CID Conference 2019
International Scientific Conference
on Collaborative Innovation Development
Poland, Bialystok, June 10–11, 2019

THE BOOK OF ABSTRACTS

Dariusz Siemieniako, Anna Kononiuk, Urszula Kobylińska (editors),
PART I - COLLABORATIVE INNOVATION DEVELOPMENT IN BUSINESS SECTOR

Ewa Glińska, Ewa Rollnik-Sadowska, Urszula Kobylińska (editors),
PART II - COLLABORATIVE INNOVATION DEVELOPMENT IN PUBLIC SECTOR

Bialystok, 2019

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FOREWORD

On behalf of the Scientific Board and the Organising Committee, we are pleased to welcome you to the CID Conference 2019 – International Scientific Conference on Collaborative Innovation Development hosted by the Faculty of Engineering Management, Bialystok University of Technology.

Thematic scope of the conference is devoted mainly to marketing perspective with the focus on phenomena such as: relationships, networks, interactions, collaborative tools and practices, communication and value co-creation. Nevertheless, the conference has a multidisciplinary character, as CID can be approached also from other than marketing perspectives e.g. R&D project management, open innovation, innovation management and organisational change management.

"The Book of Abstracts" devoted to business section comprises 13 extended abstracts – presented in alphabetical order – that have been carefully selected on the basis of a double-blind peer review process. The articles present both the theoretical and practical aspects of CID concepts. The authors of this year's conference have carried out theoretical discussions, empirical studies, data analyses, case studies, and demonstrated public sector practices.

The need of promoting "collaborative innovation development" in public sector is the result of the growing demands for public innovation. This Book of Abstracts aims to advance "collaborative innovation" as a cross-disciplinary approach to studying and enhancing public innovation. The articles involved in this book explain the special conditions and the growing demand for public innovation, and demonstrates how it can be enhanced through multiactor collaboration. The theoretical and also based on empirical researches discussion leads to the formulation of many practical implications that can be used in future studies of collaborative innovation in the public sector.

The presented Book of Abstracts contains a set of extended abstracts of conference participants. It included the issues of inter-organizational cooperation for the development of innovation in the regions, participation of various stakeholders in building marketing and technical solutions for cities and regions, comparative studies of countries in the field of the labor market in the profession of professionals in health care in Poland and Germany, or analysis of entrepreneurial intentions of students in Poland and Spain. A lot of space in the study dealt with issues concerning cooperation and support of various entities in the field of tourism development in regions, intelligent transport systems and shaping the branding of cities and places. All these activities require the support and consultation of many stakeholders. The authors, based on literature analyzes and the concept of conducting research, indicate also the necessity to conduct future research in the scope of shaping the desired smart city concept or future competencies of employees.

On behalf of the conference hosts, we would like to express our gratitude to the members of the Scientific Board the members of the Organising Committee, the Keynote Speakers and all the Authors for their effort and willingness to take part in CID conference 2019. We would like also to thank Foundation for the Development of Bialystok University of Technology for their support.

We hope that this conference will foster the exchange of new ideas and promote new contacts between researchers on the CID concept. We wish you an inspirational and fruitful conference, and hope that you will enjoy everything the conference and the beautiful city of Białystok have to offer!

Editors of The Book of Abstracts – CID 2019

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EDITORIAL

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The problems presented in the **"The Book of Abstracts"** are mainly devoted to the marketing perspective in the business **(part I)** and the public **(part II)** sector with the focus on phenomena such as: relationships, networks, interactions, trust, collaborative tools and practices, communication and value co-creation. The authors of some abstracts also raise issues other than marketing, which confirms the multidisciplinary character of collaborative innovation development. They address problems such as: R&D project management, open innovation, innovation management, technology management and foresight.

A broad overview of the issues investigated by the authors demonstrates that collaboration is an increasingly important factor in the development of various types of innovation in organisations both in theory and practice (e.g. Camarinha-Matos and Abreu, 2007; Hoyer et al. 2010; Sørensen and Torfing, 2012). Interestingly enough, the authors of the extended abstracts discuss not only an inter-organisational level of Collaborative Innovation Development (CID), but also the collaboration of organisations with individuals towards developing innovations, both in business and public sectors. In some publications, it could also be discerned that in areas where complex products and services are used, R&D activities are undertaken as collaborative processes. This applies both to different industries in the business sector (which is in line with Chapman and Corso 2005, Feller et al. 2005), and to the public sector as well, where more complex service innovations are developed in collaboration with various types of stakeholders (Voorberg et al., 2015). In some of the extended abstracts, the authors highlight the role of a network approach in CID (e.g. Farinha et al., 2016; Shiau and Wee, 2008) which can be regarded as increasingly significant both in the public and business sphere.

The first part of the "The Book of Abstracts" is devoted to Collaborative Innovation Development in the business sector (edited by Dariusz Siemieniako, Anna Kononiuk, Urszula Kobylińska). It includes 19 extended abstracts that can be

grouped into four thematic scopes, namely: CID versus B2B perspective, CID versus B2C perspective, strategic foresight and collaborative innovation development versus new technologies.

The authors of the majority of the extended abstracts in the business section touch upon the issues of product innovation development in collaboration with business customers (B2B perspective) or consumers (B2C perspective). Nevertheless, the differences in the perception of the CID concept in these two areas are still noticeable. In the B2B area the term "collaboration" is widely applied in the context of New Product Development (NPD) and frequently used interchangeably with integration or coordination and, to a lesser extent, with cooperation and communication (e.g. Mishra and Shah, 2009). Also an overview of the papers by Chapman and Corso (2005) makes it possible to conclude that B2B collaboration in NPD is discussed by many researchers under various concepts such as: networks of companies, virtual organisations, customer-supplier collaboration, extended (manufacturing) enterprises, dynamic networks, strategic alliances and joint ventures. According to Dodgson (1993), a collaborative product development can be defined as 'any activity where two (or more) partners contribute differential resources and know how to agree complementary aims in order to design and develop a new or improved product'.

The collaboration towards product development in the B2C context can be described in terms of value co-creation as a key aspect of customer's involvement (O'Hern and Rindfleisch, 2010), while other types such as: tinkering, co-designing and submitting are not so engaging. The definition of collaboration in B2C is different since it involves customer voluntariness to share and combine knowledge and resources (Wilkinson and Young, 2002).

Presenting CID in the context of the B2B perspective, the "The Book of Abstracts" opens with the study by Joanna Ejdys entitled *The role of trust in the development of collaborative innovation*. The author aims to present the relationship between general (social) trust and collaboration results measured at the national level. Through the obtained results and their graphical presentation, the author provides an unambiguous identification of a group of six countries with characteristically high general trust and collaboration indices. These countries include the Netherlands, Norway, Germany, Sweden, Finland and Switzerland.

The issue of trust is also touched upon by Natalia Wasiluk in an extended abstract entitled *The role of trust in collaborative new product development: a review article*. The main purpose of this work is to review knowledge about trust in new product development projects and to clarify the role of trust in NPD projects.

Moving from the role of trust in CID, the focus shifts to the text entitled *Dynamic approach in practicing collaborative new product development in buyer-supplier industrial relationship* by Dariusz Siemieniako and Maciej Mitręga, who focus on customer-supplier collaborative practices oriented at desirable NPD outcomes in the context of international business relationships, including both industrial supply chain relationships and inter-company relations within distribution channels.

Another extended abstract in this section entitled *The role of proactive customer orientation and joint learning capabilities in success of risky collaborative product and technology innovation development involving industrial information technologies* by Anna Zadykowicz and Dariusz Siemieniako aims at exploring the impact of proactive customer orientation and joint learning capability on the acceptance and use of machine to machine interaction in collaborative innovation development, from the supplier's perspective. The research presented by the authors is based on a case study of the automatics integrator supplying an automotive concern with a fully robotised work station.

Expanding the notion of collaborative approach, Agnieszka Cholewa-Wójcik, Agnieszka Kawecka and Magdalena Wojnarowska in the abstract entitled *Verification of the possibility of using the MFA method to expand the guidelines for eco-design of food packaging with regard to the collaborative approach of the supply chain stakeholders* identify basic environmental performance criteria and outline their verification based on hybrid testing that combines a quantitative analysis from expert interviews. In addition, the aim of their work is to develop guidelines for the eco-design of packaging.

The final study in the section dedicated to the CID-versus-B2B relationship is entitled *Effectiveness and efficiency of the CID process* – a case study of a medical product by Andrzej Pawluczuk. The presented case study of the company *Medicalgorithmics* describes its effective and efficient solution to examine cardiac arrhythmia and successful market implementation of a new product.

The second thematic scope explored by the authors is CID in the context of B2C perspective.

This section opens with the study of Anna Dewalska Opitek, who in the text entitled *Customers as value co-creators – an empirical study on customer citizenship behaviour* focuses on the identification of consumer attributes that are hypothesised as drivers of customer citizenship behaviour. To identify the key drivers for customers' inclination to participate in value co-creation, the author conducted exploratory factor analysis (EFA). On the basis of the EFA analysis, it is possible to identify five main constructs determining the inclination of customers to engage in value co-creation: customer safety and belonging, courtesy, customer's esteem, customer growth and the inclination to co-create.

The theme of behaviour is also undertaken by Lucyna Witek, who in the abstract entitled *The impact of perceived control of behaviour on purchasing intentions of an ecological product* examines the relationship between perceived behavioural control and attitudes towards the purchase of a green product and subjective standards as well as between the perceived behavioural control and the intentions to purchase a green product. Empirical studies were conducted on a sample of 650 Polish consumers purchasing green products or interested in purchasing them in the future. The author's research demonstrates that if the consumers have more control over the purchase, they more willingly express the desire to buy.

The subject of customers as co-creators is also described in the next two extended abstracts of this section, namely: *Customer education as a method of building relations at the example of science centres in Poland* by Bogdan Gregor and Beata Gotwald-Feja and *Internet based consumers' co-creation experience in new product development as companies open innovation source* by Viktoriia Khrysoforova and Dariusz Siemieniako. Bogdan Gregor and Beata Gotwald-Feja present the role of customer education in the marketing context. According to the authors, customer education is one of the tools of building relations with customers at all possible stages of customer life-cycle. The goal of Viktoriia Khrysoforova's and Dariusz Siemieniako's study is to explore consumers' co-creation experience in NPD processes incorporated by companies. In particular, it is an attempt to determine the level of consumer engagement in an online co-creation process and to understand which types of Internet-based co-creation are supposed to be used by consumers most preferably.

The last extended abstract in this section entitled *Virtualisation of selected project techniques via mobile app – concept and early experiences* by Radosław Mącik, Łukasz Kwaśniewicz, Monika Ratajczyk and Olga Smalej touches upon the concept of virtualisation of selected kinds of projective techniques in consumer research via a mobile application on tablets in individual settings and using the touch-enabled surface for group tasks. The authors used a prototype of the app to gather preliminary insights and results on the example of projective perception maps and object-sorting tasks.

The issue of strategic foresight in the business section is explored in three papers. In the study entitled *The application of cluster analysis for the selection of key competences of future-oriented entrepreneurs* by Anna Kononiuk, Alicja Gudanowska and Katarzyna Dębkowska, the authors present the methodology of the identifying the competences of future-oriented entrepreneurs in the light of the project "Becoming Future-Oriented Entrepreneurs in universities and companies – beFORE", funded under the Erasmus + Knowledge Alliance scheme. Finally, the authors recommend 14 competences of strategic foresight to be mastered by future entrepreneurs.

In the next extended abstract included in this section and entitled *The application of a modified Servqual model for the diagnosis of the educational offer – foresight perspective,* Anna Kononiuk and Alicja Gudanowska present comprehensive methodology (based on the SERVQUAL model) and the results of an across-Poland survey aimed at analysing the situation on the labour market by career guidance practitioners in the context of scientific and technological trends and the creation of alternative career development paths. The main focus of the research is to disconfirm between the ideal features of course offers and the perception of the courses completed by career guidance practitioners in Poland. The study was carried out within the "Horizons of the Future" project implemented under the "Dialogue" programme of the Ministry of Science and Higher Education.

The section devoted to strategic foresight is closed with the study entitled *The role of uncertainty and levels of knowledge in foresight methodology* by Andrzej Magruk,

who tries to determine which specific types of uncertainty and level of knowledge will be appropriate for the analysis of a specific kind of future.

The last thematic stream presented in the business section deals with collaborative innovation development versus new technologies.

We open this section with an extended abstract entitled *Collaborative development of virtual assistants – the role of artificial intelligent agents in innovation development* by Mateusz Kot and Grzegorz Leszczyński. The purpose of their study is to: identify the scope of the collaboration of VA users with the providers in the VA software agents development process, as well as define the impact of users' interpretation of VA on this collaboration. The authors conclude that there are two possible ways to innovate: 1) the provider gathers feedback from his users and by using their experiences creates another version of the software; 2) the provider designs VA in a way that fosters autonomous learning by analysing interactions with users and machine learning.

From virtual assistants "The Book of Abstracts" proceeds to the issue of robots. In the abstract entitled *Robots as new technologies improving the quality of life of older people*, Katarzyna Halicka presents the results of an all-Poland survey concerning the usage of robots. The author concludes that almost 70% of respondents believe that there is a need to construct robots aimed at providing care and their relation to older people. More than 55% of respondents would be willing to use a robot to provide care for a member of their family, and more than 70% if the situation concerned themselves. In the opinion of more than half of the respondents, robots supporting elderly care will have become common in the world by 2040.

The next extended abstract in this section deals with the issue of a digital ecosystem. Elena Aleksandrova, Victoria Vinogradova and Galina Tokunova in the text entitled *The model of creation of digital ecosystem in the sphere of construction* reveal the introduction of modern technologies and possible ways of their use in combination with information modelling. The authors also demonstrate the way of their integration to all stages of the investment and construction project on the basis of the BIM information model.

From the issue of a digital ecosystem, "The Book of Abstracts" shifts its area of interest towards the issue of a network paradigm. In the study entitled *Network Paradigm in industry 4.0*, Katarzyna Nosalska and Grzegorz Mazurek analyse selected ways to define Industry 4.0, isolating its key elements in order to identify a point of view shared by different authors. The conclusion to be drawn from this analysis is a thesis posited by the authors of the study that the key to understanding and effective implementing of digital transformation solutions based on the concept of Industry 4.0 is to view the process taking place within and outside the company from the angle of a network paradigm.

The final extended abstract in this section is entitled *Streams of entrepreneurship and the future of technostarters. A case of North-east* Poland by Wiesław Popławski and Tadeusz Kowalewski. The authors present the cases of technostarters as an exceptional type of entrepreneurs, i.e. pioneers of modern times and inventiveness.

The second part of the "The Book of Abstracts" (edited by Ewa Glińska, Ewa Rollnik-Sadowska, Urszula Kobylińska) **is devoted to Collaborative Innovation Development in the public sector.** It includes thirteen extended abstracts.

The first work by Marek Ćwiklicki and Piotr Kopyciński entitled *A multifaceted role of public authorities in collaborative innovation* aims at providing insights into a multifaceted role of public authorities in collaborative innovation at a local level. By providing the definition of public authorities and the identifying their functions derived from the results of the analysis of collective innovations – as exemplified in the abstract – the authors determine the roles of local public authorities in collaborative innovation.

The remaining abstracts included in the second part of this publication are divided into three groups, and the basis for their division constitutes an analysis perspective adopting collaborative innovation development in the public sector: regional, labour market and city management.

The first group of extended abstracts opens with the study entitled *Interinstitutional cooperation – contributions to innovation and tourism development in rural territories – best practices of tourism networks in Portugal* by Marta Amaral, who aims to outline investigations in terms of interinstitutional cooperation and the creation of cooperation tourism networks in Portugal with reference to the need for innovation in the tourism sector. The author also analyses the impact of this kind of network on rural tourism development based on the analysis of well-known examples of tourism interinstitutional cooperation networks in the country. The results of the considerations presented in the abstract indicate that these networks are very successful and socially innovative in the field of tourism. They feature a high-level importance in the sustainable development of a rural territory.

The authors of the next abstract entitled *Cooperation of entities of tourism economy for creating the brand of the region*, Halina Kiryluk, Ewa Glińska and Yauheniya Barkun identify the dimensions and ways of cooperation of the local government and other members of the regional tourism organisation in the process of developing a regional brand. The authors focus on: establishing ways to reach a common vision of regional brand identity, determining the actual and potential categories of initiatives carried out by the voivodship-level local government and the members of the regional tourism organisation meant to develop a regional brand and also diagnosing benefits and barriers of this type of cooperation. To achieve this goal, the authors use the research method in the case study of the region, specifically Podlaskie Voivodship.

In her study *Determinants of Portuguese local municipalities indebtedness*, Claudia Pires puts emphasis on the financial aspect related to the functioning of Portuguese municipalities by means of analysing determinants of their indebtedness. To accomplish this goal, she reviews dedicated literature and a set of socioeconomic, political and financial variables which allow for the creation of a model of multiple linear regressions. The analysis conducted by the author proves that the variable that explains best the indebtedness level *per capita* of each municipality is the previous year indebtedness level, corroborating the idea that debt generates debt.

The section of abstracts presenting the regional perception in the CID analysis is completed by the text of Eugenia Panfiluk entitled *Innovation of the tourist region – nature, scope and supporting factors*. The author focuses here on defining the nature, scope and supporting factors of introducing innovation in the tourist region. The analyses in particular focus on identifying entities responsible for creating the environment of an innovative tourist region and selecting their activities that support the achievement of this goal.

The second group of CID texts in the public sector covers the subject of the labour market. The first of them, entitled *German and Polish labour markets for health care professionals* by the authorship of Ewa Rollnik-Sadowska and Andree Ehlert, aims to identify two distinct approaches with respect to health care labour markets in Germany and Poland and to evaluate their transferability across countries. The conducted research proves that the greatest threat to the Polish health care labour market is the shortage of health workforce, mainly caused by the emigration of the labour force. At the same time, Germany's health care labour market suffers from an urban oversupply and rural undersupply of the number of physicians. Poland represents relatively better access to health care labour markets and lower regional heterogeneity. However, lower diversification of labour supply between rural and urban areas seems to be the result of income effects rather than specific public policy.

The next two extended abstracts refer to the future-oriented competences of career counsellors in Poland. The goal of the first of them, entitled *Future-orientation of career counselling practitioners in Poland – measuring the competency gap*, developed by Anna Pająk, Justyna Kozłowska and Anna Sacio-Szymańska, is to identify potential "competency gaps" through self-assessment and comparison of the selected list of competences in the context of their proficiency levels and suitability in professional practices of career counselling.

In turn, the authors of the second extended abstract, Ewa Rollnik-Sadowska and Andrzej Magruk, concentrate their insights on the identification of future competences of career counsellors in line with the ongoing trends in the labour market. Their study focuses on the identification on new occupational skills of career counsellors needed in the environment of uncertainty and changeability on the labour market,

The next two texts concern the attitudes of students towards their own business and university offer. José Alberto Martínez González and Urszula Kobylińska devote their text entitled *Contextual factors and entrepreneurial intentions on the example of students from Poland and Spain* to investigating contextual variables in the formation of entrepreneurship among young people. The authors also focus on the juxtaposition of contextual and personal variables, both in Poland and Spain.

The series of extended abstracts related to the labour market closes with the text of Hanna Hall. The purpose of her study, S*tudents' expectations, assessments and suggestions related to studies in the context of relationship marketing of universities,* is to present students 'expectations regarding studies, their evaluation of studies, expressing their level of satisfaction with studies and suggestions towards changes

that universities could introduce to achieve a higher level of students' satisfaction with their studies as well as better relations between these institutions and students as key stakeholders of a university.

The third group of abstracts in this section includes texts addressing CID issues in the area of city management. The authors of all the three abstracts discuss the role of residents in the process of making decisions on various aspects of city development by local authorities, but accepting other main objectives of their studies.

In the most general way, Danuta Szpilko, Joanna Szydło and Justyna Winkowska discuss the concept of a 'wise' city, which is a new approach to city management, emphasising the special importance of social aspects in the process of its development. The authors analyse the weaknesses of the 'smart city' concept, proving that the technological development of the city without proper consideration of the role of society is not a proper reference for the cities of the future.

The purpose of the abstract entitled *The participation of inhabitants in the development of an intelligent transport system,* developed by Ewelina Tomaszewska, is to present the possibility of citizen involvement in the process of designing urban transport systems, identified from the local government perspective. To achieve this goal, the author uses individual in-depth interviews (IDIs) carried out with the officers responsible for organising urban transport in selected Polish capitals of voivodships: Wroclaw, Bialystok and Lodz.

Karolina Ilczuk, in the abstract *Involvement of inhabitants through the use of social media in the process of city branding – a pilot study*, makes an attempt to assess the level of inhabitants' involvement in building a city's brand through social networking platforms popular among Internet users, i.e. Facebook. Her research is based on the analysis of posts published on 20 platforms of Polish cities with populations ranging from 10 thousand to 25 thousand residents. Her study includes a systematic analysis of posts published by individual cities within 30 consecutive days.

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PART II (edited by Ewa Glińska, Ewa Rollnik-Sadowska, Urszula Kobylińska)
COLLABORATIVE INNOVATION DEVELOPMENT IN PUBLIC SECTOR

PART I

COLLABORATIVE INNOVATION DEVELOPMENT IN BUSINESS SECTOR

COLLABORATIVE INNOVATION DEVELOPMENT – B2B PERSPECTIVE

ROLE OF TRUST IN THE DEVELOPMENT OF COLLABORATIVE INNOVATION

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INTRODUCTION

Trust is one of the key factors that determine the success of cooperation aimed at innovation development. According to several researchers, in processes aimed at the development of collaborative innovation as well as a new product, trust can have different functions, such as information integration between the parties (Cai et al., 2010); cost and risk reduction (Dyer, Chu, 2003); greater information sharing and the improvement of the coordination process (Dyer, Chu, 2003); the increase in the performance of both parties (Bunduchi, 2013); the support for learning and continuous improvement in product development (Sako, 1997); the improvement in the party commitment and involvement in the collaboration related to new product development (NPD) (Walter, 2003).

The relationship between the results of trust and collaboration can be measured at different levels: international (i.e. on the level of a country), inter-organisational (e.g. networks or supply chains) and individual (between persons involved in the process of collaboration).

The article aims to present the relationship between general (social) trust and collaboration results measured at the national level.

