' (Callen, 2008). Final goods are all commodities currently produced, exchanged and consumed although this definition is controversial (England, 1998). Thus, GDP is an indicator of the economic performance of a country (Mazumdar, 2000). Each country's data has to be converted into a common currency to make international comparisons. An exchange rate is defined through the purchasing power parity (PPP) at which the currency of a country is converted into that of another country to purchase the same volume of goods and services in both countries (Rogoff, 1996).

The World GDP data set of was extracted from the multivariate time series of the database developed by Heston *et al*. (2012) by selecting the PPP-converted GDP per capita for the years from 1970 to 2010 by Leister (2016). With the help of exploratory data science, this work shows how to search for meaningful structures in GDP. The World-GDP data set will be investigated in the context of economic similarity between nations by combining dimensionality reduction with cluster analysis. New and valid knowledge will be extracted from the structures defined by a hybrid algorithm consisting of an artificial swarm and a self-organising map.

In market segmentation, cluster analysis was applied to countries in which some indicators were defined by percentages of GDP (Day, Fox, & Huszagh, 1988; Kantar, Deviren, & Keskin, 2014; Liapis, Rovolis, Galanos, & Thalassinos, 2013; Powell & Barrientos, 2004) or correlations between GDP and various variables or cross-correlations of already clustered countries were investigated (Ausloos & Lambiotte, 2007; Franceschini, Galetto, Maisano, & Mastrogiacomo, 2010; Furnham, Kirkcaldy, & Lynn, 1996). Alternative approaches with the goal to cluster countries were performed using GDP and other variables at the same point in time (Michinaka, Tachibana, & Turner, 2011). To the knowledge of the author, neither a visualisation of structures based on GDP using dimensionality reduction was performed, nor was a data-driven approach used to explain such structures.

The methods used in cluster analysis rely on some concept of the similarity between pieces of information encoded in the data of interest. However, no accepted definition of clusters exists in the literature (Hennig, 2015, p. 705). Additionally, Kleinberg showed for a set of three simple axioms called scale-invariance, consistency, and richness, that there exists no clustering algorithm which can satisfy all three (Kleinberg, 2003). By concentrating on distance and density based structures, this work restricts clusters to 'natural' clusters (c.f. Duda, Hart, & Stork, 2001, p. 539) and therefore omits the axiom of richness where all partitions should be achievable. Thus, natural clusters consist of objects which are similar within clusters and dissimilar between clusters. '[Clusters] can be of arbitrary shapes [structures] and sizes in multidimensional pattern space. Each clustering criterion imposes a certain structure on the data, and if the data happen to conform to the requirements of a particular criterion, the true clusters are recovere' (Jain & Dubes, 1988, p. 91). Here, the Databionic swarm (DBS) is used to find natural clusters without imposing a particular structure on the data contrary to conventional algorithms (Thrun, 2018). The purpose of this work is to show that the cluster structures found with DBS are meaningful, new and interesting, whereas in

Thrun (2018) the cluster structures were investigated from a methodological point of view, e.g. described in (Behnisch & Ultsch, 2015). An example of an algorithm imposing structures would be spectral clustering which searches for clusters with 'chain-like or other intricate structures' (Duda *et al*., 2001, p. 582) (see also Hennig, 2015, p. 10). Spectral clustering lacks 'robustness when there is little spatial separation between the clusters' (Handl, Knowles, & Kell, 2005, p. 3202). For conventional clustering algorithms, such effects were made visible on simple artificial datasets (Thrun, 2018, pp. 118-124).

This work is structured as follows. In the next section, the distance-based visualisation and clustering algorithm of the Databionic swam (DBS) is explained. In the third section, DBS is applied to the world GDP dataset. The results are discussed in the fourth section leading the conclusion in the last section.

MATERIAL AND METHODS

The Databionic swarm (DBS) implements a swarm of agents interacting with one another and sensing their environment. DBS can adapt itself to structures of high-dimensional data such as natural clusters characterised by distance and density based structures in the data space (Thrun, 2018). The algorithm consists of three modules: the non-linear projection method Pswarm, the visualisation technique of a topographic map based on the generalised U-matrix and the clustering approach itself.