For the purpose of the research, the author used statistical data on general trust from the research conducted by the Institute of Comparative Studies as well as data enabling the measurement of the level of collaboration at the national level, which was available from the European Innovation Scoreboard 2018 and the Global Innovation Index 2018. Given the availability of research results related to the measurement of general trust, the conducted analyses covered 16 countries.

Two aggregated indicators, which reflect the level of collaboration, namely, the Global Innovation Linkages Index and the European Innovation Linkages Index, were used to show the relationships between the results of trust and collaboration.

The results confirmed that countries (e.g. Norway, Sweden, Switzerland and the Netherlands) with a higher level of general trust also have better collaboration outcomes.

LITERATURE REVIEW

In social relations, trust is an underlying factor (Luhmann, 1979) and an element of building a relationship (Larzelere and Huston, 1980). Nowadays, the level of trust is unquestionably a key feature of any collaboration in general or the collaboration for innovation in particular (Bunduchi, 2013).

The growing interest in the concept of trust mainly results from the growing uncertainty about the surrounding phenomena, the need for risk-taking, greater interdependence and collaboration, the growing number of new threats and dangers, and the unlimited possibility to make choices that increase the uncertainty (Sztompka, 2007). Trust and control are also often considered as success factors in relationships based on the cooperation between partners and organisations (Das & Teng, 1998). At the organisational level, trust is a factor that fosters collaboration and networking (Rousseau et al., 1998; *The Future of the Information Society in Europe*, 2006; Sankowska, 2015; Misztal, 1996; Wasiluk, 2013). Inter-organisational trust is a kind of voluntary decision of one entity to cooperate with another entity (Sankowska, 2015). Trust is an important construct in the research of inter-organisational relationships, and bilateral trust is a major factor that facilitates effective collaboration (Dwyer, Schurr and Oh 1987) and leads to improved satisfaction and performance of collaboration (Nyaga, Whipple, Lynch, 2010). According to Torugsa et al., building trust between partners is a necessary component of inter-firm collaboration (Torugsa *et al.*, 2016). Selnes and Sallis (2003) stated that in the case of a high level of trust between partners, both parties are willing to share knowledge and learn from the collaboration. Trust is an important factor in overcoming information barriers, reducing opportunism in collaboration and thus determining the results of ex-post collaboration (Brockman *et al.*, 2018). Also, according to Gulati, the trust-based approach is necessary to avoid technological leakage and opportunistic behaviour in the case of collaboration (Gulati, 2007).

In the context of collaborative new product development, Howells et al. distinguished two types of trust – goodwill trust (that the partner will not disclose information and will not behave opportunistically) and competence trust (that the partner will deliver the solution) – as two factors important in the face of riskier nature of innovation (Howells et al., 2008).

In processes aimed at the development of collaborative innovation as well as a new product, trust can have different functions. Among the most important is the information integration between the parties (Cai et al., 2010); cost and risk reduction (Dyer, Chu,

2003); greater information sharing and the improvement of the coordination process (Dyer, Chu, 2003); the increase in the performance of both parties (Bunduchi, 2013); the support for learning and continuous improvement in product development (Sako, 1997); the improvement in the party commitment and involvement in the collaboration related to new product development (NPD) (Walter, 2003).

In the context of cooperation, trust can be found as an object of scientific interest in the form of a construct moderating the performance of collaborative inter-organisational relationships and product innovation (Chi-Shiun Lai et al., 2011); key factors of the ability to produce a higher level of joint output (i.e. co-owned patents) (Brockman et al., 2018); key factors affecting the collaboration in a supply chain (Hudnurkar, Jakhar, Rathod, 2014; Nyaga, Whipple, Lynch, 2010; Chen *et al.*, 2011); a factor that plays an important role during the process of supplier selection in new product development (NPD) (Bunduchi, 2013); a factor that allows to reduce cost and risk and leads to superior information sharing in exchange relationships (Dyer, Chu, 2003); and a factor, on which supplier involvement in new product development (NPD) depends (Walter, 2003).

RESEARCH METHOD

Two sources of data to measure the level of collaboration at the national level were used: the Global Innovation Index 2018 and the European Innovation Scoreboard 2018. According to the Global Innovation Index 2018, four indicators were used which reflect the developmental level of collaborative innovation, namely, university/industry research collaboration, the state of cluster development, deals of a joint venture/strategic alliance and patent families filed in at least two offices. The description of measures is presented in Table 1.

Table 1. Description of measurements according to the Global Innovation Index 2018

Indicator name	Indicator description – measurements
University/industry research collaboration	The average answer to the survey question: In your country, to what extent do people collaborate and share ideas between companies and universities/research institutions? [1 = not at all; 7 = to a great extent]
The state of cluster development	The average answer to the survey question regarding the role of clusters in the economy: In your country, how widespread are well-developed and deep clusters (geographic concentrations of firms, suppliers, producers of related products and services, and specialised institutions in a particular field)?
Deals of a joint venture/ strategic alliance	Thomson Reuters data on deals of joint ventures/strategic alliances, per deal, with details on the country of origin of partner firms, etc.
Patent families filed in at least two offices	The number of patent families filed by residents in at least two offices.

Source: Cornell University, INSEAD, and WIPO (2018): *The Global Innovation Index 2018: Energizing the World with Innovation*. Ithaca, Fontainebleau, and Geneva. Retrieved from: https://www.globalinnovationindex.org/analysis-indicator.

According to the European Innovation Scoreboard 2018, the level of collaboration was measured using the data that reflects linkages measuring innovation capabilities by looking at collaboration efforts between innovating firms, research collaboration between the private and public sectors, and the extent to which the private sector finances public R&D activities (*European Innovation Scoreboard 2018 – Methodology Report*, 2018). The measurement framework of the European Innovation Scoreboard that reflects linkages as innovation activities is presented in Table 2.

Table 2. Description measurements according to the European Innovation Scoreboard 2018

Indicator name	Indicator description and interpretation
Innovative SMEs collaborating with others	The number of small and medium-sized enterprises (SMEs) engaged in innovation co-operation activities, i.e. those firms that had co-operation agreements on innovation activities with other enterprises or institutions during the three years of the surveyed period. This indicator measures the degree to which SMEs are involved in innovation co-operation. Complex innovations, in particular in ICT, often depend on the ability to draw on diverse sources of information and knowledge, or to collaborate in the development of an innovation. This indicator measures the flow of knowledge between public research institutions and firms, and between firms and other firms. The indicator is limited to SMEs because almost all large firms are involved in innovation co-operation.
Private co-funding of Public R&D expenditures	All R&D expenditures in the governmental sector (GOVERD) and the higher education sector (HERD) financed by the business sector. This indicator measures public-private co-operation. University and government R&D efforts financed by the business sector are expected to explicitly serve short-term research needs of the business sector.
Public-private co-publications per million population	The number of public-private co-authored research publications. The definition of the "private sector" excludes the private medical and health sector. Publications are assigned to the country/countries in which business companies or other private sector organisations are located. This indicator captures public-private research linkages and active collaboration activities between business sector researchers and public sector researchers resulting in academic publications.

Source: European Innovation Scoreboard 2018 – Methodology Report. http://www.eustat.eus/documentos/datos/PI_metod/INNO-2.2.4_i.asp

Based on the collected data, two aggregated indicators were constructed, namely, the Global Innovation Linkages Index and the European Innovation Linkages Index as an average normalised value of indicators.

According to the methodology of the World Values Survey, the level of general trust was measured by answering one question: "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Respondents could choose to either answer "Most people can be trusted" or "Need to be very careful" (Inglehart *et al.*, 2014).

RESULTS

The data collected from the Global Innovation Index 2018 and the European Innovation Scoreboard 2018 and aggregated indexes are presented in Table 3.

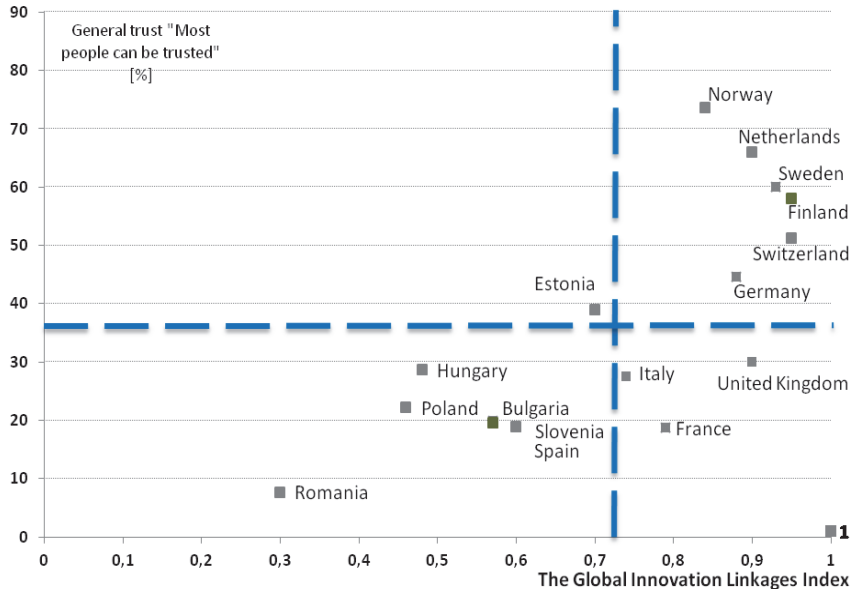

Fig. 1. Relationships between the Global Innovation Linkages Index and General Trust

Source: elaborated by the Author based on *The Global Innovation Index 2018.* Retrieved from: https://www.globalinnovationindex.org/analysis-indicator; the World Values Survey. Retrieved from: http://www.worldvaluessurvey.org/wvs.jsp.

Table 3. Indicators, the Global and the European Innovation Linkages Indexes and the level of general trust

Country	The Global Innovation Index 2018					The European Innovation Scoreboard 2018				The World Values Survey
	University/ industry research collaboration	State of cluster development	Deals of a joint venture/ strategic alliance	Patent families filed in at least two offices	The Global Innovation Linkages Index	Innovative SMEs collaborating with others	Private co-funding of Public R&D expenditures	Public-private co-publications	The European Innovation Linkages Index	General Trust [% of people who marked the answer "Most people can be trusted"]
	Rank position (the total number of countries is 126)					Normalised values				
Bulgaria	71	66	31	49	0.57	0.09	0.23	0.13	0.15	19.60
Estonia	39	68	18	27	0.70	0.44	0.38	0.26	0.36	39.00
Finland	4	16	6	1	0.95	0.72	0.45	0.72	0.63	58.00
France	34	20	39	13	0.79	0.55	0.38	0.51	0.48	18.70
Germany	7	3	43	8	0.88	0.41	0.75	0.62	0.59	44.60
Hungary	65	81	82	35	0.48	0.23	0.33	0.43	0.33	28.70
Italy	42	7	60	22	0.74	0.25	0.18	0.37	0.27	27.50
Netherlands	5	4	29	10	0.90	0.75	0.62	0.78	0.72	66.10
Norway	19	14	26	23	0.84	0.82	0.41	0.71	0.65	73.70
Poland	86	61	89	34	0.46	0.11	0.25	0.18	0.18	22.20
Romania	92	107	97	55	0.30	0.03	0.36	0.15	0.18	7.70
Spain	64	35	73	30	0.60	0.25	0.36	0.36	0.32	19.00
Sweden	10	15	4	5	0.93	0.57	0.40	0.90	0.62	60.10
Slovenia	43	72	77	24	0.57	0.55	0.46	0.59	0.53	19.90
Switzerland	1	11	12	1	0.95	0.35	0.66	1.00	0.67	51.20
United Kingdom	6	5	16	21	0.90	1.00	0.27	0.63	0.63	30.00

Source: elaborated by the Author based on *The Global Innovation Index 2018*. Retrieved from: https://www.globalinnovationindex.org/analysis-indicator; European Innovation Scoreboard 2018. Retrieved from: https://interactivetool.eu/f/extensions/DGGROW4/DGGROW4.html, the World Values Survey. Retrieved from: http://www.worldvaluessurvey.org/wvs.jsp.

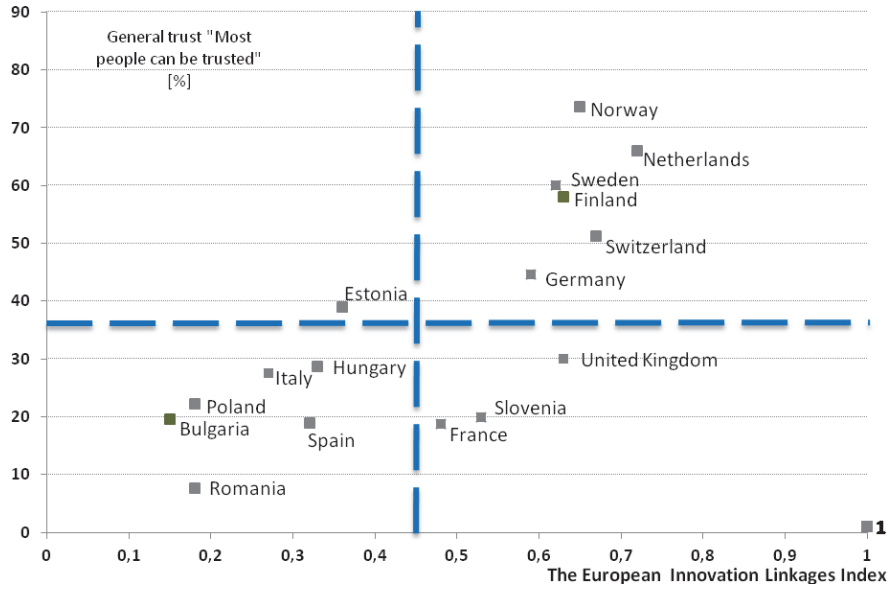

Fig. 2. Relationships between the European Innovation Linkages Index and General Trust

Source: elaborated by the Author based on the European Innovation Scoreboard 2018. Retrieved from: https://interactivetool.eu/f/extensions/DGGROW4/DGGROW4.html, the World Values Survey. Retrieved from: http://www.worldvaluessurvey.org/wvs.jsp.

DISCUSSION

The obtained results and their graphical presentation clearly spotlighted a group of six countries with characteristically high general trust and collaboration indexes. These countries include the Netherlands, Norway, Germany, Sweden, Finland and Switzerland. Two countries – the United Kingdom and France – belong to the group of countries characterised by a relatively high level of collaboration indexes but a low level of general trust. The last group consists of countries with a low level of general trust that translates into a low level of collaboration indexes. The analysis conducted on the national level confirmed the dependence between the general trust and cooperation and its effects, which thus confirmes the dependencies identified by other researchers (Chi-Shiun Lai et al., 2011; Brockman et al., 2018; Dyer, Chu, 2003). The research on the relationship between trust and cooperation at the organisational level still remains open. In particular, the measurement and subsequent shaping of organisational trust in the context of collaboration with other entities should be considered as future directions of research.

Keywords: general trust, collaborative innovation development

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THE ROLE OF TRUST IN COLLABORATIVE NEW PRODUCT DEVELOPMENT: A REVIEW ARTICLE

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INTRODUCTION

The subject of interest in this paper is two phenomena: trust and new product development. The main purpose of this article is to review knowledge about trust in new product development projects and to clarify the role of trust in NPD projects. The purpose of the article is achieved by using a method of reviewing domestic and foreign literature, mainly in the field of management and quality. Considerations contained in the article may contribute to broadening the available knowledge related to the phenomenon of trust, in particular in terms of cooperation in the creation of new products. These considerations are thematically embedded in the field of management science and quality.

LITERATURE REVIEW

The subject of trust can undoubtedly be taken from many disciplines since trust is a multidimensional and complex construct (Castaldo, Premazzi, Zerbini, 2010; Fulmer, Gelfand, 2012). There are many definitions of the phenomenon of trust in literature, and there is no agreement on one general definition of trust (Huang, Wilkinson, 2013). Particular definitions often draw attention to other aspects of the complex trust construct. According to Rotter (1980), trust is a general expectation of individuals or groups that verbal or written promises and commitments will be respected and implemented. Rousseau, Sitkin, Burt, Camerer (1998) defined trust as a "psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another". According to literature, the necessary conditions for the existence of trust are uncertainty, sensitivity, and the ability to avoid the risk of making decisions based on assessments

(Blomqvist, 1997). This article incorporates the definition of trust as proposed by Rousseau et al., (1998).

In order to understand the phenomenon of trust, it is necessary to denote types of trust and their related components. Literature in the area of business relationships distinguishes four types of trust: interpersonal trust, organisational confidence, internal trust and inter-organisational trust (Zieliński, 2017). Trust can be considered between employees from one department, between employees of different departments of the same enterprise, between employees of departments of various enterprises, between enterprises in general and in the enterprise internally. However, Dowell, Morrison, Heffernan (2015) divide this notion into cognitive trust and affective trust. The components of cognitive trust are competency, integrity and goodwill, while the components of affective trust are relational and intuitive (tab. 1). The article focuses on the division by Dowell, Morrison, Heffernan (2015) due to the multidimensional approach to the trust construct.

Table 1. Elements of trust

Base	Element	Definition
Cognitive	Competency	A person's ability to complete a task to a desired level. An industry or academic attainment that creates a perception of a person being capable to complete a task.
	Integrity	Adherence or delivering on what is promised and contracted and conforming to ethical standards
	Goodwill	Completion of tasks over and above what is required and agreed to. The presumption of a positive orientation, motives and intentions of the other person.
Affective	Relational	Faith in the norm of reciprocity.
	Intuitive	Results from friendship with and/or feelings towards another.

Source: D. Dowell, M. Morrison, T. Heffernan, (2015). The changing importance of affective trust and cognitive trust across the relationship lifecycle: A study of business-to-business relationships. *Industrial Marketing Management*, 44, 119–130.

Contemporary organisations are characterised by functioning in so-called generalised uncertainty, in which survival requires a change in the way of management (Koźmiński, 2004). Organisations need to adapt to change and stand out from the competition to survive. Thanks to trust, an organisation can adapt to unforeseen circumstances, reduce unpredictability and risk (Bstieler, 2006). During economic crises, trust becomes an element of bonding and integrating the activities of entities within a relationship (Skowron, 2016). Furthermore, many authors emphasise the fact that trust is a key factor in a relationship (Hamel, 1991; Kumar, 1996).

Integration activities of companies can consist in co-creating a new product, innovation or research. This article focuses in detail on collaborative new product development. In each team, also in teams working on new product development projects, trust is extremely important (Donovan, 1993). Confidence is recognised

as a key factor for successful cooperation (Herzog, 2001). Increasing interest in collaborative product development translates into increased involvement in joint product development with suppliers. The benefits of cooperation include a higher return on research and development investment, faster product development, lower product development costs, greater flexibility, lower risk and access to product development capabilities of the supplier (Luo, Mallick, Schroeder, 2010). Luo, Mallick, Schroeder (2010) define product development as the "transformation of a market opportunity and a set of assumptions about product technology into a product available for sale" (Luo, Mallick, Schroeder, 2010). In this study, the definition of Luo, Mallick, Schroeder (2010) is used as the main definition of product development. New product development is a process which consists of 6 stages, including (fig. 2): idea generation, scoping, build business case, development, testing and validation and market launch (Cooper, 2019).

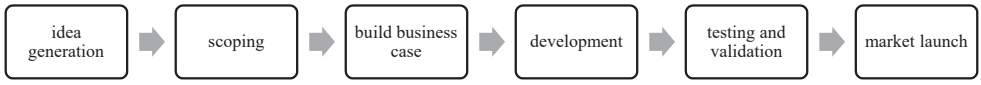

Fig. 1. New product development process

Source: Cooper, R. G. (2019). The drivers of success in new-product development. *Industrial Marketing Management*, 76, 36–47.

Trust is important at every stage of the individual stages of the new product development process, both when it comes to development of new products by the company, as well as collaborative projects. Trust changes and evolves during individual stages. It may also happen that not all the stages of collaborative co-creation will occur between co-workers, and then there is no trust at all stages.

RESULTS

Primarily, there is a noticeable consensus in literature on the lack of integration or systematisation of knowledge about trust (Lindenberg, 2000, Child, 2001, Dietz, Hartog, 2006, Seppänen, Blomqvist, Sundqvist, 2007). According to Huang and Wilkinson (2013), trust in social sciences is one of the most used, being also the least understood concept. Sankowska (2015) emphasises above all the scarcity of research taking into account the context of the situation which trust refers to, noting that trust is strongly dependent on the context. Another limitation of literature is the narrow number of studies on how trust affects NPD's success. Available NPD literature (excluding a few exceptions) discusses trust as one of the supplier selection criteria and not as a key aspect of NPD cooperation (Bunduchi, 2013). The approach to the phenomenon of trust in relations arising during cooperation on the development of a new product is described in literature in a limited way, rarely taking into account the situational context.

After defining research gaps existing in the literature referring to the phenomena described, further directions of the author's future research were established. This article presents a model for future research on the impact of trust and its elements on the overall effectiveness of activities undertaken in connection with the development of new products. The proposed model of future research of these phenomena is presented in the figure 3.

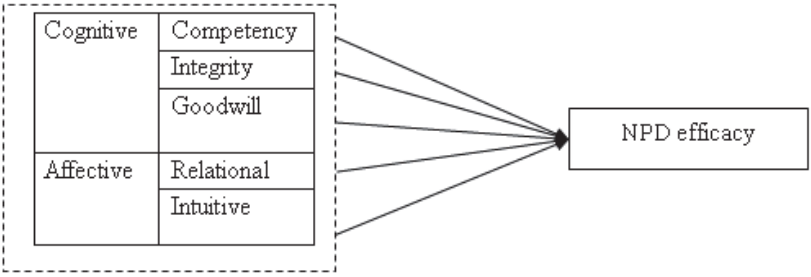

Fig. 3. Conceptual model of further research

Source: Author's own study.

The planned research is aimed at identifying the influence of affective and cognitive trust, including the components of each type of trust, on NPD effectiveness. It concerns situations where two entities decide to cooperate with each other on new product development projects. Confidence develops between the parties and affects the NPD's efficacy to some extent. The article will attempt to clarify how confidence affects the NPD's efficacy. As a measure of the effectiveness of new product development the, article recognises a positive outcome of the NPD – product commercialisation.

FURTHER RESEARCH

There is still a lot to be done about research on trust. The current studies and available literature fail to describe the construct of trust comprehensively. Further research on trust should focus on taking into account the context in which trust arises.

Keywords: trust; new product development; literature review, NPD

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DYNAMIC APPROACH IN PRACTICING COLLABORATIVE NEW PRODUCT DEVELOPMENT IN BUYER-SUPPLIER INDUSTRIAL RELATIONSHIPS

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INTRODUCTION

For decades business to business relationships, specifically buyer-supplier relationships, have attracted attention of marketing scholars and practitioners as well (e.g. Gummeson, 1987; Kalwani and Nayarandas, 1995). One important example of a strategic advantage delivered by such relationships can be the establishment of collaborative innovation, usually indicated in the NPD literature under the label of as "the supplier involvement in new product development", (Petersen et al., 2003). There are also other moderators of collaboration in innovation success, for example business size (González-Benito et al., 2016).

This study follows and extends prior research (e.g. Jer et al., 2017; Cui and Wu, 2016; Pérez-Luño et al., 2011, Pemartín and Rodríguez-Escudero, 2017) on inter-firm NPD. Specifically, this study focuses on customer-supplier collaborative practices oriented at desirable New Product Development outcomes in the context of international business relationships including both: industrial supply chain relationships (Lu et al., 2010; Teece et al., 1997) and inter-firm relations within distribution channels (Restuccia et al., 2016). This study deepens our understanding of "tactical knowledge" in collaborative NPD with customers, the topic that was largely neglected in the literature (Pérez-Luño et al., 2011). This study takes mainly supplier perspective on cooperative NPD, which can contribute to area under investigation, since majority of prior studies concentrated on customers' motivation to participate in cooperative NPD (Foss et al., 2011; Jer et al., 2017; Smals and Smits, 2012). Except literature on

collaborative NPD, we approach our research problem using mainly insights from the resource based view (RBV) theory (Barney et al. 2001). The aim of this study is to explore within the buyer-supplier dyads the practices, emphasizing the mechanisms of their action, in collaborative NPD in evolving industrial relationship. The focus is also putted on the change in practicing collaborative NPD along the relationship development. This study is based on in-depth interviews conducted among top managers of 13 supplying companies from various industries: from manufacturing to professional services.

LITERATURE REVIEW

Generally, customer participation in marketing activities is treated as factor of crucial importance, especially for achieving competitive advantage (Prahalad and Ramaswamy, 2000; Vargo and Lusch, 2004). Customers' participation in New Product Development is emphasized in the concept of value co-creation (Cui and Wu, 2016). Companies search for methods involving customers in their innovative efforts including product co-development engaging customers (Hoyer et al., 2010; Von Hippel and Katz, 2002). The extant literature on buyer-supplier relationships and collaborative NPD (e.g. Jer et al., 2017; Cuevas-Rodríguez et al., 2014; Restuccia et al., 2015) claims that the company's ability to establish and develop successful business relationships has a positive influence on outcomes of NPD. When comparing proactive and reactive customer orientation, the literature indicated on this first type of customer orientation as corelated with collaborative innovation success (e.g. Jer et al. 2013; Bodlaj et al., 2012).

The literature review presented in further part of the paper suggests that there are specific factors connected with building "tactical knowledge" (Pérez-Luño et al., 2011) as important part of collaborative NPD, which might be grouped into categories: structure of cooperation, range of value co-creation, level of project management use and communication quality.

Earlier works put special emphasis on the role of formal contracts structuring business relationships, including collaborative R&D projects (Poppo and Zenger, 2002, Sinha and Van de Ven, 2005). However, a formal contract is an insufficient mechanism for governing collaborative R&D projects, since these projects involve large uncertainty and ambiguity particularly in their early stages. For that reason there is a need to utilize other governing mechanism to ensure the effective execution of the project (Carson et al., 2006). Some studies called for non-formal, "relational" contracting for project governing (Gopal and Koka, 2012; Poppo and Zenger, 2002). As has been indicated by MacCormack and Mishra (2015) there is limited works on the interaction between formal and relational contracts and their joint impact on R&D project performance, while relational contracting can complement formal.

There is a very limited literature on NPD management in the context of collaborative NPD in buyer-seller working relationships. An exception is the research by Park et al. (2010) about collaborative NPD between U.S. and Korean companies.

According to Park et al. (2010) companies are increasingly adopting project management standards to formulate and implement cooperative strategies including management of R&D.

Customer value co-creation is considered in NPD research with regard to specific customers' roles and timing in the NPD process (Tseng and Chiang, 2016; Eslami and Lakemond, 2016). Timing of customer cooperation in NPD is perceived from the perspective of the NPD stages, namely: idea, concept, development, testing and validation, market launch and product maintenance (e.g. Gaubinger et al., 2009). Following this timing structure, Eslami and Lakemond (2016) identified different roles for customers' involvement in collaborative NPD with regard to different stages. Customers who are active partners within NPD teams are involved in joint problem solving with supplier's employees (Bogers and Horst, 2014; Jeppesen, 2005) and sharing the responsibility of product development becomes an important issue (Cui and Wu, 2016). The customers' involvement in co-creation of new products is especially important in the development of industrial products since specific knowledge from the customer is required (Eslami and Lakemond, 2016).

Communication quality is recognized as a specific building block of every exchange relationship (Pemartin and Rodriguez-Escudero, 2017). Communication quality has so far been used to explain NPD collaboration results, because prior research illustrated the positive interplay between communication quality on NPD outcomes, both: collaborative ad non-collaborative (e.g. Sobrero and Roberts, 2002; Hoegl and Wagner, 2005). According to Pemartin and Rodriguez-Escudero (2017) communication quality forms the basis of knowledge transfer and innovation generation. The high level of communication quality helps in building trust between partners, which is crucial for all collaborative projects. (Tang, 2014)

RESEARCH METHOD

To explore the suppliers' tactics oriented at relationship-based NPD with business customers we utilized the qualitative research method. In 2018 and 2019 we conducted individual in-depth interviews (IDI) with representatives of 13 companies (particular interviews coded as I1, I2, … I13). We utilized an abductive (Dubois and Gadde 2002) approach in our research, as we made some assumptions on the possible practices which we wanted to focus on, but from the other side we tried to explore some specific microfoundations of collaborative NPD with regard to 4 main research constructs, such us: structure of cooperation, communication quality, project management application and range of value co-creation

RESULTS

In overwhelming majority of analysed dyads the less formal **structure of cooperation** was associated with growing level of trust in business relationships, including within collaborative NPD. It was achieved usually after some period of cooperation

through suppliers' solid work and promise keeping. Interviewees underline that trust that was earned made customers were less oriented on controlling R&D tasks and formalization of consecutive steps. One of the interviewee (I8) representing the supplier manufacturing aerosol products described increasing informality in collaborative NPD after several years of delivering successfully OEM services to the large multinational concern. It was observable on the customer side quite often change of the particular employees responsible for NPD in collaboration with interviewed supplier, in whom the same personnel was in charge for many years. This caused the supplier's larger and larger R&D knowledge in relation to the buying company in regard to the ordered products.

During interviews we observed the tendency among suppliers to engage in collaborative NPD with "the best" customer in the industry, mainly because of expected learning effects and, as a consequence, increased possibility of acquiring new profitable customers. Such customers, usually large multinational corporations have very high expectations for their NPD processes, including those undertaken with external partners. Several interviewees reported the dynamic growth of their companies connected with involvement in collaborative NPD. Many suppliers we investigated aimed in increasing the **range of value co-creation** (VCC) with benchmark customers. The first step in this process was usually earning customer's trust after the supplier became more competent. The interviewees assessed that the suppliers' proactive orientation in offering innovative solutions in collaborative NPD was clearly encouraging customers to engage in VCC. Interviewees indicated several practices related to increasing range of VCC, such us: the necessity of trilateral meetings (supplier, customer and sub-suppliers); keeping the same key employees; showing better expertise than customer in key areas of new product R&D; delivering innovative solutions, e.g. oriented on lowering the costs or increasing the quality of the product. One of the representatives of suppliers indicated that their large customer (manufacturer with highly recognizable brand), delivered just the marketing concept of the new product and the suppliers role was to check feasibility from engineering point of view. That requirement created the space for signalling suppliers' R&D department skills.

Several interesting aspects were recognized in relation to **project management** issues in collaborative NPD, utilized commonly as a management method. The theme, which was very often underlined by the interviewees was the issue of early estimation of the costs and profitability of the collaborative NPD project, which was closely associated with the terms of contract the partners agreed for. These were mainly OEM's suppliers that reported using estimations with regard to both: project anticipated profitability and project success probability, whereas non-OEM's suppliers did rather not report such practices. Several OEM's suppliers emphasized pressure from their customers on providing NPD project pricing early, already in the concept phase. Such pricing contained usually NPD project costs and the quotation (number of items manufactured in defined period of time and cost per unit). One of the interviewee (I1) proposed a "design review" method, which was used if customer

did not know what to expect from the new product. This method is related first of all to the indication to the customer the gaps or deficiency in current level of particular NPD project advancement. Secondly this method assumes that identified shortages of the particular NPD project, should be defined how will be fixed to make possible anticipation of further such a project continuation with intention of implementation to the particular operations (manufacturing or assembling) facility of the supplier. The interviewee (I1) emphasized that evaluation of such a project costs is possible when all the gaps identified by "design review" method are decided how will be fixed. Interviewees put their attention on other practices with regard to the project management, such us: agreeing on high quality data being shared between partners in collaborative NPD project realization; the importance of the supplier's personnel from sales department and marketing department in defining customer needs; not defining clear contract terms in case most innovative or experimental collaborative NPD.

All respondents underlined the importance of **communication quality** both: internally (within firm) and externally (in inter-firm relation) with regard to collaborative NPD. The most common practices in this area were: having project leader assigned from the supplier side; competence and high self-directedness of different specialists on the supplier side (i.e. these specialists that interact with customer side); suppliers' adjustment of the way, formats and the content of communication to the customers processes and procedures (especially with regard to powerful customers); compromising speed and precision of delivering information to the customer; appointing contact person to the customer, easily available. In few interviews communication quality was stressed as important factor with regard to tensions and the crisis situations. Sometimes it is obvious to the OEM's suppliers after some phase of development that particular project is doomed to fail. Here is an ethical issue, whether to inform customer or on and just continue because of economic reasons – it is usually paid by the customer. Generally, few interviewees reported using some methods (e.g. "design review") that were fully devoted to ensure solid customer information about the status of collaborative NPD. In one of the interviews (I5), the focus was on the issue of punctuality in delivering what exactly was promised, especially when the customer was a North-Western Europe partner of a big size, In other interview (I1), we got description of resolving the crisis with key customer through improvement of communication transparency.

CONCLUSIONS

The analysis of interviews suggest that collaborative NPD is a complex and difficult area in efficient management in business dyadic relationship. The exploration of practicing of NPD in business dyads delivered deepen insights on the meaning and importance of methods which were found among 4 general research categories. The interviews analysis, showed the identified tactics and methods as influencing

on collaborative NPD process performance and its results, and also influencing on researched business dyads relationship improvement.

Keywords: collaborative New Product Development, B2B customer-supplier dyad, project management, communication quality, value co-creation

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THE ROLE OF PROACTIVE CUSTOMER ORIENTATION AND JOINT LEARNING CAPABILITIES IN SUCCESS OF RISKY COLLABORATIVE PRODUCT AND TECHNOLOGY INNOVATION DEVELOPMENT INVOLVING INDUSTRIAL INFORMATION TECHNOLOGIES

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INTRODUCTION

Rapid changes in the contemporary business world influence the understanding of the theory and practice of the company and its relationships. Specifically the dyad buyer-supplier, have attracted both theoreticians and practitioners (e.g. Gummeson, 1987; Kalwani and Nayarandas, 1995). One important example of a strategic advantage delivered by such relationships can be the establishment of collaborative innovation, sometimes indicated with the term 'supplier involvement in new product development', (Petersen et al., 2003). Innovation outsourcing has become a megatrend and has helped many companies such as IBM, Hewlett Packard, and Dell reduce their R&D budgets while relying on their external contracting suppliers to take more responsibility for design and product development (Azadegan & Dooley, 2010). The aim of this study is exploration of the influence of proactive customer orientation [PCO] and joint learning capability [JLC] on the acceptance and use of machine to machine interaction [M2M] in collaborative innovation development [CID], from the supplier's perspective. The research is based on a case study of the automatics integrator supplying an automotive concern in fully robotized work station.

LITERATURE REVIEW

An extensive body of literature focuses on customers' motivation to participate in cooperative NPD (Johnsen, 2009) but the number of works dealing with the suppliers' perspective on organizational mechanisms needed to facilitate customer involvement in cooperative NPD remains still limited (Smals and Smits, 2012; Foss et al., 2011; Jer et al., 2017).

The positive impact of relational capital on cooperative NPD is well documented in literature. Majority of current studies dealing with buyer-supplier relationships and collaborative NPD (e.g. Jer et al., 2017; Trainor et al., 2013; Pérez-Luño et al., 2011; Cuevas- Rodríguez et al., 2014) claim that generally the company's ability to establish and develop successful business relationships has a positive influence on outcomes of collaborative NPD, and such ability is defined with the term relational capital (Jer et al., 2017; Pérez-Luño et al., 2011; Cuevas-Rodríguez et al., 2014; Soosay et al., 2008). Relational capital has been suggested to play a particularly important role in joint learning, relational innovation, and intellectual capital (Chang and Gotcher, 2007; Muthusamy and White, 2005), while creating a safe space for open relational interaction that enables knowledge sharing, joint sense-making, and the integration of knowledge into relationship-specific memory (Huikkola et al., 2013). According to Soosay et al. (2008) relational capital by enhancing not only the amount but also quality of knowledge and information-sharing between partners, lessen the risks and complexity that can hinder radical innovation in global supply chains. Most studies tested a direct interconnection between relational capital and innovation (e.g. Cuevas-Rodríguez et al., 2014; Pérez-Luño et al., 2011), to show its positive impact on developing radical innovation.

According to Fang and Zou (2010), joint learning capabilities refer to "the ability of the partners [e.g., supplier-customer relationships] to develop relationship-specific organizational infrastructure and communication channels to integrate the partners' knowledge, create a new knowledge base for the relationships, and institutionalize new knowledge in the context of the relationship. Joint learning can help firms gain access and exposure to diverse knowledge domains and enlightens organizations on novel approaches by which existing problems can be solved (Subramaniam & Youndt 2005).

Huikkola et al. (2013) consider joint learning to be a relational dynamic capability that yields collaborative advantages for both of the parties. They also claim that knowledge sharing refers to the transfer of knowledge through informal and formal interactions between the supplier and customer (Chang and Gotcher, 2007; Selnes and Sallis, 2003; Sluyts et al., 2011).

Proactive customer orientation is proposed by Blocker et al. (2011) and defined as the "capability to continuously probe existing and potential new customers' latent needs and uncover future needs" (p. 217). Proactive customer orientation, being closely related to proactive type of the innovation strategy (Urban and Hauser, 1993), is very important in generating innovation because „it helps companies to

acquire information regarding future trends and assists them in obtaining a better understanding of existing and new customers' current and future requirements" (Narver et al., 2004). The research of Jer et al. (2013) argued that proactive customer orientation positively influences cooperative NPD outcomes with the link being simultaneously moderated by the supplier – customer dependences and the degree of supplier design responsibility. Empirical findings of Jer et al. (2017) suggests that relational capital creates a supportive supply chain environment that facilitates proactive customer orientation in identifying unexpressed needs and joint learning to develop new knowledge. The literature shows that information technology is associated with organizational learning (Tippins and Sohi, 2003). In addition, electronic integration can help firms interpret market information better, and thus, help develop new knowledge sets in the collaborative relationship (Malhotra et al., 2005).

Machine-to-Machine (M2M) communication is the autonomous interaction of a large number of machine devices to perform sensing, processing, and actuation activities without human intervention. These devices include meters in a smart grid, electronics and servers, and navigation sensors used for relaying information through a network. The main feature that sets M2M apart from other communication paradigms is the absence of human supervision (Othman, 2018) In the manufacturing e.g. automotive and elsewhere industrial robots that are part of M2M network perform many types of tasks from material handling to welding and painting (Michalos et al., 2010). Critical questions to address are among others fault detection and alarm limits that will influence several business critical processes including service levels and order taking. In the steel industry business relationships the steel hardness information has been for long time send via wireless networks which enables the steel hardening company immediately fill in the gap in the production line (Salo, 2012). Manufacturers of automotive assembly, in their effort to remain competitive, seek new technologies and equipment, which will allow their companies to increase their responsiveness to demand fluctuations and variability. Agile, modular and autonomous assembly systems are considered as the most suitable solutions. Therefore, new technologies are introduced to almost every section of the automotive assembly plant (Michalos G., 2010).

Included M2M solutions in technological or new product innovation development increases the business risk for customers, because of several reasons. The first is the novelty of such a solutions, without sufficient base of implementations, allowing for assessment of advantages and disadvantages of it (Nagy et al., 2018). The second is the issue of limitation of human decision making on the side of increasing the autonomy of machines decision taking, which is related to the trust issues. In case of problems with M2M interactions in newly designed technology, there is limited human control on the technological process. Sometimes it means no human direct control on the process because of remote management (Momeni et al., 2018) in which M2M interactions is used.

RESEARCH METHOD

The case study was used as a research method. It was conducted in 2019 at Polish manufacturing company producing automotive equipment. Due to the non-disclosure agreement between the organization and the author involved in the project, some information concerning the organization, including products application and description of automated assembly line, cannot be exposed in detail. Several individual interviews were conducted with the CEO, design engineer and project leader. It also extended on the analysis of documents. The researcher participated in commercial meetings between the supplier and the customer on the subject of development of robotic assembly line with M2M interaction solutions. Although the implementation is not yet done completely, it allowed the analysis on partners collaboration in this solution development. It is also possible to analyse the customer needs and motivations in terms of his perception of the use of the M2M solutions included in automotive machines. It was analysed the proactive customer orientation and joint learning capability of researched supplier and its influence on the success of CID. The categories for researching PCO were adopted from (Blocker et al. 2011) and JLC from (Jer et al. 2018)

INITIAL RESULTS

Decision about the level of automation is not a planned and structured activity and there are no support decision systems to adopt, on the contrary it is mainly an ad hoc nature activity. There is little use of methods to design, introduce and evaluate automation projects. Proactive customer orientation of the supplier influenced the customer on making the decision about choosing provider. Spending time to understand their needs and concerns led to innovative solutions and ideas. Alongside the core offer, provider also created value for customer through "service support" such as installation, training, or maintenance. Business relationship provided opportunities for forming social bonds thanks to which the communication and the ease of doing business mutally improved.

Assumptions to line construction came from the customer who prepared the technological process. Business to business relational capital supported running operation meetings and on-the-job workshops, where teams of engineers and project managers from both parties, could learn how the assembly line design was complex due to the high number of variables involved, such as line efficiency, cost, reliability and space. The line automation was supposed to yield significant improvements: sizeable increase of the workstations saturation, better cohesion with Just in Time principles, reduction of the employed working force, and increase of the quality control process rigor. The joint learning capability developed new knowledge, thanks to which innovation emerged. The relational capital facilitated proactive customer orientation of the supplier and curtailed the risk and uncertainty of the customer concerning the machines features and its reliability. The supplier also gained knowledge on the general future demands of automotive industry. It enhanced development of new solutions.

DISCUSSION

Focusing on joint learning capability as the key mediating construct, with industrial information technologies, and proactive customer orientation to drive innovation generation, this paper broadens and deepens our understanding of how innovation by suppliers can be generated in customer-supplier relationships. With a significant shift toward supplier-driven innovation networks and open innovation, suppliers are currently playing key roles in innovation generation in supply chains. Research on innovation in supply chains is flourishing, yet our general understanding of the antecedents and consequences of innovation generation on interorganizational relationships and specific understanding of supply chains remains relatively unclear (Jer et al. 2018). Although contracting suppliers firms have adopted more innovative jobs, how these firms can develop innovative capabilities through collaborative (i.e., joint) learning with customers remains unanswered.

Keywords: proactive customer orientation, M2M communication, joint learning capability, relational capital

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VERIFICATION OF THE POSSIBILITY OF USING THE MFA METHOD TO EXPAND THE GUIDELINES FOR ECODESIGN OF FOOD PACKAGING WITH REGARD TO THE COLLABORATIVE APPROACH OF THE SUPPLY CHAIN STAKEHOLDERS

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INTRODUCTION

The modern approach to the design of food packaging as product constituting inherent elements of integrated product enforces taking into account and adapting to the changing market trends. These trends have a significant impact on the consumer goods market, and thus on products offered on it. This is evidenced by changes in structure and consumption as well as an increase in the demand for products and their packaging, which will be highly adapted to the requirements of all entities in the supply chain (Cholewa-Wójcik, Kawecka 2014, Shi et al. 2019). Despite the adaptive nature of packaging supply chains, which should be treated as systems of cooperating organizations capable of dynamically adapting changes at the level of the environment and its individual links, there is no collaborative approach to working out the fundamental assumptions for the greening of food packaging. This problem is extremely important due to the current trends of product greening, including packaging and necessary adjustments to legal acts related to the limitation of the use of plastics for the production of food packaging.

The main goal of this study is to identify the basic environmental performance criteria and their verification based on hybrid testing that combines quantitative

analysis from expert interviews. In addition, the aim of the work is to develop guidelines for the eco-design of packaging.

The implementation of the work objective was carried out using a systematic approach to treating the packaging supply chain as a network of related organizations, in which the collaborative approach to the primary common goals of its actors should dominate, with particular emphasis on packaging greening as a basic element of the supply chain. The above approach departs from the hitherto prevailing concept according to which the main task of supply chains is primarily to strive to optimize the flow of material goods and information.

Taking into account the purpose of the work, the following theses were adopted:

T1: The use of a multiple factor analysis allows to indicate the links between the decision-making criteria of the entities in the packaging supply chain.

T2: Analysis of the corresponding criteria of the packaging supply chain entities can be a guideline to develop the fundamental principles of the ecodesign of packaging.