Pswarm is a swarm of intelligent agents called DataBots (Ultsch, 2000). It is a parameter-free focusing projection method of a polar swarm that exploits concepts of self-organisation and swarm intelligence (Thrun, 2018). During construction of this type of projection, which is called the learning phase and requires an annealing scheme, structure analysis shifts from global optimisation to local distance preservation (focusing). Intelligent agents of Pswarm operate on a toroid grid where positions are coded into polar coordinates allowing for a precise definition of their movement, neighbourhood function and annealing scheme. The size of the grid and, in contrast to other focusing projection methods (e.g. Demartines & Hérault, 1995; Ultsch & Lötsch, 2017; Van der Maaten & Hinton, 2008), the annealing scheme are data-driven, and therefore, this method does not require any parameters. During learning, each DataBot moves across the grid or stays in its current position in the search for the most potent scent that means it searches for other agents carrying data with the most similar features to itself with a data-driven decreasing search radius (Thrun, 2018). The movement of every DataBot is modelled using an approach of game theory, and the radius decreases only if a Nash equilibrium is found (Nash, 1951). Contrary to other projection methods and similar to the emergent self-organising map, the Pswarm projection method does not possess a global objective function which allows the method to apply self-organisation and swarm intelligence (Thrun, 2018).

In the second module, the projected points $\{l, j\}$ are transformed to points on a discrete lattice; these points are called the best-matching units (BMUs) $bmu \in B \subset \mathbb{R}^2$ of the high-dimensional data points $\{l, j\}$. Then the generalised U matrix can be applied to the projected points by using a simplified emergent self-organising map (ESOM) algorithm which is an unsupervised neural network (Thrun, 2018). The result is a topographic map with hypsometric tints (Thrun, Lerch, Lötsch, & Ultsch, 2016). Hypsometric tints are surface colours that represent ranges of elevation (see Thrun *et al.*, 2016). Here, contour lines are combined with a specific colour scale. The colour scale is chosen to display

various valleys, ridges, and basins: blue colours indicate small distances (sea level), green and brown colours indicate middle distances (low hills), and shades of white colours indicate vast distances (high mountains covered with snow and ice). Valleys and basins represent clusters, and the watersheds of hills and mountains represent the borders between clusters. In this 3D landscape, the borders of the visualisation are cyclically connected with a periodicity (L,C). A central problem in clustering is the correct estimation of the number of clusters. This is addressed by the topographic map which allows to assess the number of clusters (Thrun *et al*., 2016).

The third module is the clustering approach itself. In (Lötsch & Ultsch, 2014) it was shown that a single wall of the abstract U-matrix (AU-matrix) represents the actual distance $D(l,j)$ information between two points in the high-dimensional space: the generalised U-matrix is the approximation of the AU-matrix (Lötsch & Ultsch, 2014). Voronoi cells around each projected point define the abstract U-matrix (AU-matrix) and generate a Delaunay graph $\mathcal{D}$. For every BMU all direct connections are weighted using the input-space distances $D(l,j)$, because on each border between two Voronoi cells a height is defined.

For the distance $D(l,j)$ the dynamic time warping (DTW) distances were calculated using the CRAN package in R 'dtw' (Giorgino, 2009). 'The DTW distance allows warping of the time axes to align the shapes of the two times series better. The two series can also be of different lengths. The optimal alignment is found by calculating the shortest warping path in the matrix of distances between all pairs of time points under several constraints. The point-wise distance is usually the Euclidean one. The DTW is calculated using dynamic programming with time complexity $O(n^2)$' (Mörchen, 2006, p. 24).

Now, the distances between two points in the high-dimensional space are considered as the distance between two time series. All possible weighted Delaunay paths $p_{l,j}$ between all points are calculated toroidal because the topographic map is toroidal. Then, the minimum of all possible path distances between a pair of points $\{l,j\} \in O$ in the output space O is calculated as the shortest path $G(l,j,\mathcal{D})$ using the algorithm of (Dijkstra, 1959) resulting in a new high-dimensional distance $D^*(l,j)$. Here, the compact approach is used, where the two clusters with the minimal variance *S* are merged until given the number of clusters defined by the topographic map is reached.