LITERATURE REVIEW

In the literature on the subject, issues related to the design and development of ecological features of products, including packaging, are extensive and broadly analyzed by authors representing various fields and disciplines (Dieter & Schmidt, 2012, Geissdoerfer et al., 2016, Pinheiro et al., 2018). Issues related to eco-design are taken in technical, environmental and marketing terms. The problems of technical design are presented, among others in studies by Dieter & Schmidt (2012), Cholewa-Wójcik (2018). In turn, the role of environmental aspects in the design process was the subject of works conducted, among others by Luttropp & Lagerstedt (2006), Aloone & Bey (2009), Perry et al. (2010), Lacoste et al. (2011), Chun et al. (2018). However, the marketing and management role in the product design process is the subject of works by such authors as: Earle et al. (2007), Solomon et al. (2010), Kline-Weinreich (2011), M. Borchardt at al. (2011), Read et al. (2015), Prendeville et al. (2017), Singh & Sarkar (2019). Literature considerations also concern the role of methods, analytical techniques and IT tools in the design processes, which were described, among others, by Traill (2008), Almeida at al. (2010), Bouch et al. (2014), Grajewski et al. (2015), Garcia- Dieguez (2015), Rodriguez at al. (2017). Despite the multifaceted nature of design issues undertaken in the literature of the subject, in individual works this subject is presented in a selective manner taking into account a narrow aspect of design or presenting formulas for design in the design process relating to a specific product or group of products. Therefore, the approach presented in the literature for the design and development of ecological characteristics of products, including packaging, did not include the concept of eco-designing food packaging, taking into account the collaborative approach of supply chain entities, although importance of cooperation is noticeable in papers by Vicianová et al. (2017)

The analysis of the scope of research and analyzes carried out so far, indicated the need to undertake own research in order to develop guidelines for the eco-design of food packaging, taking into account the collaborative approach of supply chain entities.

RESEARCH METHOD

In order to verify the substantive thesis regarding the indication of links between the decision-making criteria of entities in the packaging supply chain, a multiple factor analysis (MFA) was selected as a research method. It is a method from the factor method group, which allows to isolate hidden a posteriori variables that explain the maximum number of variations or associations in the original data set (Pages & Husson, 2013, Abdi et al. 2013). The idea of MFA is to integrate variables at different measurement levels that describe the same observations expressed in tabular form and analyze the relationships between data tables. The number of variables in each set may be different, and their nature may be different. It is important that the variables in a given set are of the same type. MFA allows for structural analysis, infrastructure analysis and structural analysis of objects in a shared multidimensional space. MFA is carried out in two stages: in the first one, an analysis of the main components or an analysis of correspondence is carried out. The data sets obtained are normalized, i.e. all elements are divided by the square root of the first eigenvalue. Normalized data is combined into a data matrix and the main component analysis is performed on this matrix. The individual data sets are then projected onto the global n-dimensional space (Pilch & Sagan, 2014).

In order to verify the possibility of using MFA to indicate links between the decision-making criteria of the entities of the packaging supply chain for packaging design, it is planned to conduct qualitative research in the form of interviews with deliberately selected respondents. To this end, the so-called competent judges who were at the same time representatives of individual entities in the supply chain or its surroundings (representatives of companies producing packaging materials and packaging, printing packaging, distributing packaging, users of packaging, consumers, representatives of packaging waste management sector companies, as well as packaging experts). Respondents were selected in a targeted manner on the basis of their professional functions and competences. As a rule, each of them, due to his role in the supply chain, may be guided by different categories of decision-making purpose. The respondents' task will be to indicate a set of criteria relevant to them in the context of designing food packaging with plastic components. Then, each of the respondents, based on their indicated criteria, will evaluate selected food packaging in a 7-point scale, where 1 will mean the smallest intensity of a given feature in a given packaging, while 7 will be the largest. After analyzing the components for each assessed package, normalized data will be combined into a global matrix, which is the basis for component analysis and the construction of global space on its basis. This allows showing a common space structure for the analyzed packages.

DISCUSSION

The obtained research results will enable the implementation of the research goal and its assumptions. In addition, the data collected in the course of analysis using the MFA method in the form of sets of features distinguished by individual judges and the assessments received by individual packaging against the distinguished characteristics, will allow to identify common design criteria relevant to all entities in the supply chain. The indicated criteria will also serve as a basis for formulating the fundamental principles of packaging design, taking into account ecological aspects, which will constitute a collaboratively developed consensus of individual entities in the supply chain.

Keywords: eco-design, packaging eco-design, environmental performance of packaging, multiple factor analysis

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EFFECTIVENESS AND EFFICIENCY OF THE CID PROCESS – A CASE STUDY OF A MEDICAL PRODUCT

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INTRODUCTION

The introduction of an innovative medical product from an emerging country to the competitive sector and market in the US requires a highly competent team that uses a collaborative innovation development (CID) process along with financial aids and support from business angels and venture capitals. The presented case study of the company *Medicalgorithmics* describes its effective and efficient solution to examine cardiac arrhythmia and the market implementation of a new product.

LITERATURE REVIEW

The literature review presents several reasons why start-ups or, companies in general terms engage other stakeholders in research and creation. These reasons may include: saving transaction costs in case of incomplete contracts, using networks as a way of increasing synergy, efficiency and power, creating and exploiting high risk. Opportunities, benefits and challenges of collaborative innovation with a customer and a health sector representative are crucial to conduct a validation process and obtain a certificate from an authority like Food and Drug Administration (FDA). At an early stage, in order to attract a business angel and venture funds a start-up needs to overcome insufficient competence, for example in finance, sales and attract customers. Because of a lack of income, the effectiveness and efficiency of CID is crucial for start-ups to survive.

The present study was inspired by the lack of research on efficiency and effectiveness of the collaborative innovation development process in transformed countries located in mid-eastern Europe, such as Poland. The participation of doctors and patients in the pharmaceutical product testing process is broadly described, but

there is a clear lack of analyses of e-health new technology implementation. The case study described in the paper is the only successful one, known to the author, which had started more than ten years ago and provides financial and statistical data for this period.

RESEARCH METHOD

The author bases his research on literature review in the area of case study methodology, start-up and collaborative innovation development. The desk research allowed for obtaining information aimed at presenting the case study. *Medicalgorithmics* received many aids from the national scientific government agencies and European funds, which were discussed briefly in the papers, across websites of donors, reports of the company and newspaper articles (tab 1).

Table 1. List of received grants

No	Founds	Programme	Title
1.	EFRR	Increased competitiveness of enterprises	A remote cardiac monitoring system with automatic arrhythmia and pre-infarction angina diagnostics
2.	EFRR	Increased competitiveness of enterprises	Participation in a international trade fair as an exhibitor
3.	MNiSzW	Technological Initiative I	Remote cardiovascular consultation system using a multi-function telemetric device
4.	NCBR	IniTECH	A new method for long-term telemetric measurement of cardiovascular parameters
5.	EFRR	POIG	Development of a new generation multi-function system for mobile cardiac telemetry
6.	EFRR	POIG	Medicalgorithmics invention protection in EU and the U.S
7.	EFRR	POIG	Obtaining legal protection of a Medicalgorithmics Sp. z o.o. inventions and extending the range of their protection in EU, the U.S. and India
8.	7PR	FP7-ICT	Intelligent Knowledge Platform for Personal Health Monitoring Services
9.	EFRR	POIR	ECG TechBot Dedicated software that uses a set of algorithms for automatic interpretation of the ECG signal based on deep learning methods

Source: Own study based on the donors' websites

The company has been listed on Warsaw Stock Exchange since 2011, which imposes the obligation of reporting important data concerning company operations and financial reports in certain periods. Since the company was viewed by many experts and journalists as a good example to be introduced to the public, it is a

participant of many conferences. All the press information and presentations contain relevant information about the company. The main expenditures and effects were calculated using financial documents. However, many outputs and outcomes of CID were presented in the table as intangible.

RESULTS

The research shows that the company achieved superior market performance as a result of inter-and intra-organisational involvement. At the beginning of its activity, the company started to collaborate with more than ten hospitals in Poland and Europe and above twenty professors of medicine. The implementation of many projects financed by external sources forced constant cooperation not only with donors but also with experts or other entities directly and indirectly participating in the indicated projects. It did not build its own sales department but made an agreement with an American deliverer from the health sector to spread its product. The time for obtaining the FDA certificate took less than 2 years and the task was completed successfully (PocketECG: May 2009, PocketECG CRS: July 2018). In 2010, on the US market, where the company is a holder of the FDA certificate, the margin was almost 50% in the first completed year: the revenue amounted PLN 4.1 million and the profit reached PLN 1.9 million. The commercialisation was conducted with success and met high customer satisfaction. One of the last evaluations of the system product (PocketECG) has been presented at a cardiac conference: Heart Rhythm Society in Boston in 2018, beating the competitors thanks to top results and parameters. The presented result at the mentioned conference was prepared with the R&D team from *Medicalgorithmics,* key opinion leaders (KOL) and professors from Houston Methodist Hospital.

DISCUSSION

Maintaining a competitive advantage in the long term needs observing technical, legal and economic variables as well as the activity of competitors. The scope and strength of the involvement of other stakeholders on the market regarding the company should be evaluated in terms of collaborative innovation development. Competitors created similar products, which made a significant change on the market, further intensified by lower subsidies for cardiac monitoring granted by hospitals or insurance companies. Intra- and interorganisational learning should be one of the main factors of improving the market position in the future.

Keywords: collaborative innovation development; emerging markets; innovation process; start-up

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COLLABORATIVE INNOVATION DEVELOPMENT – B2C PERSPECTIVE

CUSTOMERS AS VALUE CO-CREATORS – AN EMPIRICAL STUDY ON CUSTOMER CITIZENSHIP BEHAVIOUR

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INTRODUCTION

Customer citizenship behaviour is one of most promising areas in both: marketing theory and marketing practice. In marketing theory the customer citizenship behaviour (CCB), perceived as consumers non-obligatory actions delivering value to the company, is addressed under various notions in several research streams, including service dominant logic of marketing, customer engagement and prosumption. CCB is also utilized in business practices as companies welcome and encourage customers to perform CCB. In turn, these customers are being treated as value co-creators.

Although there are various factors discussed in the literature as drivers of customer citizenship behaviour and inclination for value co-creating, our knowledge about mechanism leading consumers to engage in these activities is still weak, especially on empirical level.

This paper addresses the gap identified in the literature by presenting the results of empirical study conducted among Polish customers. The research was explorative in nature and conducted among 105 respondents. The study aims especially at identifying consumer attributes that are hypothesized as drivers of customer citizenship behaviour. To identify the key drivers for customers' inclination to participate in value co-creation, exploratory factor analysis (EFA) was conducted and convergent validity was tested. Except for research results the paper will present conclusions, point at some limitations and indicate the possible future research areas.

LITERATURE REVIEW

Recently, there has been focus on customer behaviour in management and marketing literature (Bettencourt 1997, Groth 2005, Yi et al.2013, Aggarwal 2014). Prior studies allow to recognize the role of customers who engage in a variety of positive, discretionary behaviour directed towards companies, and other customers (Yi, Gong 2006). Various terms have been used to describe this behaviour, including customer voluntary behaviour (Bettencourt 1997, Rosenbaum and Messiah 2007, Balaij 2014) or customer citizenship behaviour (Gruen 2000, Groth 2005, Bove et al. 2009), which is a subject matter of general interest presented in the paper.

Customer citizenship behaviour (CCB) may be defined as "*discretionary and pro-social actions displayed by customers, that bring benefits both to the companies and other customers*" (Bettencourt 1997; Bove et al. 2009). Literature studies (Soch, Aggarwal 2013; Garma and Bove 2009; Balaji 2014; Bettencourt 1997; Groth 2005; Johnson, Rapp 2010; Gruen 1995; Bettencourt 1997) prove that customer citizenship behaviour is a multidimensional construct consisting of several forms. Researchers have mentioned conceptually distinct dimensions of CCB, i.e.:

- customer behaviour that involves providing information and (positive or negative) opinions on companies, their goods and services, with the intention of improving the marketing activity (co-creation, voice, consultancy);
- customer behaviour that involves encouraging other customers (friends, family members internet users etc.) to use a company's goods or services, positive WOM and recommendations (advocacy);
- customer behaviour that displays commitment to a company, a favourable attitude towards its products, services and marketing activity by presenting a company's logotype (on clothes, bags etc.), presenting involvement in marketing events provided by a company (displaying affiliation, social support);
- customer behaviour consisting in helping other customers when product usage or company's proceedings may be troublesome and uneasy for other customers, benevolent acts of service facilitation towards other customers (helping other customers);
- customer behaviour that involves observing other customers to eliminate their inappropriate behaviour, e.g. not respecting the queue, misbehaving on company's fun page, being rude to other customers (mitigating, policing).

Among various dimensions of CCB, one was focused on, i.e. customer value co-creation. Traditionally, suppliers produced goods and services, which were purchased by customers. Today, customers can engage in dialog with suppliers during each stage of product design and product delivery (Ballantyne 2004). Due to cooperation and mutual engagement, supplier and customer have the opportunity to create value through customized, co-produced offerings. The co-creation of value is a desirable goal as it can assist firms in highlighting the customer's or consumer's point of view and in improving the front-end process of identifying customers' needs and wants (Lusch and Vargo 2006).

It should be noticed that value co-creation requires customer engagement or may even envolve a sacriface on customers' part (such as time and effort) and is described by researchers as commitment or supportive behaviour (Wing Sung Tung et al. 2017). Since the behaviour is voluntary, it should be driven by specific motives. A question may therefore arise: what may be the determinants of customer citizenship behaviours in general and in case of helping other customers, particularly? An in-depth analysis into the subject of helping other customers as a CCB dimention requires the consideration of related concepts and theories relevant to the subject matter.

RESEARCH METHOD

The purpose of this study was to identify correlates with the inclination of customers to perform value co-creation in favour of companies, as a specific form of CCB. The research was in a form of a survey conducted in 2017. It was as a part of broader spectrum of customer citizenship behaviour conducted on 482 Polish respondents, nevertheless the paper presents only limited extend, i.e. research finding referring to customers' value co-creation. The research was exploratory in nature, conducted in order to determine the nature of the problem, and was not intended to provide conclusive evidence, but to have a better understanding of the problem (Henson and Roberts 2006).

In total, 105 valid questionnaires were used in the analysis. 49 of the respondents were male and 56 female, aged 18–25 (40%) with secondary and higher education level (61,9% and21% respectively). Asked to describe their economic status in comparison to other people at the same age, respondents evaluated it as similar or the same (61,9%) and rather better (26,7%). Respondents were also asked how often they used Internet. 68,6% declared the internet usage several times a day.

RESULTS

Respondents were asked whether they had co-created value in favour of companies. It was a filter question used for sampling. 105 survey participants declared they had, and when asked to indicate which specific activities were performed, 75,2% declared they "*Had provided information on customers' satisfaction, participated in customer surveys*" and 50,5% "*Had provided feedback on company's products, services and market activity (online and offline)*". Some companies notice the extra-role behaviour of their customers and express gratitude. 15,2% of respondents experienced gratification in forms of *acknowledgements*, *emails with gratefulness*, but also *rewards* and *gifts*, *company gadgets*, *discounts*, *vouchers* and *coupons*.

We also asked the respondents about their intention to perform value co-creation in future. Researched customers declared they "*would rather*" provide information on customers' satisfaction, participate in customer surveys" and also "*would rather*"

provide feedback on company's products, services and market activity" (55,3% and 49,5% respectively).

In order to identify the key drivers for customers' inclination to participate in value co-creation, exploratory factor analysis (EFA) was conducted on the basis of SPSS program. The Scree Plot indicated a five-factor solution. The Varimax results of EFA for previously identified 18 items used for the latent constructs. In general, all items loaded on the expected constructs and they had factor loadings higher than 0,6 with no cross loadings.

The rotated component matrix allows to indicate 5 main constructs determining the inclination of customers to engage in value co-creation. The first one refers to safety and belonging needs of customers (CUSTOMER_SAFETY AND BELONGING) and covers safety, stability, order, membership in a group, relationships with others. The second construct (COURTESY) refers to customers'attitudes and behaviour towards others, i.e. being polite to other people, appreciating other people politeness, lack of acceptance for impolite behaviour of other people. The third and fourth constructs (CUSTOMER_ESTEEM), (CUSTOMER_GROWTH) also apply to customers' needs identified and described by Maslow, i.e: esteem needs (acceptation, notification, respect) and growth needs (self-fulfilment, self-development, development of competences). The last construct is the willingness to perform customer citizenship behaviour in the form of value co-creation in future (CO-CREATION_INCLINATION), consisting of providing feedback on company's products, services and market activity, both online and offline, and providing information on customers' satisfaction, participating in customers surveys.

Following Hair et al (2006), as well as Mitręga and Pfajfar (2015), convergent validity was tested to determine whether the "indicators of a specific construct should coverage or share a high proportion of variance in common". Average variance extracted (AVE) and composite reliability (CR) asses convergent validity, according to the following criteria: AVE>0,5 and SCR>0,6. The criteria were met in case of all measured constructs.

DISCUSSION

Summarizing the deliberation presented in the paper, CCB may be perceived as an important trend in customer behaviour. It is a multidimensional construct consisting of several dimensions, customer value co-creation among them. The behaviour, voluntary in nature, is driven by specific factors making customers provide extra role behaviour. On the basis of conducted exploratory factor analysis (EFA) 5 main constructs determining the inclination of customers to engage in value co-creation: CUSTOMER_SAFETY AND BELONGING, COURTESY, CUSTOMER_ESTEEM, CUSTOMER_GROWTH, CO-CREATION_INCLINATION. Measures of latent variables were valid and reliable in case of all five constructs, which allows testing relationships between these constructs in future studies, using other analytical methods.

This study may enrich our understanding of relationship marketing on both theoretical and empirical levels, indicating the key drivers for customer extra role behaviour in the form of value co-creation.

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THE IMPACT OF PERCEIVED CONTROL OF BEHAVIOUR ON PURCHASING INTENTIONS OF AN ECOLOGICAL PRODUCT OF POLISH CONSUMERS – IMPLICATIONS FOR MARKETING

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INTRODUCTION

The market for green products is currently one of the rapidly growing market sectors in highly developed countries, but the share of green products on the market is still small. This problem concerns not only the Polish market, but also other European markets. Purchasers express their concern about the future of the planet and the cleanliness of the environment, but in their conduct they do not take into account ecological criteria (Carrington et al. 2010, Bray et al. 2011). Positive attitudes towards environmental protection do not translate into green purchases (Fraj & Martinez 2006, Follows & Jobber 2000, Gupta & Ogden 2006). A person may have a positive attitude towards a particular behaviour, but may not have the intention to behave in a particular way, especially if they perceive difficulties. Therefore, a positive relationship between an attitude and an intention should be verified by the degree of perceived ease or difficulty of behaviour. The most frequent explanations of the discrepancy between attitudes and behaviour in the market of green products are: lack of trust and high prices (Connell 2010, Gleim & Lawson 2014). Some authors draw attention to the low level of purchasers' knowledge about green products and the lack of their availability (Braga et al., 2014). The existing factors limiting the purchase of green products may affect the consumer's perceived effectiveness as low (Lee 2009). Poorly-perceived control of behaviour may lead to the abandonment of green products, which makes it difficult for companies to implement eco-marketing strategies (Witek 2019).

LITERATURE REVIEW

The perceived control of behaviour was included in the theory of planned behaviour (TPB) as an independent variable (Ajzen 2002). TPB is considered one of the most useful theoretical frameworks in explaining consumer behaviour, where behavioural intention is accepted as the best available predictive factor (Ajzen 1991). The introduction of perceived behavioural control to the TPB model allowed for verifying a behavioural intention to perform an action and, consequently, the action itself. The perceived control of behaviour is expressed in the assessment of the ease or difficulty of achieving a given behaviour (Eagly & Chaiken 1993). It is important to convince the purchaser of the availability of resources and the assessment of the possibilities that may facilitate or inhibit behaviour. Pavlou & Fygenson (2006) suggest that resources and self-efficacy are two constructs capable of measuring behaviour control. It is assumed that perceived behaviour control has a direct impact on the intention of behaviour (Han & Kim 2010). The bigger it is, the stronger intentions of purchasing a green product (Mancha & Yoder 2015). Poorly perceived behavioural control of purchasers is associated more with the perceived lack of resources and the opportunities to behave (Wallace 2005). Dowd & Burke (2013) find a relationship between perceived behavioural control and intent of purchasing at a level of 0.51. In general, the results of research indicate congruence, although Yazdanpanah & Forouzani (2015) indicate that there is a negligible relationship between perceived behaviour control and the intention of purchasing green products.

RESEARCH

The aim of this research is to examine the relationship between perceived behavioural control and attitudes towards the purchase of a green product and subjective standards, and between perceived behavioural control and the intentions of purchasing a green product. Empirical studies were conducted on a sample of 650 Polish consumers purchasing green products or interested in purchasing them in the future. The CAWI method was used. The 7-point Likert scale was used as well. In the study, perceived behaviour control was assessed on the basis of the following factors: perceived consumer effectiveness, income, time, price of the green product, accessibility and habits. The research was carried out at the significance level of $\alpha = 0.05$. The following hypotheses were put forward:

- H1. The most important factor limiting the purchase of green products is its high price.
- H2. Attitudes towards the purchase of a green product and subjective standards are positively correlated with perceived behaviour control.
- H3: Perceived purchase control has a positive impact on the intentions of purchasing green products from consumers who buy green products.

- H4: Perceived purchase control is negatively correlated with the intentions of purchasing green products from consumers interested in purchasing green products, but not yet their purchasers.

RESULTS

The dependent variable purchase intent – is most associated with the attitude variable (0.60). The relationship is positive and directly proportional, which means that with the increase in the attitude variable, the variable "intentions of purchasing a green product" grows. It is also strongly associated with social norms (0.50). The relationship with perceived behaviour control is relatively weak, but statistically significant (0.21). By using the stepwise regression method, it was checked which variables and in what order they enter into the model and the most-described variable "intentions". The first one was the "posture" variable (R2 = 0.36). The next variable included in the model was "social norms" (R2 = 0.43), followed by "perceived purchase control" (R2 = 0.45). An analysis of the correlation between TPB variables in the group of purchasers showed a positive influence between an intent and perceived behaviour control. However, in the group that does not care for perceived behaviour control, it is negatively correlated with the intention of purchasing a green product. The variable "perceived purchase control" turned out to be irrelevant in the group that was not statistically significant ($p = 0.155915$).

Table 1. Pearson correlation matrix between TPB elements in the group of purchasers and non-purchasers

Variables	Attitudes	Social norms	Perceived control	Purchasing intents
Attitudes				
Purchaser	1	0,41	0,10	**0,56**
Non-purchaser		0,46	−0,20	**0,54**
Social norms				
Purchaser	0,41	1	0,19	**0,46**
Non-purchaser	0,46		−0,19	**0,47**
Perceived control				
Purchaser	0,10	0,19	1	**0,25**
Non-purchaser	−0,20	−0,19		**−0,01**
Purchasing intent				
Purchaser	**0,56**	**0,46**	**0,25**	**1**
Non-purchaser	**0,54**	**0,47**	**−0,01**	

Source: Own study based on the research conducted.

DISCUSSION

The research has shown that if the consumer had more control over the purchase (i.e. the more problem-free the purchase was, the more it was feasible), the more

willingly he expressed the desire to buy. In many cases behaviour associated with the purchase of a green product is hampered not by negative attitudes, but by weak positive attitudes combined with the lack of perceived control of their behaviour. The study showed that in relation to green products, price and availability in particular were the factors of perceived behaviour control. When the consumer notices that he has no control over the performance of a particular behaviour or it is very weak due to the lack of availability of products or resources required to purchase, then the behavioural intentions will be weaker, or the behaviour may be limited (Witek 2019). There are differences between purchasers and non-purchasers. The group of non-purchasers has no knowledge about green products, their prices, availability and assumes that purchasing household products requires relatively low involvement. The hypotheses in this study have been confirmed.

Taking into account only the variables included in the theory of planned behaviour, the intentions of purchasing all the respondents are influenced by attitudes, followed by social norms and perceived purchase control. The results of this study are in line with the results of other studies conducted on the market of green products. The examinations carried out by Baker & Ozaki (2008) exemplify this compliance. Some studies (Padeli & Foster 2005, Tanner & Kast 2003) emphasise a higher value of attitudes over perceived behaviour control. Consumers perceive difficulties in purchasing green products, which negatively determines their purchase intentions. The meta-analysis of Wallace et al. (2005) proved that restrictions such as perceived social pressure and the perceived difficulty of behaving in a certain way weaken the relationship between attitudes and behaviour. Their research showed that the average relationship between attitude and behaviour, determined by the correlation coefficient, was 0.41 in terms of an average level of social pressure and perceived difficulties in behaviour. Klöckner's meta-analysis (2013) showed that perceived behavioural control had a relatively low impact on behaviour. The same conclusion was obtained in this study.

Knowledge about the factors determining purchasing processes on the market of green products is important because it encourages all stakeholder groups to be more responsible for the way they operate and become more involved in environmental protection and the use of sustainable marketing strategies. Ecological products purchased by consumers are carriers of the value of sustainable development. The results of this monograph refer to the science of marketing, because the identified relationships can be used to formulate practical guidelines for shaping marketing instruments. One of the directions of marketing activities striving to change purchasers' attitudes towards ecological products is the strategy of increasing the purchaser's conviction that the ecological brand has important features. Another strategy is to identify purchasers' beliefs about the weak features of a green product (e.g. high price) and then convince the consumer to its attributes. This research indicates that the surveyed consumers do not have confidence in pro-environmental declarations. An important role in building trust is played by the labelling of green products, which must be simple and transparent. When analysing the obtained

results, one should take up the problem of limitations resulting from the application of the theoretical approach and research methodology. Limitations, however, open a path to future research. Many other studies, however, suggest adding additional variables to the TPB model to increase the explanatory and prognostic capability of this model (Chan 2001, Jaiswal & Kant 2018).

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CUSTOMER EDUCATION AS A METHOD OF BUILDING RELATIONS AT THE EXAMPLE OF SCIENTIFIC CENTRES IN POLAND

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INTRODUCTION

The aim of the article is to present the role of customer education in a marketing context. The paper provides an analysis of the definitions of the marketing mix and education, which is followed by research results conducted at the beginning of 2019.

LITERATURE REVIEW

Researchers have diagnosed the need to adjust the existing models of the marketing mix to the new global reality that surrounds business. It is reflected in the emergence of new concepts, such as 5Ps, 4Cs or 20Ps as a consequence of 4Ps development (Pearson, 2013). Along with the appearance of new models, promotion (as part of the marketing mix) changes its meaning and role. In 4Cs communication highlights the meaning of feedback in dialoguing with customers. The client becomes the subject of marketing activity, taking an active part in the process of value creation and delivery. In 4Es model, created by Fetherstonhaugh (Carter, 2017), promotion is replaced with a stronger term, namely Evangelism. The idea is to find emotions behind a product and spread this concept (Wani, 2013) in the knowledge that the emotional component is a focal point of the attitude, without behavioural and cognitive parts. Additionally, it may include a kind of fanaticism, which is not advised due to common values of the contemporary society.

Customer education is an issue explored dynamically in literature. It was especially noticed and described in the SAVE marketing mix model, where it replaced promotion/communication. The model created by Richard Ettensen, Eduardo Conrado and Jonathon Knowles assumes that "Education" (next to Solution, Access and Value) is responsible for making a marketing process successful. The basic explanation for the "E" letter in the model is "providing information relevant to the customer's specific needs at every point of the purchase cycle. Understanding education as an element of sharing information, as required and often requested by customers, stays in line with the concept of delivering value in every possible way (Ozuem, Bowen, 2016).

In its classical approach, education is perceived as a process of transferring knowledge from a more experienced teacher to a less competent learner and, in that meaning, companies would be responsible to "educate" customers only. Still, education can and should be explained in a broader context. A.R. Rather states that in classical understanding, education means "becoming developed or processing from inside to outside". Therefore, it is rather a fertilising process, where a teacher (or company) is only a gardener for the plant of human internal potential. Companies have no ability to change humans (customers) unless they are able to discover and strengthen the potential of customers with regard to their active participation. In that case, education is a constant process of discovery, where both parties learn each other's potential and recreate it in a required (or expected) direction.

Changes in customers' profile (Geiko, Gotwald, Kowalczyk, 2013; Mróz, 2013; Gregor, Gotwald-Feja, 2017) accelerate changes and co-creation in accordance with the presented definition. Common access to information and its perception (Sobczyk, 2018) among changes of customers' profiles in general (Gregor, Gotwald-Feja, Łaszkiewicz, 2017) forces companies to understand customers better and to build long-lasting relations with them. The depth of the relation and its scope make customers more willing to use an offer delivered by a certain entity and support the possibility to create new solutions together (Łaszkiewicz, 2018). Customer education lies beneath the classically understood promotion and becomes a tool to enhance the quality of relations between customers and companies because better understanding creates healthy and safe environment for the parties to co-operate.

The role of customer education is especially visible in case of innovative products, where good understanding of product characteristics and the perception of its attractiveness play a vital role. Mostly those customers who are by definition open to innovation are more apt to research, create and engage in newly-implemented solutions, previously non-existent on the market. Although the ability to leave comfort zone to experience novelties (Kaczorowska-Spychalska, 2018) and to understand the surrounding reality is more visible at every age, still there is a small group of people who initiate the process (Barczyński, Gotwald-Feja, Kowalczyk, 2017). For that reason the aptitude to build strong relations on the foundations of educational activity is one of the major elements of the contemporary business.

Consumer education is visible in various situations, starting with content marketing activities, aimed at broadening the scope of customers' knowledge on product usage, through video marketing and user-generated content used for branding, and ending with product co-creation, which seems to be one of the most engaging activities. Education can be used by companies for marketing purposes due to several trends which shall be described below. They are: growth mindset, maker education, digital citizenship, personalised learning, open education, game-based learning (TeachThought Staff, 2018), educators as facilitators, Augmented Reality training, cultivation of empathy through role-play, introduction of "Genius Hour" in schools (PaperHelp, 2019), need for experiences, increased role of arts while compared to STEM (Fitzmaurice, 2019).

RESEARCH METHOD

The mentioned trends were analysed on the science centres market. The goal of the research was to answer a question: what is the marketing potential of customer education in building relations on the science centres market? Two research methods were used: observation of science centres activity and conducting interviews with science centres employees. The observation was made between January and March 2019 on the Polish science centres market. The main basis of the article provided 10 in-depth interviews conducted with employees of Polish science centres during the "Interakcja-Integracja 2019" conference held in Gdansk in March 2019.

RESULTS

There are five science centres which form a part of the European Network of Science Centres and Museums, but in reality there are approximately 15 entities operating on the market (in Europe – around 200 entities). The activity of all these science centres focuses on delivering high-value educational and cultural experience to the visitors, in particular hands-on experience. These science centres operate between cultural and educational markets, between informal education and the museum field. Such complexity implies the need for applying specific activities in marketing too.

Science centres use their profile to build long-lasting relations and provide satisfaction to all the customers (even incidental ones). Customer education is one of the tools that build relations with customers at all possible stages of customer life-cycle. Tools might differ, but general philosophy remains the same. Education is used as a product (on the first layer) and as a tool of building relations (at a deeper level).

Trends in education, as mentioned above, are also visible and used by science centres which are not yet an alternative for traditional schools, but obviously offer a complimentary product to the existing system. Growth-oriented mindset, which assumes that people are and should be learning all their lives in various areas, is a crucial aspect. Establishing long-term relations with customers representing cultural and educational entities is possible only when those people are open to acquiring

new knowledge all their lives. Science centres then become an institution that assists in their development in all the possible fields. Life-long education is ensured during science picnics or outdoor events, where science centres meet the prospects and customers in their natural environments. Hands-on education stands in line with maker education, since individual and group activities of customers are always aimed at creating something, apart from value delivery only. Science centres deliver personalised learning through individual consultancy and game-based education to customise customer experience and build an individual or quasi-individual relation with customers (due to a deeper character of the connection). The high-value content delivered in social media and related interest of clients provide evidence for the idea of digital citizenship. Growing access to the Internet and the ability to use it effectively together with openness to new technologies equip science centres with the possibility to deliver exceptional customer experience. Those who have never had contact with Augmented Reality or Artificial Intelligence can touch the technology and understand it thanks to the science centres activities. In that kind of organisations it is common that the "Genius Hour", which lets people practice their best-selves, lasts all the visit and plays a role in group activities. An interdisciplinary character of workshops allows for creating links between STEM and Arts. Educators employed in the centres are open to people and focus on facilitating the processes of gaining and structuring knowledge.

On the other hand, if education is a bilateral process of self-discovery and its goal is to create bonds between parties, science centres have a huge potential of learning from customers. If an organisation is a social system, the elements of it (employees) create bonds with the environment's representatives (i.e. customers). Since shared experiences (preferably emotional ones) deepen relations (Raghunathan, Corfman, 2006), education (as shared experience of self-discovery) is a tool for developing people that become a part of the system, which is reflected in strengthening relations between individuals and the systems. On the basis of that assumption it can be claimed that customer education is a marketing tool, positively affecting marketing relations. Marketing research becomes easier (Gregor, Kalińska-Kula, 2018) as the representatives of the parties understand each other at a deeper level thanks to each other's and self-gained discovery, achieved by education. It is also easier to foresee the future and create plans adjusted to individuals, companies and societies.

SUMMARY

In the days of global crisis of values and dynamic changes of environmental reality, education in its classical meaning seems to be a means for building long-lasting and profound relations with each other. Created bonds and deeper understanding make reality more stable and predictable, which eases business management. Bonds created with customers might be a source of self-discovery for employees being parts of an organisation's system and the organisation as such. In the future, further research might focus on the diagnosis of relations between education activities of organisations and

the depth of the relations with customers or the significance of customers' education in value delivery (in the context of long-term relations). Developing objective research methods allows for believing that this shall be developed and deepened. Still, there remain two questions: is the theory adequate to all business segments and how might the technical development (and depersonalisation) influence the process of relations building.

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INTERNET-BASED CONSUMERS' CO-CREATION EXPERIENCE IN NEW PRODUCT DEVELOPMENT AS COMPANIES OPEN INNOVATION SOURCES

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INTRODUCTION

These days, nearly all organisations face the challenge of rapidly changing and dynamic environment that requires them to cope with and adapt to changes. The evolvement of the Internet and external trends such as globalisation or increased competition have changed the innovation process of organisations that was traditionally executed inside the organisation towards open innovation approach, in which not only internal employees have an influence in innovative developments. The concept of open innovation implies a more active contribution of consumers to new product development (NPD) processes (Chesbrough, 2003). Therefore, companies which work with an open innovation strategy view consumers as a valuable resource for new product ideas (Geise, 2017) and the inclusion of consumers in NPD is becoming a trend for many organisations, being referred to as "consumer co-creation" (Hoyer et al., 2010). Consumer co-creation defines an active, creative and social collaboration process between producers and consumers, facilitated by the company (Piller et al., 2010). This concept has received increasing attention in the past few years and nowadays organisations are forced to find new ways to attract, gain and maintain loyal customers in order to stay competitive.

The purpose of this paper is to explore consumers' co-creation experience in companies' NPD processes. Specifically it aims to determine the level of consumer engagement in an online co-creation process, identifying motives and reasons for

participating in NPD as well as understanding which types of Internet-based co-creation are the most preferable to use by consumers.

A quantitative research method in a form of online questionnaire (CAWI) through Google Forms has been adopted because a new era of consumer empowerment enables them to interconnect worldwide and it helps to gather data not only from one geographical location.

LITERATURE REVIEW

In a constantly changing business environment, as it is nowadays, companies need to compete in implementing new strategies where innovation is used to satisfy consumer's needs and desires. Therefore, open innovation has become a new paradigm for organising innovation and an integrated part of companies' innovation strategies (Inauen & Schenker-Wicki, 2011). A recent report has shown that 61% of enterprises decided to grow and expand their open innovation efforts with a focus on partner networks, ideation programs, problem/solver networks and co-creation programs (Griffin et al., 2014). Integrating open innovation within companies leads to the development of new products on the competitive marketplace. Consequently, NPD is an important driver of corporate growth and profitability (O'Hern & Rindfleisch, 2008), and the emphasis is being placed on systems which simultaneously provide quality, variety, frequency, speed of response and customisation (Bessant & Francis, 1994). This can be achieved through the NPD process and its stages. NPD processes involve a series of stages called as Stage-Gate process (Cooper, 2010), aimed at delivering a functional commercial benefit to consumers (Harmancioglu et al., 2007) as well as improving and controlling NPD (Sethi et al., 2012).

A typical Stage-Gate process design breaks the traditional process of new product development into a set of discrete and identifiable stages, each stage consisting of a set of prescribed activities (Tzokas et al., 2004), such as: generation of new product ideas, development of an initial product concept, assessment of its business attractiveness, actual development of the product, testing it within the market, and the actual launch of the product in the marketplace. Alongside each of these stages, an evaluation takes place, basically to determine whether the new product should advance further or be terminated (Tzokas et al., 2004).

By launching new products, companies try to deliver new product characteristics such as new benefits, higher quality, correspondence to user's needs, reduced time to market, and smaller development costs (Cooper, 2013). The aim of NPD is to provide solutions that would satisfy consumer needs and wants (Von Hippel, 2005). Hence, in order to ensure this course of action, it requires creating and launching successful new products and the understanding of consumer preferences has to be essential and taken into consideration (Joshi & Sharma, 2004). This shift of consumer role during the NPD process leads to "co-creation". By relating the NPD and the co-creation process, O'Hern and Rindfleisch (2008) describe a definition of the co-creation in terms of "a collaborative NPD activity in which customers actively contribute and/or select

the content of a new product offering". This idea of co-creation is distinct from some other terms such as mass collaboration, crowdsourcing, and mass customisation that can be confused with it. Co-creation is different from mass customisation, because it creates value not only for an individual, but also for others. Co-creation is different from the crowdsourcing of ideas because it implies an active intellectual participation in a process, and it is different from mass collaboration because of the two-way flow between the organisation and the participant (Ind et al., 2013). In addition, involving consumers in the NPD process can improve product quality, reduce risk, and increase market acceptance (Hoyer et al., 2010).

The ability of consumers to play a more active role in NPD has been significantly enhanced by recent technological advances, most notably, the development and growth of the Internet (O'Hern & Rindfleisch, 2008). The introduction of Web 2.0 and different social media platforms has contributed to the development of a new era of consumer empowerment, enabling consumers to interconnect worldwide and easily share and exchange personal, social and scientific knowledge with like-minded individuals (Lorenzo-Romeo et al., 2014) as well as share information, opinions and experiences as fast as never before (Smaliukiene et al., 2014). Thus, the web and social media enable companies to interact and to share knowledge with consumers, and to co-create new products with them.

Co-creation involves consumer engagement in the creation of offerings through ideation (e.g., consumers generating new ideas in companies' virtual environments), design (e.g., consumers designing their own offerings with the help of companies' self-design tools), and development (e.g., user communities testing offerings against defects) phases of NPD (Verleye, 2015). For example: (i) BMW Group's "Co-Creation Lab" is a virtual meeting place for individuals interested in car-related topics and anxious to share their ideas and opinions on tomorrow's automotive world; (ii) LEGO Ideas is an online community where members can discover cool creations by other fans and submit their own designs for new sets; (iii) Apache is an open source web server software where consumers can test, provide feature enhancements, bug fixes, and provide support for others on blogs and forums. However, the co-creation process can be considered from different perspectives, namely a firm-perspective and a consumer-perspective, highlighting the benefits for both parts.

From the firm perspective, facilitating the co-creation experience with consumers requires creating environments that promote co-creation. Enterprises need to create specific environments for employees to interact with consumers, information infrastructure and resources (Terblanche, 2014). These capabilities and infrastructures that allow consumers to perform activities have to fulfil five basic requirements: provide user-friendly operation, offer module libraries, provide "trial and error" functionality, define a possible solution space and transfer user design (Gaubinger et al., 2015). Furthermore, these resources and infrastructures have to be built on the basis of three characteristics such as: "degrees of freedom" (consumers' autonomy in the task), "degrees of collaboration" among consumers (firm-consumer interaction vs. communities) and the "stage of the innovation process" (front-end vs.

back-end) (Piller et al., 2010). According to these three dimensions, eight ideal types of co-creation with consumers emerge: idea contests, idea screening, product-related discussion forums, communities of creation at front-end co-creation; and toolkits for user innovation, toolkits for customer co-design, communities of creation for problem solving and virtual concept testing at back-end co-creation. All these methods of consumer co-creation follow a common principle, but despite this common ground, companies intending to profit from co-creation need to know which of the different methods are most suited for themselves and how to use these tools best (Piller et al., 2010). In order to answer these questions, more detailed research is needed.

From the consumer perspective, co-creation has been addressed in terms of the stages consumers go through when participating, what motivates them to participate, their roles in co-creation and their participation styles (Terblanche, 2014). The level of consumer participation in co-creation depends on the consumer's technical ability, the information they possess and the costs of participation (Gurau, 2009). According to Fuchs and Schreier (2011) there are four levels of consumer involvement, which relate to consumer empowerment in terms of two basic dimensions: creating ideas for new product designs (zero empowerment and create empowerment) and selecting product designs to be produced (select empowerment and full empowerment). In result, different levels of involvement will have different effects on the outcomes of co-creation. The higher the involvement of consumers in co-creation, the more positive the outcomes will be.

But the concept of co-creation is based on a voluntary basis, which implies that consumers have to be motivated in order to participate. Therefore, a key constraint of the concept is the consumer's willingness to exchange his ideas and knowledge with organisations. It is vital for businesses to determine what enables consumers to actively share their ideas and what might inhibit their decision to cooperate.

Fuller (2010) has done some work on motives for co-creation. Moreover, multiple reasons drive consumers to engage in open innovation projects ranging from purely intrinsic motives (such as fun, kinship, and altruism) through internalised extrinsic motives (e.g., learning, reputation, and own use) to purely extrinsic motives (such as payment and career prospects) (Von Krogh et al., 2008). This observation has led to the identification of 10 motive categories: intrinsic playful task, curiosity, self-efficacy, skill development, information seeking, recognition (visibility), community support, making friends, personal need (dissatisfaction), and compensation (monetary reward) (Gaubinger et al., 2015). This motive structure became a basis for the distinction of four consumer types: reward-oriented consumers, intrinsically interested consumers, curiosity-driven consumers, and need-driven consumers (Fuller, 2010). Reward-oriented customers are driven by monetary awards. Intrinsically interested customers are highly motivated by their interest in innovation activities, as they are very skilled novelty seekers who like problem solving. Monetary award is not so important for them. Curiosity-driven customers are highly involved in co-creation, as they are curious about the process and its result. Need-driven customers participate in co-creation because they are not satisfied with the current

products/services on the market. They are highly demanding and very interested to adapt an existing offer to their own needs (Orcik et al., 2013). Ideally, a company should target all envisaged types of consumers with its Internet-based co-creation activities and meet their expectations.

RESEARCH METHOD

A qualitative research method in a form of an online questionnaire has been conducted with the aim to reveal motives for consumers to participate in co-creation processes via Internet-based sources. In the questionnaire, the uses & gratifications (U&G) theory (Katz et al., 1974) is used as a basis model to understand consumer motivation to co-create online and is supplemented with Fuller's classification of benefits (Fuller, 2010). The questionnaire uses different types of questions, including dichotomous, multiple-choice, ranking scale questions. Facebook as a social media platform was used for distributing the survey to reach respondents worldwide. The sample essentially comprises students or young professionals from around the world.

This research focuses on co-creation from the consumer perspective and provides insights into the consumers' experience in co-creation situations, their determinants and motives, where the co-creation experience depends on consumer characteristics, such as: expected co-creation benefits (that is, consumers' expectations towards benefits in co-creation situations) (Fuller, 2010), customer's attitude towards co-creation (what attitudes the customer has towards co-creation, taking into account before mentioned benefits) and consumer reflection (which construes how attitudes are translated into actions) (Katz et al., 1974). The survey and its results are vital for drawing significant conclusions that contribute to the existing research objective. The findings of this research are inaccessible as the research will be conducted in the second quarter of 2019.

CONCLUSION

Based on literature review, co-creation is an important aspect on today's highly competitive market. With the advent of the Internet and mobile technologies, obtaining consumer opinion and information is simple and less expensive than ever before. Thus, co-creation with consumers is not only a means of gaining an insight into what consumers want, but also as a marketing tool to show that the company allows its consumers to participate in the development of new productions and companywide innovation. In addition, consumer co-creation has substantial implications both for enterprises and consumers themselves, where firm-related outcomes of co-creation are efficiency and effectiveness, increased complexity, whereas consumer-related – meeting consumer needs, relationship building, engagement and satisfaction.