Let $c_r \subset I$ and $c_q \subset I$ be two clusters such that $r,q \in \{1,\dots,k\}$ and $c_r \cap c_q = \{\}$ for $r \neq q$ and

$$\Delta Q(j,l) = \frac{k*p}{k+p} D^*(l,j) \tag{1}$$

where:

(l,j) - the data points in the clusters be denoted by $j_i \in c_q$ and $l_i \in c_r$;
k - the cardinality $|c_q|$ of the first set;
p - the cardinality $|c_r|$ of the second set;
D^* - high-dimensional distance based on weighted shortest paths in the Delaunay Graph.

then, the variance S between two clusters is defined as

$$S(c_r,c_k) = \sum_{i=1,j=1,j\neq i}^{k,p} \Delta Q\,(l,j) \tag{2}$$

A dendrogram can be shown additionally. The clustering is valid if mountains do not partition clusters indicated by coloured points of the same colour and coloured

regions of points. The algorithm was run using the CRAN package in R 'DatabionicSwarm'.

RESULTS

The World GDP data set of Leister (2016, pp. 105-107) was logarithmised, and countries with missing values were not considered. As a result, 160 time series of countries remain for which the optimal alignment between every two two time series is calculated using the R package 'dtw' on CRAN (Giorgino, 2009). The cluster analysis approach of the Databionic swarm (DBS) has one parameter defining either a clustering for distance or density based cluster structures. Thus, the probability density distribution of the dynamic time warping (DTW) distances is investigated using the Pareto density estimation (PDE) which is particularly suitable for finding groups in data (Ultsch, 2005). A Gaussian mixture model (GMM) can be calculated (Figure 1). There, the first mode consists of smaller distances and the second mode of larger distances. Both modes are drawn in blue, their superposition in red and the probability density function estimated by PDE in black.

Comparing the GMM to the percentiles of the distances, the Quantile-Quantile plot shows a good fit, meaning that the distances can be clearly separated in larger inter-cluster distances and smaller intra-cluster distances. Therefore, the dataset has a clear distance structure. With this information, the clustering of the DBS algorithm is computed.

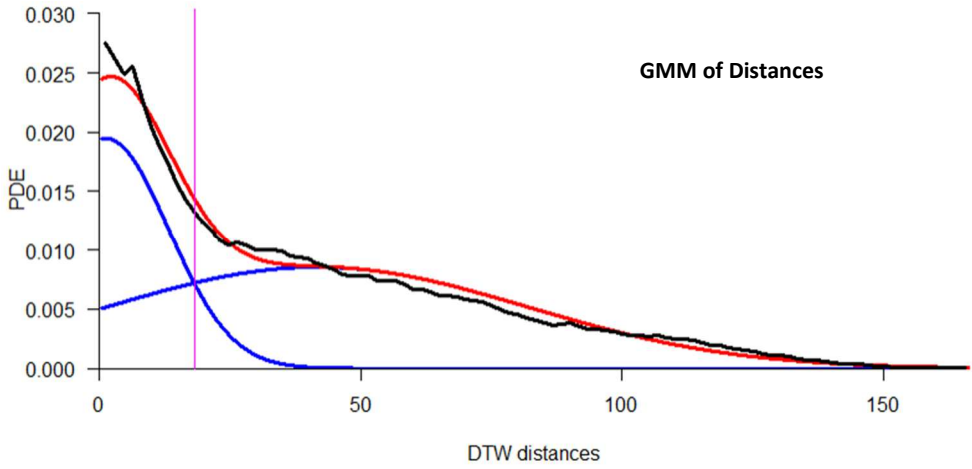

Figure 1a. GMM (red) is based on the pdf of DTW distances (black) between countries estimated by PDE

Source: The visualisation was generated using the R package 'AdaptGauss' available on CRAN Ultsch, Thrun, Hansen-Goos, & Lötsch, (2015).

In contrast to most conventional clustering algorithms, the topographic map allows to visualise high-dimensional distances and densities between the projected points identifying that clustering of the data is meaningless if no structures are visible (Thrun, 2018). In this 3D landscape the heights and colour scale are chosen in such a way that

small heights indicate small distances (sea level), middle heights indicate middle distances (low hills), and large heights indicate vast distances. Valleys and basins represent clusters, and the watersheds of hills and mountains represent the borders between clusters. Thus, Figure 2 demonstrates a clear (natural) cluster structure. Additionally, the quality of the clustering of DBS is confirmed by the heat map (Figure 3) which shows small intra-cluster distances in every cluster and high inter-cluster distances between the two clusters. The Silhouette plot in Figure 4 indicates a good spherical cluster structure for values above 0.5. This corroborates the results illustrated in Figure 2 showing that countries in the same cluster are similar to each other and countries being in different clusters are not. Contrary to the non-linear approach of the projection method Pswarm, a linear projection method into two dimensions called independent component analysis (ICA) (Hyvärinen, Karhunen, & Oja, 2004) is unable to capture the cluster structure (Figure 5). This indicates that a linear model would be unable to distinguish the distance-based structures of the World GDP dataset.

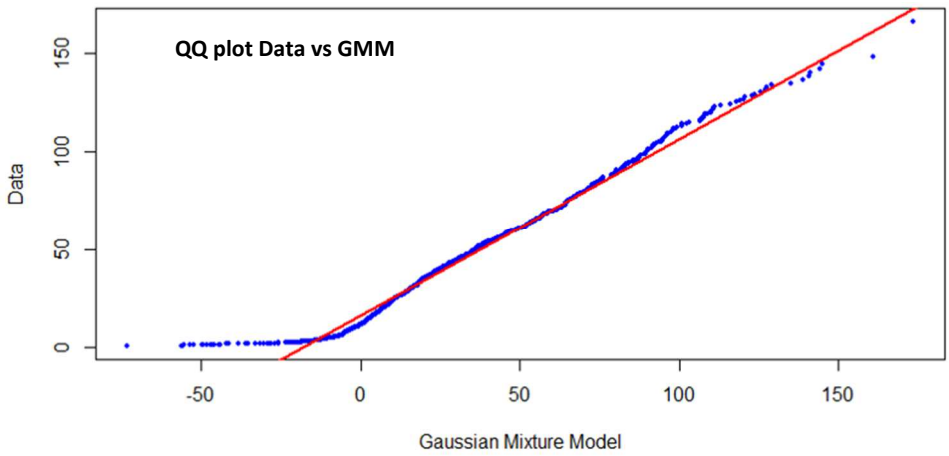

Figure 1b. The QQ plot shows a good match between the data of distance and the GMM through the straight line
Source: The visualisation was generated using the R package 'AdaptGaus' available on CRAN (Ultsch et al., 2015).

In Figure 6 the result of the Classification and Regression Tree (CART) algorithm is presented. The clusters are defined mainly by an event that occurred in 2001 if one follows the path from the root to leaf in the tree. The rules generated from the CART are presented in Table 1, and applied as coloured labels to the world map in Figure 7 with the same coloured points as in Figure 2. By using the CART classification, the two main classes have different distributions of GDP which is visualized with the Mirrored Density plot or so-called MD-plot (Thrun & Utsch, 2019). The MD-plot is depicted in Figure 8.