Although this paper considers consumer co-creation in the B2C sector, there is a less known, yet potentially powerful B2B sector active as well. Technology enables B2B companies to open up and design their operational processes with each other;

however, B2B companies have smaller awareness because suppliers are more focused on the end-consumer rather than functional inputs (Gouillart et al., 2011). Literature on co-creation within B2B markets is limited, however Kärkkäinen et al., (2011) state that differences can be seen in the phases of the innovation process, information and knowledge management perspectives.

Robust conclusions and discussion will be proposed once the survey has been completed and analysed.

Keywords: open innovation, NPD, consumer motivation in value co-creation, Internet-based co-creation

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VIRTUALISATION OF SELECTED PROJECTIVE RESEARCH TECHNIQUES VIA MOBILE APP – CONCEPT AND EARLY EXPERIENCES

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INTRODUCTION

Changing consumer lifestyles as a result of ubiquitous usage of information and communication technologies are changing not only the consumption patterns, and also the landscape of marketing research. The virtualisation of some research techniques became not a choice of researcher but often obligation necessary to carry out the study. In the age of falling response rates for questionnaires, the need to fight for the attention of the respondent under time pressure, research techniques are subject to change, often in the way of including gamification elements or other ways for making them more attractive for the study participants.

Our experience in using different approaches for quantitative and qualitative marketing research studies led to studying the concept of virtualisation of some projective techniques, particularly those used during qualitative interviews like Focused Group Interviews and In-depth Interviews. Some traditional approaches for deploying them require the usage of manual work – using paper, scissors and glue – that may be perceived as boring and difficult, particularly by younger subjects. For researchers, using such tasks is time-consuming, although results provided are worth the work. Unfortunately, manual transfer of the data for further analysis (including

measuring the coordinates of placed objects) is a serious drawback. Taking such drawbacks into account, including virtualisation tendencies, as well as permanent usage of mobile devices, an idea of virtualisation of selected types of projective mapping tasks via mobile app appeared.

The goal of the paper is to discuss the concept of virtualisation of selected kinds of projective techniques in consumer research via a mobile application on tablets in individual settings and using the touch-enabled surface for group tasks. We used a prototype of the app to gather preliminary insights and results on the example of projective perception maps and object-sorting tasks.

LITERATURE REVIEW

Digital transformation of businesses on strategic level changes many firms' areas of functioning starting from IoT usage in production processes and including virtualisation of marketing activities (Kane, Palmer, Phillips, Kiron, & Buckley, 2015; Matt, Hess, & Benlian, 2015). Also blending offline marketing with digital marketing is a must for companies to adapt to the new market reality (Todor, 2016). Mentioned tendencies also include a shift in approach for marketing research when some decisions are relying on data continuously gathered from digital channels and passive measurement not consciously engaging consumers (Metwalley, Traverso, Mellia, Miskovic, and Baldi, 2015). However, the possibilities of virtualising other than survey type research techniques are still limited and raises ethical questions for qualitative research (Flick, 2018, p. 267; Roberts, 2015).

Although virtualisation tendencies are strong, we did not find in scientific literature studies when virtualised projective tasks are used within qualitative interviews conducted in person. It signalises the research gap we also observed in our practice. To fill this gap, we choose a simple form of projective perception mapping (structured projective mapping) and object-sorting task as possible prototypes of more generally defined tasks that study participants can perform with mobile devices during qualitative interviews and also in more separated conditions

Structured projective mapping is a form of conventional projective mapping approach. This technique uses square or rectangular space and line scales, where with two axes worded as antonyms (typically using adjectives) (Hopfer and Heymann, 2013). The underlying concept behind projective mapping is two-dimensional sorting procedure. Together with other variants of projective mapping (unstructured projective mapping and different forms of Napping®), this approach is common in sensory studies, mainly for food products (dis)similarity assessments by trained judges or typical consumers (Cruz et al., 2013; Hopfer and Heymann, 2013; Kennedy, 2010). Although mentioned techniques with quite sophisticated data analysis proposals are well developed, there exist also a simple approach to use structured projective mapping during qualitative interviews in consumer research as a typical projective technique, used to compare objects such product categories, brands. Such task is typically performed individually, on a paper sheet with described axes and

objects positioned by study subjects with stick-on labels or logos/other images glued to the sheet.

The object-sorting tasks are commonly used in psychology since the ’50s of the 20th century, particularly used in the research of small children or persons with cognitive difficulties (Brace, Morton, and Munakata, 2006; Kloo and Perner, 2005). The mentioned technique is also frequently used in consumer research (Flick, 2018).

We propose to virtualise such tasks and similar ones via mobile app. Provided further propositions for data analysis are expected to improve reliability and validity of the measurement via projective techniques, sometimes questionable, according to literature (Boddy, 2005).

RESEARCH METHOD

Presented preliminary research is mostly the direct comparison of the paper-and-glue traditional approach with the usage of the prototype of the own research mobile application allowing for virtualisation of projective techniques. Two kinds of projective tasks have been used – structured projective mapping (as two-dimensional sorting procedure) and sorting objects into predefined slots (object-sorting task).

We made preliminary tests during typical two Focused Group Interview (FGI), where projective tasks were served to the participants via a mobile app. Group participants differed in age (18–26 and 27–45 years old). The topic of the study revealed to participants has been described as the perception of products and brands of different origin. This test has been focused on the usability of the app on different mobile devices.

The second stage is testing the comparability and stability of subjects’ answers in repeated measure settings (2x2 group setting, of about 15 participants in each group). Groups 1 and 2 firstly participated in the test with the paper-and-glue approach, and after a month the measurement has been repeated – for Group 1 the same way, and for Group 2 – with equivalent tasks served via a mobile app on tablets. Groups 3 and 4 started with tasks performed via the mentioned app, and the second measurement will also be conducted in virtual settings for Group 3, and with a paper-and-glue approach for Group 4, also after a month from the first measurement.

Paired comparison of object coordinates for projective mapping task, and choice categories for the object-sorting task will be assessed via the test-retest approach, taking into account the same or different mode of measurement. Correlations and tests for differences between two measurements, as well as Cohen’s d measure for effect size – using formulas for repeated measures (Cohen, 1988) will be assessed. We expect low effect sizes for mode change and no effect for repeated measures in the same mode.

RESULTS

As at the time of writing the extended abstract direct comparison results for stability measures were not available yet (research is in progress). Results will be available at the time of the CID 2019 Conference.

Although we cannot present such data yet, we collected valuable insights from observations made during FGI and first measurement. Participants and researchers opinions are favouring using the app so far, as quicker, more convenient and modern.

From researcher point of view, first savings of time is task design, when if text labels only are used or preloaded images are present in the system, it takes only a few minutes to design a task. Second saving is a quicker time of task completion – measured completion time for virtualised tasks was about 30%–40% shorter than paper-and-glue approach with much lower individual differences. Using the task served via the app eliminates manual coding of test results manual transfer of coordinates of placed objects for further analysis is a serious drawback, and virtualisation creates at this stage the main advantage in terms of researcher time savings. Also, time stamps for positioning and repositioning of sorted objects are available in the data file, that allows for further analysis. Total time savings including data preparation for the traditional approach is on the level of 70% (70% shorter), favouring the virtualised tasks.

From the participant side comparing in two-dimensional space or sorting objects such like product categories, brands are often perceived as funny (with typical comments: "return to kindergarten"), but also creates cognitive effort because of comparisons and the need of manual work. Such task is typically performed individually, on a paper sheet with described axes and objects positioned by study subjects with stick-on labels or logos/other images glued to the sheet. In our recent projects many subjects (regardless age) reported the difficulties in performing manual tasks, making the completion time longer and leading to high differences in task completion in group settings, so serving the tasks via mobile device makes possible to overcome this difficulty, although persons not accustomed to touch-screen operations may need some training before real tasks. For participants, we noted favourable feelings and emotions, as well as satisfaction from the shorter time of task completion both for mapping and sorting tasks.

DISCUSSION

We could not identify at this time comparable research to directly compare our virtualisation of selected projective techniques. Our concept is focused on making the projective tasks easier and quicker to complete while maintaining or improving the validity of the measurement.

As projective techniques are considered useful in a broad range of situations, not only in sensory studies, to compare relations between objects with known or revealed dimensions, we argue that virtualisation of tasks based on them goes in line with respondents expectations.

The used prototype is being developed into fully functional mobile application consisting with four basic modules: task creation by researcher, task deployment and control by a moderator in FGI settings or researcher, task execution by the participant, collected data export with a simple analysis. Analysis proposals include for projective perceptual maps the centroid approach for data aggregation as well as bootstrap based average coordinates and confidence ellipses for particular objects on the map. Those manipulations must be carried out externally now. We intend to commercialise the app and make it available for researchers.

Keywords: marketing research; virtualisation; projective techniques; structured projective mapping; mobile app

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STRATEGIC FORESIGHT AND NETWORKS

THE APPLICATION OF CLUSTER ANALYSIS IN THE SELECTION OF KEY COMPETENCES OF FUTURE-ORIENTED ENTREPRENEURS

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INTRODUCTION

The scientific problem raised by the authors of the article involves defining a way of identifying future-oriented entrepreneurial competences. The aim of the article is to present the possibilities of application of cluster analysis in the selection of key competences of future oriented entrepreneurs on the basis of data collected within "Becoming Future-Oriented Entrepreneurs in universities and companies – beFORE", a project in which the authors of the paper participated. The initiative is co-funded under the Erasmus + Knowledge Alliance scheme. The goal of beFORE project is to increase future literacy among students, academics and entrepreneurs as well as to guide individuals and organisations in their future preparedness. The competences identified by the researchers on the basis of the literature review were evaluated by renowned foresight experts and project partners with regard to their importance in six dimensions: a future-oriented entrepreneur, insight, visioning strategy development, innovating and leadership, with the application of a 5-point Likert scale. Finally, the authors recommend 14 competences of strategic foresight to be mastered by future entrepreneurs.

LITERATURE REVIEW

Competences have been an issue of interest in scientific literature since the beginning of the 20th century (Volpentesta, Felicetti, 2011). There are many ways to understand the notion of "competence". Often the terms competence, skills, qualifications, rights and duties are used interchangeably. In reality, however, these are not the same concepts. Frequently, making a clear distinction between competences, knowledge and skills is also problematic (Kinkel, Schemmann, Lichtner, 2017). According to Hertle and others, knowledge is the narrowest concept, including certain abilities. Qualifications take precedence over knowledge and competences cover the other two terms (Hertle et. al., 2015). Competence can therefore be understood as a relationship between a person and the tasks to be carried out in the course of a professional career, i.e. knowledge and skills required to carry out a specific task effectively (Volpentesta, Felicetti, 2011). Competences also have certain essential characteristics: they are related to a specific task or professional activity; they are variable and therefore subject to development; they change with experience and professional and life development; they are measurable (Kubat, Filipowicz 2016).

The main focus of this study rests in competences of future-oriented entrepreneurs. The research presented in the paper is based on the study of Amsteus (2011), who demonstrates a valid and reliable 12 Likert item scale for measuring managerial foresight.

In the world of fast changes and uncertainty, futures literate individuals will increase their employability, as suggested in the 2006 European Reference Framework for Key Competences for Lifelong Learning: the challenge concerns the manner of providing entrepreneurship education that offers competences matching the characteristics of the current state of the world: i) rapid technological and organisational change and need for innovation (Kononiuk, Sacio-Szymańska, Gaspar, 2017); ii) "information overload/pollution" (Levitin 2014); iii) "weak signals" (Kuusi, Hiltunen 2011).

Heinonen and Ruotsalainen, 2012 present an interesting view on competences of future-oriented entrepreneurs. According to the authors, in a holistic, creative, and meaning-based neo-growth of economy, general competences and skills are particularly needed. Instead of high specialisation, multiple competences will become critical in future work. The workforce will be growingly utilising the whole range of the human potential and skills. Soft competences i.e., skills of communication, interaction, and socio-cultural sense-making will, in particular, gain in importance. The following set of future skills and competences are summarised in the concept of the Futures Competences Diamond, consisting of seven edges (Heinonen 2012) and including the following competences of the future-oriented entrepreneur: interaction competence, collaboration competence, time competence, technology competence, environmental competence and systems competence.

RESEARCH METHOD

The main research methods applied in this study were a literature review, case studies and cluster analysis. Literature review covered global literature review, domestic literature review, higher education offer review, commercial foresight courses review. Case studies enable to identify competences of a future-oriented entrepreneur, retrieved from well documented 52 business practices. Both the extensive literature review and the analysis of business practices allowed the project consortium to identify more than one thousand six hundred competences of a future-oriented entrepreneur. A huge amount of competences, their heterogeneity and a different level of granularity presented a major challenge for the researchers involved in the project. Next, the competences became the subject to preliminary assessment. A limited set of competences (39 items) underwent cluster analysis. Cluster analysis is a grouping method that allows for the identification of groups containing similar objects (Tryon, 1939). Clustering techniques are used in many different research fields. Hartigan (Hartigan, 1975) provides a perfect summary of many published studies that inform the reader about the results of the analysis of clusters. This method is a representative of the so-called methods of the analysis of interdependence, which means that all variables in the analysis are treated as interdependent without distinguishing between dependent (effects) and independent variables (causes). The purpose of the analysis in such a case is usually to identify the structure of the examined set of variables or objects. Cluster analysis as a method of grouping allows for the identification of internally consistent groups of objects.

RESULTS

All in all, out of 193 sources, (global and domestic literature review: 71, syllabuses: 53, foresight courses: 17, business foresight practices: 52) the authors identified an extensive set of competences consisting of 1,626 items. As this set of competences was very comprehensive, they were grouped in two proposed stages:

STAGE I – preliminary – manifested in an initial overview of the 1,626 competences and assigning them to the one of the 12 working spheres such as: insight, framing, creativity, personal, leadership, implementing, strategy, innovation, visioning, theory&methods, general knowledge, nowhere else. The names of the clusters were retrieved on the basis on the experts' intuition as well as foresight models and stages already existing in literature (such as Foresight Competency Model, APF 2016, Habegger (2010), Miles and Popper (2008), Magruk (2014). The identification of the working spheres helped the researchers to capture the whole range of competences and then further group them within working groups.

STAGE II – basic – manifested in a detailed analysis of each of the competences and, finally, assigning them to a thematic area. The same competences (including similar ones) were grouped into subgroups. If there appeared some of the competences that were not clear in meaning or where the competences did not necessarily

correspond with the thematic scope of the course, they were assigned to the nowhere else group. As the project focused more on the competences of an entrepreneur that stem from the knowledge and skills area, "personal competences" and "nowhere else" cluster of the competences were excluded from the analysis. After the rejection of "personal competences" and "general knowledge", the group comprised 50 working clusters of the competences. After the consultation with external foresight experts, the group was further reduced to 39 competences, which were subject to internal assessment. Finally, 23 experts took part in an internal assessment of 39 competences of a future-oriented entrepreneurs as well as the domains of their activity such as: insight, visioning, strategy development, innovation and leadership. The electronic version of the questionnaire was sent to all the project partners, with a request to involve 3 experts within the partnership to complete the form. The measurement tool was a 5-point Likert's scale where 1 meant that the competence is not very important, whereas 5 meant that a given competence is very important. The obtained results enabled to calculate arithmetic average values of the assessment of the 39 competences in the given dimensions. In this way, a set consisting of N=39 cases and six variables was obtained. This led to the creation of significance-based rankings of competences for a future-oriented entrepreneur and domains of his/her activity. Correlations between variables (importance for a future-oriented entrepreneur and domains of his/her activity) were positive. On the basis of the correlation analysis, it is possible to identify two variables that are the most strongly correlated with the assessments of competence importance of variables: a future-oriented entrepreneur and domains of his/her activity. These are: strategy development (correlation coefficient=0.758197) and visioning (correlation coefficient=0.622013). In the next step of the analysis, the competences were grouped according to the similarity of the assessment in five dimensions with the help of cluster analysis. At the first stage of the analysis, a dendrogram which provided a basis for the emergence of four clusters. Then, for the defined four clusters, with the help of a k-means method, the authors specified the content of each cluster as well as average marks for the dimensions assessment in the competences clusters. The content of the competences clusters achieved with the help of a dendrogram and a k-means method is the same.

On the basis of the results of cluster analysis, one may recommend two sets of competences for further analysis. The first one comprises average high marks for the importance for a future-oriented entrepreneur and at least 3 average high marks for the domains of his activity.

In terms of a working list of competences that could be mastered by future-oriented-entrepreneurs, the following were juxtaposed: 1. Results of cluster analysis, 2. Results of the internal assessment of the competences importance for a future-oriented entrepreneur, 3. Results of the external assessment of the competences importance for a future-oriented manager carried out during FEN meeting and ISPIM conference, 4. Comments to the competences provided both by internal and external experts. Taking into account all the above, the list of the following 14 competences to master by future-oriented entrepreneurs was recommended: 1. The ability to

define, identify and analyse trends within micro- and macro-environment of the company; 2. The ability to find and interpret weak signals of change and disruptions (wild cards and abnormal phenomena); 3 The ability to work in teams; 4. The ability to act proactively (autonomous strategic behaviour, enterprising spirit); 5 Reflexive capacity; 6. The ability to manage change and uncertainty (also dynamic capability); 7. The ability to build networks both internally and externally; 8. The ability to deal with complexity; 9. The ability to develop and implement strategies; 10.The ability to think out of the box; 11.The ability to transform new ideas into business practice; 12. The ability to implement scenario approach within an organisation; 13. The ability to create an organisational vision (both collective and individual); 14. Seeing the big picture.

DISCUSSION

According to the authors, cluster analysis is a useful tool of grouping, but it should be juxtaposed with qualitative assessment. In the case of the research presented in the article, the identified huge and diverse set of competences forced the authors of the research to conduct their initial selection and grouping before applying cluster analysis. Conducting a series of assessments and the necessity to narrow down the set of competences resulted in the fact that some of them, although very highly rated in the ranking as a result of a single evaluation and poorly rated by the others, were excluded. In further research it would be worthwhile to look at such comments and deepen the research into their scope in order to explain such a large difference in the scores achieved by individual evaluations (e.g. COMPETENCE 17: RISK TAKING CAPABILITY). COMPETENCE 11: COACHING SKILLS and COMPETENCE 26: CAPACITY FOR DESIGN THINKING proved to be interesting competences, to which further in-depth consideration could also be devoted. They were evaluated as low for a future-oriented manager, but at the same time they were evaluated as very high for leadership and innovation.

Also an interesting observation could be made on the basis of COMPETENCE 35: THE ABILITY TO LOOK FOR PRODUCTS THAT PROVIDE REAL BENEFIT. It was evaluated as high for a future-oriented entrepreneur, but at the same it obtained low marks for the fields of his/her activity which could indicate that one more domain in the analysis is needed (e.g. market orientation).

In conclusion, the cluster analysis conducted as part of the "Becoming Future-Oriented Entrepreneurs in universities and companies – beFORE" project enabled the authors to indicate both a set of competences, but also provided information on the possibilities of further research.

Keywords: competences, future-orientation, cluster analysis, foresight

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THE APPLICATION OF A MODIFIED SERVQUAL MODEL IN DIAGNOSING AN EDUCATIONAL OFFER – FORESIGHT PERSPECTIVE

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INTRODUCTION

The aim of the article is to present comprehensive methodology (based on SERVQUAL model) and the results of an across-Poland survey in the scope of analysis of the situation on the labour market by career guidance practitioners in the context of scientific and technological trends and the creation of alternative career development paths. The main focus of the research was disconfirmation between the ideal features of educational offers and the perception of the courses completed by career guidance practitioners in Poland. The study was carried out within the "Horizons of the Future" project. The project is implemented under the "Dialogue" programme of the Ministry of Science and Higher Education. The goal of the project is to create strategic foresight tools that will be useful in educational processes and will serve as support in advisory processes in practice. The undertaking is addressed to all persons professionally connected with the areas of counselling, planning and career development. The project is implemented by the Institute of Sustainable Technologies (National Research Institute) in Radom in partnership with the Bialystok University of Technology.

LITERATURE REVIEW

Cultural and economic challenges resulting from ageing, globalisation, digitisation and automation are the hallmarks of modern times. The already mature idea of

Industry 4.0 is becoming more and more visible in the economic practice, particularly in management and production processes. Businesses today face the challenge of constantly "adapting" to demanding external conditions, and thus creating the ability to detect early signs of changes ('weak signals'), the ability to use new development and innovation opportunities arising as a result of changes, and the constant development of competences adapted to changes in the labour market (Peter, Jarratt, 2015). Therefore, it seems to be pivotal to equip career guidance practitioners with tools that enable them to analyse trends that shape labour market and to create scenarios of alternative career paths as well as check to what extent those topics exist in career guidance training. The model which was chosen as an initial inspiration for the creation of a research tool in the adopted methodology was the SERVQUAL model proposed in 1988 by Berry, Parasuraman and Zeithaml (Parasuraman, Zeithaml, Berry, 1988). It is widely used to measure the quality of service from the customer's point of view. It has been tested in areas such as banking (Ahmed et al. 2017; Ali et al. 2014; Dutta, 2009), insurance (Siami, Gorji, 2012), health-related services (Butt, de Run, 2010; Papanikolaou, Zygiaris, 2014) and education (Datta, Vardhan, 2017; Yousapronpaiboon, 2014; Pohyae et al. 2016; Zareinejad et al. 2014; van Schalkwyk, Steenkamp, 2014). The use of the model allows for the detection of the so-called gaps, i.e. five critical moments for the final evaluation of the quality of services. These gaps indicate areas for improvement and specify what needs to be changed and to what extent (Seth, Deshmukh, Vrat, 2005; Wolniak, Skotnicka-Zasadzień, 2009). Frequently, the model objective is expressed in the identification of a gap between expected quality and the perception of the actual service, which is reflected in the existence of the fifth gap in Parasuraman's theory (Parasuraman, Zeithaml, Berry, 1985). Due to the popularity of the model, there are many discussions on its evaluation. It has gained a wide range of both supporters and opponents who highlight the advantages or uncertainties of the model (Buttle, 1996; Woźniak, 2017).