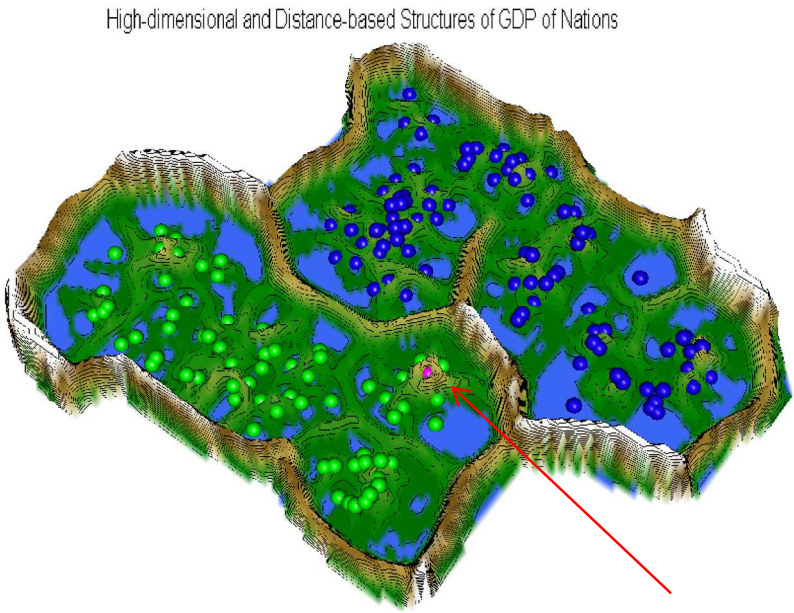

Figure 2. The topographic map of the DBS clustering of the World GDP data set shows two distinctive clusters, c.f. (Thrun, 2018). There is one outlier, coloured in magenta and marked with a red arrow
Source: The visualisation was generated using the R package 'DatabionicSwarm' available on CRAN (Thrun, 2018).

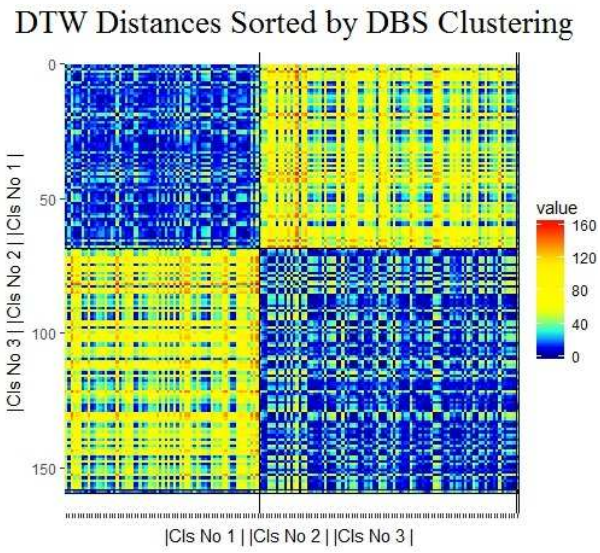

Figure 3. The heatmap of the DTW distances for the World GDP dataset, c.f. (Thrun, 2018), shows a small variance of intracluster distance in blue colours and large inter-cluster distances in yellow and red colours
Source: The visualisation was generated using the R package 'DataVisualizations' available on CRAN Thrun & Ultsch, (2018).

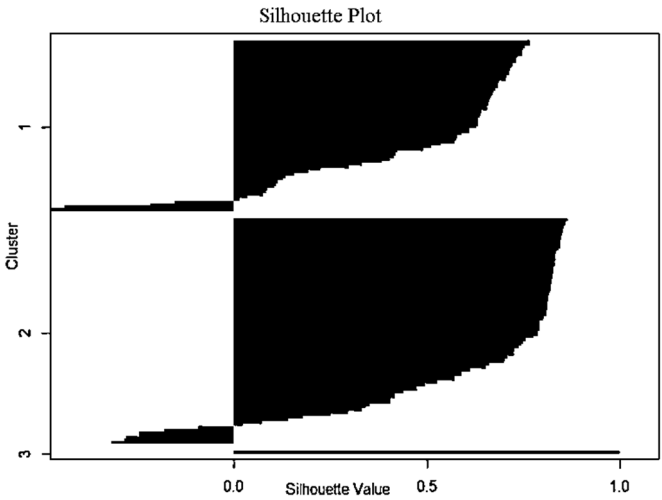

Figure 4. The silhouette plot of the DBS clustering results for the World GDP data set indicates that data points (y-axis) above a value of 0.5 (x-axis) have been assigned to an appropriate cluster, c.f. (Thrun, 2018)

Source: The visualisation was generated using the R package 'DataVisualizations' available on CRAN Thrun & Ultsch, (2018).

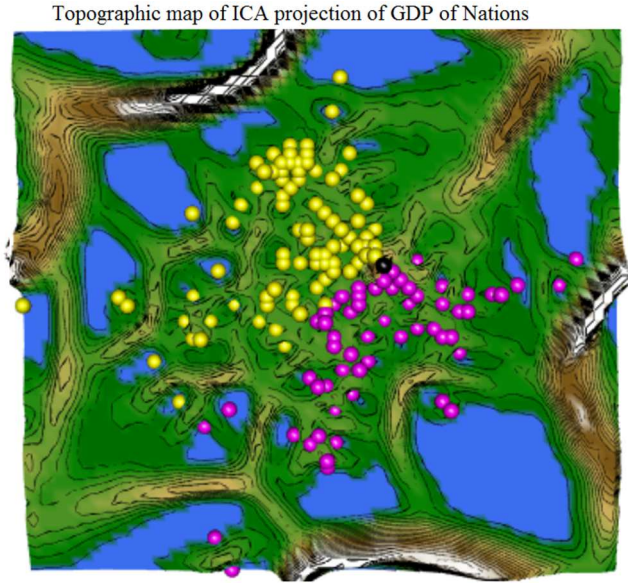

Figure 5. The linear projection of the independent component analysis (ICA) is unable to distinguish the clusters, even if generalised U-matrix is applied to generate a topographic map out of the two-dimensional projection

Source: The visualisation was generated using the R package 'ProjectionBasedClustering' (Thrun & Ultsch, 2017) and 'GeneralizedUmatrix' (Ultsch & Thrun, 2017) available on CRAN.

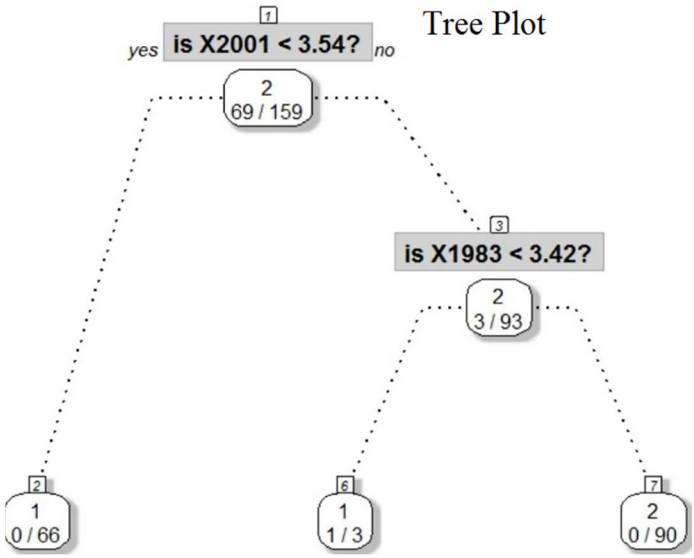

Figure 6. Classification and Regression Tree (Cart) analysis reveal rules for the clusters, c.f. (Thrun, 2018). The two main clusters are defined only by an event in 2001
Source: The visualisation was generated using the R package 'rpart' available on CRAN Therneau, Atkinson, Ripley, & Ripley, (2018).

Table 1. The CART Rules Based on Figure 4 in Which Cluster of Figure 1 is Used (*)

DBS Cluster No./Rule No.	Clusterwise Median Distance	Medoids	No. of Nations	Rules
1/R1	12.2	Sudan	66	GDP lower than 3469 Y in the year 2001
2/R2	12.6	Taiwan	93	GDP higher than 3469 Y in the year 2001

* Egypt, Micronesia and the outlier Equatorial Guinea classified incorrectly by these two rules. Abbreviations – Y: PPP-converted GDP per capita.
Source: own elaboration using the R programming language [R Development Core Team, 2008].

DISCUSSION

Regional cluster analysis on GDP datasets was performed for Latin American countries in Redelico, Proto and Ausloos (2009) and European countries in Gallo and Ertur (2003). To the knowledge of the author, no cluster analysis of the whole world was performed with the goal to explain the clusters by rules and through a spatial world map (Figure 7). Here, both clusters found by the Databionic swarm are spatially separated.