RESEARCH METHOD

The literature review model enabled the authors to develop a research tool dedicated to the evaluation of the quality of an educational offer and methodology of teaching within the framework of vocational guidance training. Quantitative studies were carried out with the modified SERVQUAL model. The intention of the authors of this study was to assess a gap between expectations as to the quality of the vocational counselling offer and its actual state in the perception of vocational counsellors and persons who have completed training in this area. This assessment was carried out by gathering the views of respondents on 24 statements with the use of Likert's 7-point scale relating in various degrees to the five theoretical dimensions of the analysis, i.e. physical aspects, reliability, responsiveness, confidence and trust, and empathy. The survey metrics included such variables as gender, age, form of vocational training, year of graduation, voivodship, educational unit (private and public sector), as well as the duration of employment in the area of vocational counselling. The statements

prepared as a result of the literature review were divided into two parts: (1) for studies in the field of career guidance completed by respondents and (2) with regard to the opinion of respondents on how ideal education should look like. The survey was conducted from January to March 2019.

RESULTS

The survey was conducted on a sample of 178 respondents, them being vocational advisors employed in various institutions and organisations. One third of the research sample constituted advisors from Labour Offices, while the next – in terms of the number of advisors – were those employed in: primary schools (16%), Career Offices at universities (13%) and technical schools (11%) as well as comprehensive secondary schools (8%). The least numerous groups constituted advisors employed at universities as scientific and didactic staff (2%) and vocational advisors from industry schools of the first or second degree (3%). When comparing arithmetic averages and standard deviations obtained and the values of the classical coefficient of variation, it should be noted that variability increases with the decrease of the arithmetic mean. This means that if the statement was rated high, the rating was characterised by lower variability. Therefore, it can be noted that the respondents were rather unanimous in the case of high scores, unlike for low scores. The results presented in relation to the largest gaps highlight a strong need of respondents to create a form of classes more attractive in terms of group work, gamification and taking into account scientific and technological trends shaping the labour market. On the basis of the analysis carried out, it can also be concluded that the theme of the analysis of scientific and technological trends, such as automation, robotisation, digitisation, which is the subject of interest of the project, is treated marginally within the framework of education completed by the respondents. The smallest gap (–0.56) in the perception of completed education and ideal education was noted in the case of sociology specialists, who provide vocational guidance, and in relation to the class atmosphere (–0.91), which should be conducive to an open and free discussion. The biggest gap was noted in the comparison of the arithmetic mean values perceived and expected by the respondents as to the use of dedicated online games by the teaching staff that educate advisors (–3.73). A considerable gap was also observed in the case of the teaching staff using interactive whiteboards for group work (–3.60). A big difference in the perception and expectations can also be noted in relation to the use of interactive educational games as part of vocational counsellors training (–3.25). A slightly smaller but still significant gap (–2.57) was recorded in relation to the development of students' skills in analysing technological trends (e.g. automation, robotisation, digitisation) and their impact on the labour market.

Therefore, at the last stage of the analysis, an average gap was calculated for all statements, which stood at the level of (–1.95). Taking into account the seven-level scale of assessments, the identified gaps indicate the existence of significant differences between the perception of completed vocational guidance courses and

the expectations of respondents in this respect. Therefore, it can be assumed that the expectations of respondents as to the quality of the educational offer in the field of vocational counselling are not met.

DISCUSSION

The most important aspect in drawing conclusions from the results obtained with the use of the SERVQUAL method is to strive for a state of affairs where no gaps occur. The survey demonstrated significant differences between the perception of completed vocational guidance courses and the expectations of survey respondents in this respect. An interesting aspect of the research is the fact that the survey was completed by a larger number of respondents than expected.

A significantly larger number of responses were obtained than the assumed assumptions, which indicates a strong need for changes in the environment of career advisors**.** Taking into account the challenges of the industry, 4.0 trend analysis and scenarios of career path development should be fundamental methods used by career guidance practitioners. On the basis of the conducted analysis, it can also be concluded that the themes referring to the analysis of such scientific and technological trends as: automation, robotisation, digitisation, which is the subject of interest of the research carried out, are treated marginally within the framework of education completed by the respondents.

In general terms, the SERVQUAL model is a very useful framework for gap identification between the perceived and desired state of phenomena. However, the dimensions of the model need to be adapted to the area in which the research is being carried out. Moreover, the context of the study sometimes implies a deviation from weighing dimensions, due to a significantly asymmetrical division of statements between the following dimensions, which was also the case in the presented research. An important issue in formulating conclusions concerning disconfirmation involves the adapted measures of the evaluation of statements contained in the model. High variability of data may justify the use of positional measures.

Keywords: SERVQUAL model, labour market, career guidance practitioners

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THE ROLE OF UNCERTAINTY AND LEVELS OF KNOWLEDGE IN FORESIGHT METHODOLOGY[1]

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INTRODUCTION

At the beginning of the last century, it was observed that efforts to make social life more rational generate unintended consequences in a form of increased uncertainty (Poli, 2017).

Many of today's global uncertainties are systemic in nature, being one of the most important features of many areas of social and economic life, especially in the context of future management.

The management of such systems enforces the use of complex, innovative – based on theorising – research approaches, also in the future context, generating new theories of management (Shepherd & Suddaby, 2017). Undoubtedly, foresight methodology includes such methods.

Foresight became an important instrument of long-term problems related to risk and uncertainty at the end of the 20th century (Jenssen, 2010).

Although foresight research tries to steer a course between the unsettling uncertainty and unpredictability of the future (highlighting the unexpected opportunities and requiring adjustments to existing plans) and the need for data, information and knowledge to shape this future (*Foresight Manual*, 2018), till now uncertainty wasn't the main research object but rather was treated as the background for future research. The main purpose of the publication is an attempt to change this perspective – treating uncertainty as one of the main research facilities in future studies – by answering the following research question: "What uncertainties and levels of knowledge can shape foresight research methodology?" In the author's opinion,

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in complex systems – from the foresight methodological point of view – it seems relevant to determine which specific types of uncertainties and level of knowledge will be appropriate for the analysis of a specific kind of future.

LITERATURE REVIEW

Both the human ability to understand the processes of change, the indication of cause-and-effect relationships, and predict the future requires knowledge, characteristic for foresight research. When uncertainty is expressed in connection with a desired outcome, it is more positively evaluated than when it is expressed in terms of an undesired outcome (Smithson, 1989).

The uncertainty in the modern era is the result of the complex interaction of different kinds of forces: technological, social, political, economic and environmental (Ringland & Schwartz, 1998, Chodakowska & Nazarko, 2017). Uncertainty usually is treated as a form of incompleteness in information or knowledge (Smithson, 1989).

Every theory of knowledge draws a distinction between knowledge and ignorance, mostly between ignorance in the sense of incomplete knowledge and ignorance in the sense of erroneous belief (Smithson, 1989).

Uncertainty can be considered from different points of view. There were many typologies of uncertainty developed for different purposes (Magruk, 2016).

In this publication, uncertainty is treated as a phenomenon that arises on self-knowledge regarding the information on the basis of which decisions are formulated.

Self-knowledge about the decision-making situation in the context of uncertainty refers to three aspects important from the future research point of view of (Kaivo-oja J.Y. et al., 2004): 1) knowledge, 2) predictability) and 3) time.

Together with the widening of the time horizon, there is a correlation between the increase in the level of uncertainty and the decrease in predictability. In a short period of time, predictability is high, which determines the application of forecasting models. In the medium term, the level of predictability and uncertainty detects the use of scenario and simulation methods. In a very distant future, we deal with very deep uncertainty and all attempts of prediction can only be based on hope (Kaivo-oja J.Y. et al., 2004).

For further horizons uncertainty continues to expand and deepen. This is due to, among other things, the complexity of the features, the studied systems of structures and behaviours which usually extend beyond the area observed and verified by the available knowledge, especially for individuals (Magruk, 2017).

RESEARCH METHOD

The study uses the results of the analysis and criticism of the literature as the main research method. This provided a basis for formulating conceptual modelling.

RESULTS

Based on the works of Walker, Harremoës, Rotmans, van der Sluijs, van Asselt, Janssen, Krayer von Krauss (Walker et al., 2003), Sardar, Sweeney (Sardar & Sweeney, 2016) regarding the types of uncertainty, levels of knowledge and their relation to kinds of future (by Voros (Voros, 2017), Magruk (Magruk, 2017)), the author of this publication proposes the following levels of uncertainty in the context of complex systems: zero, surface, statistical, scenario, outspread, substantial, deep, ontological, and levels of knowledge: nomological, plain, based on current trends, based on current knowledge, borrowed, blurry – referring to future knowledge, irrational, total ignorance.

In the research of the future (in particular in foresight) and uncertainty, the author proposes to use the idea of the "cone of futures & uncertainties & ignorance" (Figure 1), whose basic skeleton in a form of "future cone" was developed by J. Voros (Voros, 2017).

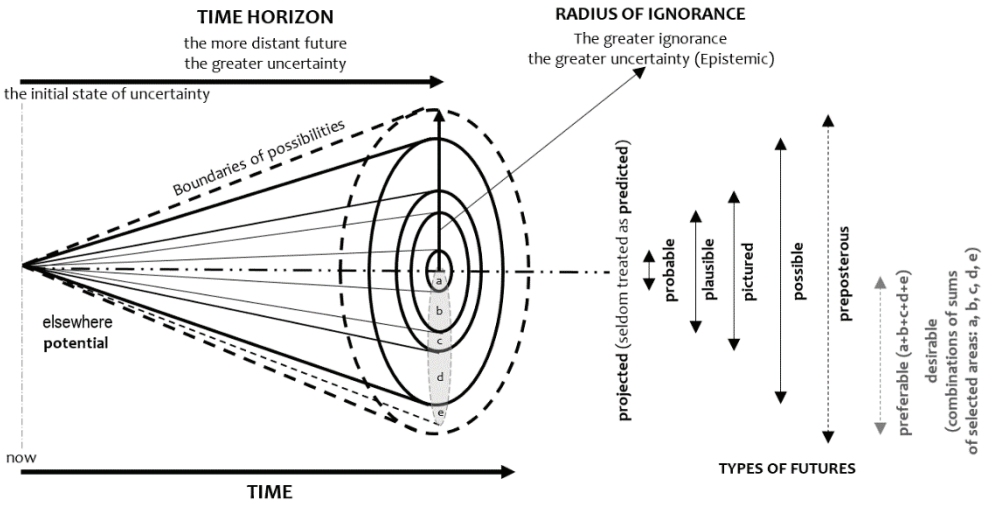

Fig. 1. Cone of futures & uncertainties & ignorance

Source: Author based on (Magruk, 2017; Voros, 2017, Sardar & Sweeney, 2016

In order to strengthen the focus of foresight research on the reduction of uncertainty in the studied area, the author has identified over 100 methods (dividing them into 10 classes: consultative, creative, prescriptive, multicriterial, radar, simulation, diagnostic, analytical, survey, strategic) that can be used in foresight studies and that can have influence on the identification, analysis and minimisation of uncertainty (Magruk, 2011).

The expanding cone reflects the complexity and uncertainty of the future. It results from the fact that the more distant time horizon and also the worse quality and resources of knowledge (the higher level of ignorance), the greater the uncertainty (its scope and range).

A more detailed concept of the cone of futures & uncertainties & ignorance is presented in Table 1.

Table 1. Methodological foresight matrix in relation to the type of futures, uncertainties and knowledge

TYPE OF FUTURE	Predicted Future (a)	Projected Future (a)	Probable Future (a)	Plausible Future (b)	Pictured Future (c)	Possible Future (d)	Preposterous Future (e)	Potental Future
SCOPE OF UNCERTAINTY RELATED TO TIME HORIZON AND RADIUS OF IGNORANCE	Zero	Surface	Statistical	Scenario	Outspread	Substantial	Deep	Ontological
LEVEL (AWARENESS) OF KNOWLEDGE	Nomological	Plain	Based on Current Trends	Based on Current Knowledge	Borrowed	Blurry	Irrational	Total Ignorance
CLASSES OF FORESIGHT METHODS	SAMPLES OF FORESIGHT METHODS BELONGING TO EACH CLASS THAT CAN BE USED IN SELECTED TYPES OF FUTURE							
Consultative	Interviews, Expert Panels, Essays							
Creative						Wild Cards	Speculative Writing	
Prescriptive	Genius Forecasting				Future Mapping	Rich Pictures	Alternative History, Science Fiction Analysis	
Multicriterial			DEA					
Radar			Scientometrics					Analogies
Simulation		Trend Extrapolation, Long Wave Analysis	Probability Trees, Stochastic Forecast					System Dynamics
Diagnostic				SWOT, DEGEST				
Analytical	Megatrend Analysis	Trend Impact Analysis						Technology Watch, Environmental
Survey	Literature Review	Weak Signals						
Strategic				Scenarios, Technology Roadmapping				

Source: Author's own study

This approach makes it possible to identify (and, in consequence, manage) selected types of uncertainty. Thanks to this approach, it is possible to change the research perspective in which the kinds of the future (types of alternative futures) characteristic of a "future cone" can become a background for research on uncertainty.

DISCUSSION

This paper attempts to draw together three methodological fields: uncertainty, foresight, and knowledge. The author analyses complex relations among the above areas on the basis of their characteristic which are author's extensions of the existing concepts available in the literature. In the author's opinion, by showing strong relationships between the above fields, the research objective of the work is achieved.

The methodology that is the most characteristic for the foresight research is the selection of appropriate research methods to create desirable future. In the author's opinion results showed in Table 1, can be helpful in ways of choosing appropriate foresight methods in a situation when it is known with what type of future, scope of uncertainty and level of knowledge we are dealing with. The knowledge on the type of future may be a derivative of the formulated goals of the research in a specific area (besides many factors influencing foresight research).

Such a schematic approach, although simplified, provided a good basis for achieving the main purpose of the article, i.e. the answer to the question: "What uncertainties and levels of knowledge can shape the foresight research methodology?"

Keywords: uncertainty, knowledge, ignorance, foresight, cone

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COLLABORATIVE INNOVATION DEVELOPMENT VERSUS NEW TECHNOLOGIES

COLLABORATIVE DEVELOPMENT OF VIRTUAL ASSISTANTS – THE ROLE OF ARTIFICIAL INTELLIGENT AGENTS IN INNOVATION DEVELOPMENT

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INTRODUCTION

Artificial Intelligence (AI) technology provides a revolutionary way of collaboration to create innovative products and services and to deliver value to customers. In this paper, we consider Virtual Assistants (VA), AI-based software agents, that can assist their owners in the scheduling business meetings and everyday tasks. VA can interact with others in a typical business interface – which is email – using natural language to set a meeting between two people, reserve a conference room or even book a hotel, restaurant, and flight. Setting a meeting requires providing VA with access to one's calendar and then including the VA agent to an email conversation between parties that want to meet. VA than communicates with one of the interested parties to find the best time and space for the meeting.

VA agent delivers an innovative service to its customers. The service is co-created by the service provider and its users. Even if users are not involved in the initial process of creating the service, they still heavily influence the outcomes and its later development (Gumesson, 2002). However, a willingness to take part in this cooperation can be influenced by actors' attitude to artificial intelligence and to communication with an artificial entity instead of a human being. Thus, the purpose of this paper is to: (1) identify the scope of the collaboration of VA users with the providers in the VA software agents development process, (2) define the impact of users' interpretation of VA on this collaboration. Since VA is based on AI, development of VA agent can be based on innovative algorithms that learn and evolve

with every encounter they have. Machine learning needs interactions with users to evolve and IT developers need feedback from users. Therefore collaboration between VA provider and users can be guided by the provider who implements improvements to algorithms or can be left to VA which can develop itself autonomously, thanks to the use of learning algorithms on the basis of observation of their interaction. This paper refers to literature on collaborative innovation and sensemaking. We posit some research questions, and we try to answer them on the basis of a qualitative study. In the end, we present a conclusion.

LITERATURE REVIEW

The need to reach outside one's boundaries in order to innovate is a result of dispersed points of knowledge across the business network (Powell, Koput & Smith-Doerr, 1996). Open innovation can be attained in various ways, one of which is collaborative innovation (Gallaud, 2013). Three types of actors are involved in the use of VA. The first is the provider – which is the company that creates the system and through a collaborative innovation process develops it. The second is the host – this is the organisation that hires the VA software agents for its employees, who use VA to set meetings with other stakeholders. VA has access to the host's calendar and can manage it to some degree. The third type of actor is the guest – it is the organisation whose employees want to meet with the host employees and have to interact with VA in order to do it. Collaborative innovation is a process that happens between the provider, the host and the guest requiring some form of collaboration between them. The provider can use the observation of the users' behaviour to make the software more adjusted to them and to develop new software abilities. Deriving from the Dahlander and Gann (2010) work, this is an inbound innovation based on sourcing activities. Researchers have pointed to the need for recognizing how users help participate in the innovation process of digital solutions (see Bogers et al., 2017).

We assume that in the case of VA, collaborative innovation can proceed on two levels – the configuration settings and the core of the service. The configuration settings are the basic way a user can adjust the service to its needs. This level represents standard functionality in software and is not a subject of collaborative innovation. We are interested in the second level, which refers to the functionality and usability of the VA. Especially to the question how the provider uses collaboration with the host and the guest to improve the agent on its core functionalities and capabilities.

The interaction with an artificial entity, such as VA that uses normal language, can be extraordinary for the human actors. As computer programs can be perceived by its users as social actors (Nass et al., 1994), we do not know how VA will be interpreted and what effect this will have on the interaction with it and the collaborative innovation process. Recent studies have shown that people react differently to AI agents than humans (Mou & Xu, 2017), and the way an agent is constructed can have significant effects on the humans' reactions when interacting with it (Ciechanowski et al. 2018). The user's interpretation can, therefore, impact the collaborative innovation process,

because depending on the interpretation human actors can have different attitudes towards the service. We assume that attitude can influence the motivation to give feedback to the VA provider.

RESEARCH METHOD

Our basic question is about the collaboration model in the case of VA development and the influence of users' interpretation of VA on their participation in VA development. In the interorganizational use of VA, the interactions will happen on two levels: individual and organisational. The interface between the provider and users as an organisation and its employees becomes an important study object (Hargrave and van de Ven 2006). The VA provider can bring the host and guest organizations to collaborate, but to develop VA it needs to engage also the host and guest staff, for they are the actual interlocutors of interactions.

According to the interpretative paradigm, we can assume that VA as a new entity will evoke intensive sensemaking. We assume that this will be a process of learning and sharing of information with VA (as AI) and/or with the provider. The result of this process will be an interpretation of VA, that can influence the collaborative behaviour of the host and the guest employees towards VA agent or its provider. Thus, the motives to share the experience with AI provider (as the developer) needs explanation (Bogers et al., 2017).

In our study, we treat VA providers as key informants because they have to deal with the collaboration with hosts and guest to develop VA agents. The study consists of four steps. At the first step, we aimed to identify and compare VA solutions worldwide, and we found twenty companies that offer VA solutions worldwide. In the next step, we conducted initial in-depth interviews with the CEOs of two companies: Kono and Evie. These interviews considered three aspects: the role of VA in host/guest interaction, the attributes of VA promoted to users, they attitude to VA and development of the agent. Respondents were open to share their knowledge and experience, however, they tended to talk about VA usage and implementations rather than its development. Based on the collected data we designed the next step – interviews with all VA providers worldwide. CEOs of those companies will be invited to participate in our study using multiple ways like emails and social media communicators using the first two interviews as recommendations. Interview scenario was modified according to initial interviews to get more data about VA development in collaboration with hosts and guests as well as about the influence of their AI sensemaking on that collaboration. At the last step, the interviews will be analyzed according to Miles and Hubermann (1994) scheme of analytical work with qualitative data. Interviews will be coded and deconstructed, then interpreted and finally reconstructed to show relationships and insights derived in the interpretation phase and to find explanations referring them to existing theory and practice.

RESULTS AND DISCUSSION

This study allows us to point out to some preliminary findings. VA is developed in the collaborative innovation process in two ways. The software itself is introduced based on R&D processes, which only in a small degree use open innovations. Then there are two possible ways to innovate: 1) provider gathers feedback from its users and by using their experiences creates another version of the software; 2) the provider designs the VA in a way, that it will be able to learn autonomously using the analysis of interactions with users and machine learning. The second way leads to a notion, that thanks to the use of AI, there is a new model of collaborative innovation, and this model can revolutionize the way collaboration is carried out.

The VA image is comparable among providers and users. Users are interested in the solution, but also show some anxiety about it. However, this is not related to the use of AI but to the way, VA communicates with users. As scheduling meetings usually are initiated by a human, not an artificial entity, the reactions could be influenced by a different propensity to answer to an invitation sent by a bot.

VA connects organisational aspects with individual interactions, so the propensity of users to cooperate can have a significant impact on the collection of their feedback and collaborative innovation. Individual VA users will often interact with such form of AI for the first time, which leads to sensemaking processes among human actors. Sensemaking easily can be described as a process "of meaning construction whereby people interpret events and issues within and outside of their organizations that are somehow surprising, complex or confusing to them" (Cornelissen, 2012, p. 118). Sensemaking leads to the identity attribution, which can influence the way people interact with VA, the propensity to collaborate with it and share their experiences. Collaborative development of VA can require to create a specific image of the VA among its users (to influence the sensemaking processes of VA) and acknowledging that users will learn to interact with VA and share their experiences along with consecutive interactions.

Our research among VA providers is ongoing. Therefore we expect to broaden the presented results. It will be a consequence of exploring further opinions but also studying other VA software agents that are being introduced to the market, that potentially can be based on different business models.

Keywords: virtual assistants; artificial intelligence; business relationships; innovation development.

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ROBOTS AS NEW TECHNOLOGIES IMPROVING THE QUALITY OF LIFE OF OLDER PEOPLE

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INTRODUCTION

For more than twenty years now, the world has seen a steady decline in the proportion of the working-age population and an increase in the relative number of retired people. The estimated world population on 1 January 2017 was 7.55 billion and 511.8 million in the EU. The share of older people (aged 65 and over) in the world was 8.70% and in the EU 19.40% (0.3% increase compared to the previous year and 2.5% increase compared to 10 years ago). The highest share of people aged 65 or over in the total population was observed in Japan with 28% of the population (United Nations, 2017; Eurostat, 2018).

According to forecasts prepared by the United Nations, it is estimated that in 2030 the number of people aged over 65 will constitute 11.66 of the total population in 2030, in Europe 30.3% and in Poland 23.2% (United Nations, 2017). In 2080 the number of people aged over 65 is expected to constitute 20% of the total population worldwide and in Poland as much as 35.25%. Increasing the life span of the population and increasing the number of elderly people brings the need to provide them with institutional support in a form of care. Assistance is particularly needed for people with a low level of independence. With their aptitude to improve the quality of life of older people, robots may become be one of the key elements in helping the elderly.