The distribution analysis of distances shows two Gaussian modes. The analysis indicates that by choosing the DTW distance measure, high-dimensional distance-based structures can be found because the first mode indicates small intra-cluster distances and the second mode large inter-cluster distances. The values of the cluster-wise median distance support this indication (Table 1). The DBS is able to visualise these structures using dimensionality reduction and able to generate a clustering based on the DTW distances.

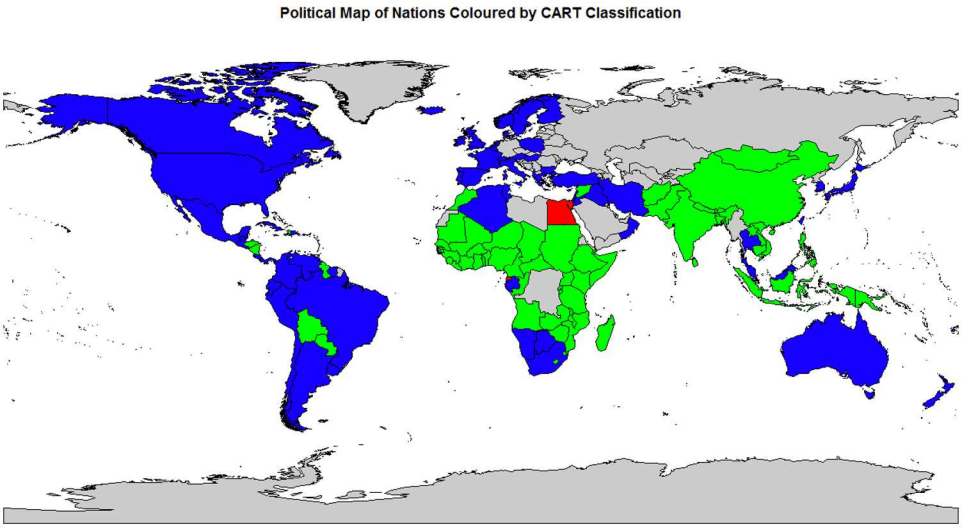

Figure 7. Two rules of Table 1 classify countries in a political map of blue and green countries. For grey countries, no data was available in Leister (2016), e.g. Balkan countries. The rules result from the clustering of Figure 1. In red there are the Outlier Equatorial Guinea as well as the incorrectly classified countries Egypt and Micronesia

Source: The visualisation was generated using the R package 'DataVisualizations' available on CRAN Thrun & Ultsch, (2018).

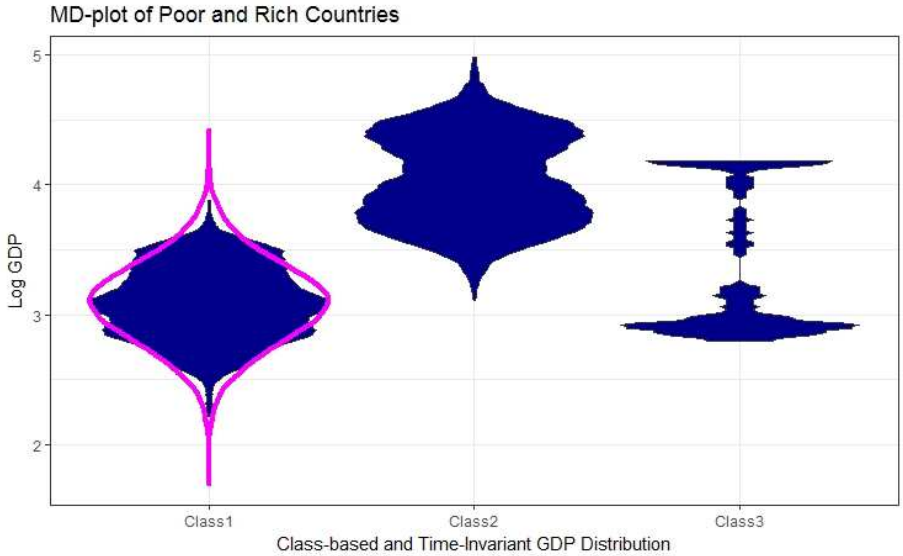

Figure 8. PDE of class-based probability density distribution of log-transformed GDP for all years combined shows that the classes can be roughly distinct in poor and rich countries

Source: The Mirrored Density plot (MD-plot) was generated using the R package 'DataVisualizations' available on CRAN Thrun & Ultsch, (2018).

The extracted cluster structures by DBS are meaningful: The first cluster consists mostly of African and Asian countries and the second cluster of industrialised countries predominantly in Europe and America. Due to the correlations between the human development index (HDI) and PPP-converted log(GDP) per capita shown in Figure 3.2 on page 69 in (UNDP, 2003, p. 69, Fig. 3.2), the second cluster in Figure 7 is highly similar to the HDI map of Figure 1 in Birdsall and Birdsall (2005, Figure 1) with HDI higher than 0.7.

The analysis was performed exploratively, meaning that contextual information was disregarded and GDP was clustered with a data-driven approach. It is surprising that neither hunger periods (e.g. Somalia, Ethiopia, Nigeria) nor war periods (Iran, Iraq) seem to affect the analysis because more detailed structures did not exist and additional outliers could not be found. In future research, the typical path of a time series of GDP would be an interesting point to investigate in order to understand why such events do not affect GDP strongly enough to be seen in the cluster structures. With the current analysis, homogeneity of clusters indicates that either a clustering analysis using DTW distances is not sensitive enough to be influenced by war or hunger or GDP itself is not affected strongly enough by such events.

If one follows every path from the root to the leaves of the tree, the resulting two rules of the (CART) analysis which are presented in Table 1, demonstrate that the clusters are defined by an event that occurred in 2001, which could be the crashing of aeroplanes into the World Trade Center. In aftermath of that event, 'the world economy was experiencing its first synchronised global recession in a quarter-century' (Makinen, 2002, p. 17). Therefore, the results indicate that the first cluster of African and Asian countries was unaffected by this event, and the second cluster of American and European countries was affected. As published in Vollmer, Holzmann and Schwaiger (2013), GDP can be sensitive to economic shocks, e.g., oil-price of exclusively oil-exporting countries or countries with a low number of inhabitants (Vollmer, Holzmann, & Schwaiger, 2013). The data regarding the PPP-converted GDP per capita of Egypt may be misrepresented, because 'during the twentieth century the population of Egypt has increased by more than 5 times' (El Araby, 2002). The outlier in Figure 1 describes the data of Equatorial Guinea. This small country with an area of 28 000 square kilometres is mostly based on oil and is one of sub-Saharan Africa's largest oil producers. The Federated States of Micronesia is a subregion of Oceania and has only a low number of inhabitants (105 000). Thus, it could also be an outlier.

The choice of distance measure was strictly based on data-driven assumptions (Figure 1 and Table 1) resulting in meaningful structures. The DTW distance copes with time deformations and different speeds associated with time series (Müller, 2007) but can enforce delays in reaction to shocks. Thus, DTW does not necessarily account for smaller shocks at the same time. The CART tree indicates that the shock in 2001 was massive, resulting in the most prominent property defining the clustering. However, keeping the ugly-duckling theorem in mind (Watanabe, 1969, pp. 376-379), clustering is always biased towards the choice of properties. In exploratory data science it is preferable to make such a choice based on data but if a specific hypothesis would be pursued another choice of distance measure could result in other insights about the data.

CONCLUSIONS

This work shows the merits of applying exploratory data analysis on data before pursuing a specific hypothesis. The clustering derived from the Databionic swarm (DBS) resulted in coherent spatiotemporal clustering of the multivariate time series of the PPP-converted gross domestic products (GDP) per capita of 160 countries in the years 1970 to 2010. It seems that 157 countries can be classified by using two rules extracted from CART with only one threshold for GDP in the year 2001. This indicates that the economic perfomance of these countries were profoundly affected in the year 2001. The knowledge of the existence of meaningful structures in GDP is vital in the pursuance of a specific hypothesis because it should be tested on the two main clusters separately if GDP takes part in an analysis. As a side-effect, a data-driven approach for defining poor and rich countries by log GDP distributions was defined. This approach is clearly non-linear and could not be applied without searching for structures beforehand. DBS can be downloaded as the R package 'DatabionicSwarm' on CRAN.

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