LITERATURE REVIEW

Thanks to their technological capabilities, robots can be used by the elderly to: capture, transfer, remind about taking medicines, recognise and assess health, monitor walking, motivate to walk, meet social needs through interaction. In the near future, robots may begin to help people take care of seniors and provide companionship

for older people (Broadbent et al., 2009; Piezzo and Suzuki, 2017; Flandorfer, 2012; Broekens, et al., 209).

This situation triggered research aimed at creating robots with human-like intelligence, receiving stimuli from the environment and equipped with the ability to make decisions and solve simple problems. In literature, robots can be divided into those used for rehabilitation: they do not communicate with the patient (powered lower limb orthoses, exoskeletons) and social interaction (Yan et al., 2015; Vandemeulebroucke et al., 2018; Kazerooni, 2005; Koops et al., 2013).

Until recently, social robots were divided into: service robots and associated robots. Service robots help older people to function, they are used for basic tasks associated with independent living, such as preparing food and bathing; mobility and navigation; nutrition advice or monitoring.

Associated robots are aimed at improving mental health of older people. Currently, social robots can be programmed to simultaneously perform activities supporting the life of an elderly person (they served as service robots) and at the same time provide company for the elderly (they served as associated robots) (Choi et al., 2014; Martinez-Martin and del PobilCosta, 2018; Klamer and Allouch, 2010; Pollack et al., 2002). Literature studies and research carried out so far allow the following research questions to be formulated (Ejdys and Gedvilaite, 2017; Grant et all. 2004; Usman and Tomimoto, 2013): Can humanoid robots with artificial intelligence be used in the future to care for the elderly? What risks can humanoid carers pose to the elderly? What marketing factors will determine the development of technology? What ethical barriers are the users of the solutions exposed to? What determines the functionality of technology application?

RESEARCH METHOD

In order to find the answer to the above-mentioned research questions, a study was carried out. The research was carried out between March and April 2018 on a sample of 643 Poles. The respondents represented all voivodships from Poland. An electronic form of the survey was distributed with the use of social media and snowball techniques. The respondents made an assessment of the analysed technology, using the 7-point Likert scale, where 1 – it definitely means I do not agree with the given statement, 7 – I strongly agree. Taking into account the fact that not every respondent encountered the formula of a humanoid robot, the term robot was used in the questionnaire. In the sample structure, 32.7% (210 people) were people aged 18–25, 24.9% (160 people) people aged 26–40, 25.8% (166 people) aged 41–60 and 16.4% (107 people) over the age of 60.

RESULTS

According to the respondents, the predicted degree of universality of the analysed technology is diversified at the level of the world and Poland. According to more

than half of respondents, robots supporting the care of the elderly will have become common in the world by 2040. As far as Poland is concerned, the respondents are more sceptical and over 30.0% believe that this will happen only after 2050. A relatively higher percentage of respondents (11.7%) believe that the analysed technology will never be widespread in Poland. Such an opinion is expressed by 6.7% of respondents in the context of technology diffusion in the world. Marketing aspects of the analysed technology were assessed from the demand perspective. Robots improving the quality of life of older people were analysed in terms of the appearance of the robot, the perceived benefits of its use, the existing demand among family members and the elderly themselves. More than 66% of respondents indicated that the appearance of a robot will have a significant impact on the scale of its use. In the opinion of respondents, there is a higher demand for robots on the part of family members than the elderly themselves. Less than 23% of respondents believe that the demand for labour is related to temporary fashion. Using robots to care for the elderly can give rise to many ethical dilemmas. Respondents had difficulty in clearly indicating whether the analysed technology will be a source of social benefits or will generate social problems. The majority of respondents see both benefits and social problems. This indicates the need for further discussion and research focused on the analysis and assessment of potential effects of introducing new technologies. Taking into account ethical and moral problems, more than 54% of respondents claim that the widespread use of robots in elderly care may cause moral dilemmas and doubt whether a robot can be entrusted with elderly care. Only 5% of respondents do not see such problems. The highest rated functionalities (ratings of 6 and 7) included the possibility to call for help by an elderly person under the care of a robot, the possibility to remind about the need to take medication, inform the family about the health condition of the elderly person or perform heavy-weight activities, e.g. lifting the elderly. Every fourth respondent indicated that staying in the presence of the robot can be pleasant. The highest rated risks were those related to interpersonal reactions. A source of concern is also the possibility of unpredictable, unexpected behaviour of the robot and the fact that due to human error (in design, programming) the robot may inadvertently cause harm to an elderly person. One in five surveyed persons believes that a robot may expose users to loss of health or life, and one in seven believes that a robot may intentionally harm an older person.

DISCUSSION

To sum up, it can be said that almost 70.0% of respondents believe that there is a need to construct robots for care over older people. More than 55% of respondents would be willing to use the robot to care for a member of their family, and more than 70% see themselves as users of this technology. According to more than half of the respondents, robots supporting elderly care will have become common in the world by 2040. As far as Poland is concerned, the respondents are more sceptical and more than 30% believe that this will happen only after 2050. More than 66% of respondents

indicated that the appearance of a robot will have a significant impact on the scale of its use. Over 75% of respondents believe that robots will not replace the relationship between men.

The use of robots in the care of the elderly may involve only partial support for such care by performing heavy, repetitive tasks by the robot. Problems/threats related to the use of robots in the care of older people indicated by the respondents can be assigned to one of the following groups: social, psychological-ethical, economic, technological factors. Among the highest rated threats, the respondents included those related to interpersonal reactions. Only every tenth respondent strongly agrees with the statement that they could trust a robot and feel safe in its company.

Keywords: humanoid robots, new technology, the elderly

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THE MODEL OF CREATION OF A DIGITAL ECOSYSTEM IN THE SPHERE OF CONSTRUCTION

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INTRODUCTION

In today's world the significance and impact of the development of digital technologies in various spheres of human life is difficult to overestimate. In 2017 Russia – at the federal level – took a course to form and develop an information society, within a framework that introduced the state program "Digital Economy of the Russian Federation", which establishes an active role of the state in forming a digital ecosystem, in which the society jointly participates in the introduction and use of advanced technologies.

The construction industry is of no exception – the latest technologies are already used at all stages of the investment and construction project. Modern technologies, such as information modelling of buildings and structures – BIM (Building Information Modelling), Big Data, Block Chain, IoT (Internet of Things), 3D printing, resource saving technologies and innovative technologies in the development of new building materials sector, are widely used in Russian construction practices. The collaboration of the government and business entities plays a great role across the different stages of the innovation process.

The abstract, reveals the main problems of introducing modern technologies, analyses possible ways of their use in a combination with information modelling, and offers a manner of their integration at all stages of the investment and construction project on the basis of BIM information model. The relationship between the government and domestic companies fosters the formation of foreign collaboration.

LITERATURE REVIEW

Nowadays the most popular technology in the sphere of construction in Russia is BIM-modelling. According to the report of NRU MGSU (2016), "BIM is the process of creating and managing information at all stages of the life cycle of a construction project ('planning' – 'design' – 'construction' – 'operation' – 'liquidation')". The possible advantages of using this technology are unconditionally observed by all participants of the investment and construction process: multifunctional application, adaptability and flexibility of the model, and, as a result, a reduced number of conflicts and improving the quality of work performed, cost reduction and time effectiveness of implementing the investment and construction project. (Kupriyanovsky et al., 2016)

The state actively facilitates growth in using BIM-modelling. The Russian Ministry of Construction has approved a programme for the introduction of information modelling technology, which results in the mandatory use of BIM-technologies at the stages of design, construction and operation of the capital construction project by means of budget funding.

While researching the matter of the introduction and use of information modelling technologies in the Russian practice, the author observes one main problem. It is a lack of official statistic data on the exact number of design, development or construction companies that factually use the latest technologies in their business. For example, according to the report of NRU MGSU (2016) in Russia, there are about 51 000 project companies which employ approximately 500,000 designers. Over 100,000 software licenses for supporting the technology of information modelling have already been sold this year. However, there are not many companies that declare they do use BIM-modelling and are ready to share practical experience in the implementation of pilot projects – except a few dozen of the largest players on the market. This is a common phenomenon due to unsuccessful experience in implementing BIM-modelling. The reasons for this are potential losses with regard to such implementation and unreadiness for such losses among companies on the Russian construction market as such implementation causes slowdown in productivity at an initial stage, increases costs due to the introduction of a large-scale technology and requires organisational restructuring (Talapov, 2015; Kallaur, 2018).

This situation is magnified by the shortcomings of a regulatory framework and a lack of common state standards for the implementation of construction projects, as well as common understanding of the life cycle of the construction project, a shortage of qualified personnel in the labour market, a high cost of software and the need to adapt foreign programmes to Russian conditions (Talapov, 2015; Ginzburg, 2016).

Many researchers emphasise the possibility of using information modelling at all stages of the life cycle of a capital construction project (Talapov, 2015; Ginzburg, 2016; Churbanov, Shamara, 2018). The concept of BIM maturity levels developed by Mark Bew and Mervyn Richards (2014), who describe the development of information modelling levels, distinguishes levels 0–3, from 2D to iBIM (integrated BIM). Collaboration in a form of information exchange between different parties begins

at Level 2, where the General model is built and analysed for various programmes in one of the main interfaces, such as IFC (Industry Foundation Class) or COBie (Building Information Exchange). Level 3 BIM, or the Integrated model, implies full cooperation between the participants of the investment and construction process and shared access to a centralised repository of the BIM model.

In addition, the paper distinguishes a concept of "BIM measurement", i.e. a number of different indicators of the information model, where the 3D model is complemented by new information and formed into an n-D BIM model (Ginzburg, 2016; Pilyay, 2017). The first important organisational parameter complementing the model is the time factor. The 4D model includes information about calendar planning and a sequence of actions. The 4D formula has become a basis for creating a 5D model and connecting information of an economic nature, namely financial costs at each stage of implementation, as exemplified by one of the few examples on the Russian market – the company YIT (Mironov V., 2018). The 6D model includes information "as built", that is, reflects the already created property and is intended for use at the stage of operation. The 7D model fosters management and control of the property due to built-in data transmission system sensors and "smart" engineering infrastructure.

Literature on technology information modelling and British standards offers two concepts: AIM (Asset Information Model) and PIM (Project Information Model), distinguished in terms of creating and managing the asset. This division is quite logical, as it provokes the creation of the object technical customer, and often manages another person – the operator. PIM project information model appears at the stages of object creation (planning, design, construction, reconstruction or restoration), AIM collects information related to the current maintenance and management of the property (British standard PAS-1192-3:2013).

Nonetheless, there is another point of view. Ginzburg A. does not share his views upon the model or its functional application. He rather combines all aspects into one model BLC IM (Building Life Cycle Information Modelling). One thing remains clear, information modelling can extend to the entire life cycle of an object. However, in the contemporary Russian environment BIM-technologies find their application only at the design stage and less often at the construction stage, and do not reach the next stages of the life cycle. The main obstacles to their development are the divergent interests of participants in the investment and construction project.

As a result, the most successful in the application of information modelling technologies of construction projects among Russian companies were, first of all, integrated full-cycle companies, which were able to assess the benefits of BIM at each stage of the project implementation in order to maximise their economic effect (Kallaur, 2018). Despite this fact, Churbanov, Shamara (2018) carried out a significant study which analyses the impact of the development of information modelling technologies on the relationship between the participants of the investment and construction project. It incorporates a model of disintegrated procurement, which means that a traditional scheme of relations ("design" – "tender" – "construction")

will attract the contractor at an early stage and take into account its technological and resource capabilities, as well as contribute to the development of management contract.

Integration of BIM modelling is a radical innovation. Only radical innovation is relevant to the growth of an enterprise, regardless of the fact whether it is developed internally or by means of collaboration with domestic or foreign partners (Hsieh et. al, 2018).

Collaborative ideation is a key practice for innovation. Implementing suitable appropriability mechanisms during this collaborative ideation is a necessary, yet difficult task. This difficulty stems from a high level of uncertainty and a low level of codification Enterprises can employ several appropriability mechanisms to protect their knowledge. (Gama, 2019)

The model of integrated procurement, or an integrated method of implementation of the investment and construction project ("Integrated Project Delivery"), will become a basis for interaction in the activities of designers and builders, and accelerated development of integrated engineering. As well as for both models, it will trigger the formation of a partnership mechanism based on the principles of risk and responsibility sharing, and common interests in the success of the project. Thus, it forms an ecosystem, which increases locational capital wealth and prosperity (Audretsch et al., 2018)

RESEARCH METHOD

The basis of digitalisation of the investment and construction process incorporates BIM technology, but, additionally, for example, in the Russian Federation, also Blockchain technology has become widespread. A BlockChain, or block chain, is a database of sequential operating records that is stored in a distributed form between different storage devices and is not bound to a single master server (Ablyazov, Petrov, 2019). As part of the investment and construction project, this technology is most interesting from the financial side of the process, especially in the case of transition towards the use of smart contracts between the participants of the investment and the construction project. BlockChain in this case provides: security of transactions due to the mandatory encryption and distribution of data storage; exceptional transparency of the process, which is provided by General and equal access to the history of transactions of all participants; acceleration of operations due to the absence of intermediaries. Despite the obvious advantages of BlockChain, in Russia the spread of this technology is hampered by the high cost of personnel training and a high energy consumption of the necessary equipment. However, there have been several pilot projects on the conclusion of contracts for share-building-based BlockChain, for example, in the project implementation of the blockchain in the process of concluding contracts for share participation, technical development, performed by specialists from Vnesheconombank (Ablyazov, Petrov, 2019).

In addition to using BlockChain technology in financial smart contracts, the synergy of technology with BIM modelling opens up the possibility of building entire databases of projects, building elements and materials, which could be accessed by any developer, and to which any contractor could connect with their product. At the same time, the results of transactions can be immediately visualised in a BIM model. This feature would solve one of the most important drawbacks of n-D modelling – the lack of data security.

Equally broad opportunities for the construction have augmented AR (Augmented Reality) and virtual reality VR (Virtual Reality). The first is quite firmly established in the field of interior design. And the most promising application of virtual reality is the ability to review a 3D-BIM-project. Due to the implementation of VR solutions, designers can quickly digitise their BIM model for interactive experience. It becomes possible to literally travel inside an object that has not yet been built, for example, using the Virtuix Omni platform. This is convenient, for example, in demonstrating the future of the project to the customer, as done by an American company BIM-CAVE. At the construction stage, it becomes possible to track the progress of the project at a distance, using unmanned aerial vehicles with photographic and laser fixation. This allows designers to avoid mistakes in designing the object by analysing it with structural and visual assessment in the future landscape and during the development of a construction project. The main disadvantage of this technology, obviously, is the price. Although reviewing the model by the customer does not require significant investments, the developer will face large-scale costs connected with the management of remote monitoring of the construction progress. (Obodnikov, Alekseev, Kagan, 2018)

Big Data – in Russia big data analysis is often used in the project management system and in the analysis of the sales market, as well as in further management and operation of the finished property, although it is possible to use it very effectively in the implementation of construction and installation works. First of all, this technology contributes to the adoption of more effective management decisions at all stages of the investment and construction project, and secondly – allows for optimising design and construction processes, thereby reducing project costs. In the future, Big Data in conjunction with information modelling can be used in analysing a complex, generalised information model of the "Living Environment Information Modelling", necessary for solving problems of urban planning (Ginzburg, 2016).

One of the most promising technologies is the Internet of Things. "Internet of things" – a fully automated cycle of devices and systems by connecting them to a wireless network. Thanks to IoT, monitoring and timely repair of construction equipment, management of material and technical supply of construction production, energy saving and safety at the construction site are possible at the construction stage; at the stage of operation of the property sensors can detect the appearance of technical defects, warn against the occurrence of pre-emergency situations in communication systems and so on. An obvious advantage of using IoT is cost reduction, but the introduction and full-featured application of this technology in

the work is a very time-consuming and expensive process. There are always threats to cybersecurity and physical security of sensors. At present, IoT in Russia has become widespread only at the stage of the operation of real estate, incorporating work with resource-saving technologies. One example of such resource-saving technologies is a management system "Smart house" – a single system of the building, which includes sensors, control elements and actuators and combines power supply, security, heating, ventilation, water supply, etc. The use of resource-saving technologies can meet domestic needs of the users of real estate and significantly reduce operating costs. Despite this, in Russia these technologies have not met proper development and the number of equipped facilities does not exceed 0.1%, due to the low awareness of the population and a frequently high cost of implementation.

IoT platform, according to Analytical Report of J'son & Partners Consulting (2019), can be divided into three types:

- analytical platforms and applications that implement the functions of optimising the consumption of resources and operation modes of equipment/systems of buildings and structures;
- IoT-platforms and cloud applications that implement not only the functional analysis and recommendations on the optimal modes of operation of the equipment, but also have a control loop (BMS/BAS (Building Management Systems / Building Automation Systems) and BEMS (Building Energy Management Systems));
- computer-aided design systems that implement the concept of 7DBIM, that is, cover not only the design and construction stages of the building, but also the stage of its operation, and thus intersect with the cloud BMS/BAS/BEMS. In the future, the synchronisation of BIM with this technology will foster the practical implementation of the transition to the sixth or seventh dimension of the BIM model due to the possibility of obtaining a continuous flow of data from both the building under construction and the operated building. Data collection through advanced technologies – photo-video recording, laser scanning, embedding sensors and transmission devices in construction equipment, drones, etc. will allow for creating a real digital copy (digital twin) of the object under construction for the transition from the configuration of the model "as designed" to "as built".

3D printing is a method of construction of building structures, based on a layer-by-layer application of the composition through the printhead of a 3D printer. There are two ways to use printing in the construction process. The first method involves printing directly on the construction site, that is, the printer is placed in the centre of the future object, and printing is carried out from the inside. In the second method, separate blocks are printed in factory conditions, followed by transportation to the construction site. The use of 3D printing provides growth in productivity, reduces labour intensity, increases the speed of production and reduces the cost of construction. The 3D printing market in Russia has been steadily growing for over the past 8 years (in quantitative terms, it has grown 10 times), but according to research by J'son & Partners Consulting (2019), Russia's share in the global 3D printing market

is only 1.5%. To stimulate the development of 3D printing, Russian policy makers have undertaken to foster the formation of competence centres together with the development of national standards and the resulting "Comprehensive action plan for the development and implementation of additive technologies in the Russian Federation for the period 2018–2025", which involves consolidating efforts of Russian scientists and developers of additive production facilities.

The relationship between 3D printing and BIM modelling is very important at the design stage of construction. Before you start 3D printing, you need to create a 3D model. Most often this is done with the help of special software. At the same time, the creation of a BIM model allows designers to determine specific physical properties of different components and set a greater number of information parameters of manufacturing technology, which make the design process more flexible and transparent. At an early stage of planning the 3D printing process, this approach can significantly improve the efficiency of manufacturing building structures (Ignatova E., Utkin M., 2019).

The integration of these technologies requires a high level of collaboration not only inside an enterprise, but also outside. Also the collaboration of government and companies plays a great role across the different stages of the innovation process. This necessitates establishing such relationships between colleagues and partners so that the participants are able to integrate and develop the innovation of BIM modelling. They need to communicate with each other effectively, discussing problems and achievements.

These technologies are already used as independent innovations by major Russian developers in some investment and construction projects. However, the proper use of them all together can create a synergy effect, which will bring a great boost to the development of the whole construction industry.

RESULTS

As noted earlier, the most popular technology among Russian developers is BIM-modelling, which can be used with other modern technologies. The technological basis for the digitalisation of the investment and construction process is the integration of BIM, high-performance IT-systems, cloud platforms and IoT solutions that provide unified and constant connectivity, specialised mobile applications, robotic equipment, unmanned vehicles, additive technologies, AR/VR, services for Big-Data analysis and BlockChain technologies. Such integration makes it possible to form a united digital ecosystem that allows designers to manage, control and regulate the full life cycle of the construction project, and then the property in real time. The synergistic effect can be achieved only by means of compatibility and interaction of technological solutions with the possibility of seamless data exchange, storage, synchronisation and access in real time (report of J'son & Partners Consulting, 2019).

The first prerequisites for the creation of a united digital ecosystem at the state level are: providing banks with normative-technical and methodological

documentation, all participants of the investment and construction project with standard forms of contracts for, and state information and analytical systems with sources of information about land plots, prices, contract tenders, etc. This will form a basis for state requirements and standards with regard to the implementation of BIM modelling at all stages, and will ensure timely consideration for changing environmental conditions (Churbanov, Shamara, 2018).

A unified digital ecosystem based on the information model will allow not only for using all kinds of automated tools, but also providing regulated access to data on the object to all stakeholders of the investment and construction project (report of J'son & Partners Consulting, 2019).

In a global meaning, the use of the BIM model can be represented as a tree trunk, the branches of which are auxiliary technologies. And thus, by means of uniting the participants of the investment and construction project on the basis of the BIM-model, it is possible to connect the described technologies of Big Data, Block Chain, IoT and 3D-printing at each section of the project path. Hence, in the initial planning of the project, it is possible to use a deep analysis of Big Data at the stage of acquiring a site for construction, in order to identify the needs of potential customers, as well as to search among the many thousands of options for the optimal project. Taking into account the data obtained, as well as information from the state information and analytical systems, it is possible to obtain the most acceptable BIM model of an investment and construction project. Then, in terms of this model it is possible to use BlockChain technology for concluding contracts and procuring construction materials. During construction, the BIM model is connected to the Internet of Things technology, allowing the use of various technical means, such as sensors to monitor optimal progress of construction, adjusting the project in accordance with the indications in real time and even for compliance with safety regulations. At the same time, for greater clarity, you can use virtual reality technology in order to analyse the model of the object under construction with your own eyes. It is at this stage that the transition to the as-built (6D-BIM) model is carried out at the expense of IoT platforms from the original, as-designed model. At the same time, before or during the construction phase, based on the parameters of the BIM model, it is possible to use 3D printing technology, both for the construction of the capital construction project as a whole, and for the creation of its individual blocks. Finally, when the investment and construction project is implemented and the stage of operation of the facility, the IoT technology is again connected for the optimal implementation of energy-saving technologies. At the same time, with BIM-modelling as a basis of the investment and construction project, all participants at each stage of the project can have access to the overall picture and refer to a single standard of digital interaction. Figure 1 illustrates the model of Creation of Digital Ecosystem in the sphere of construction.

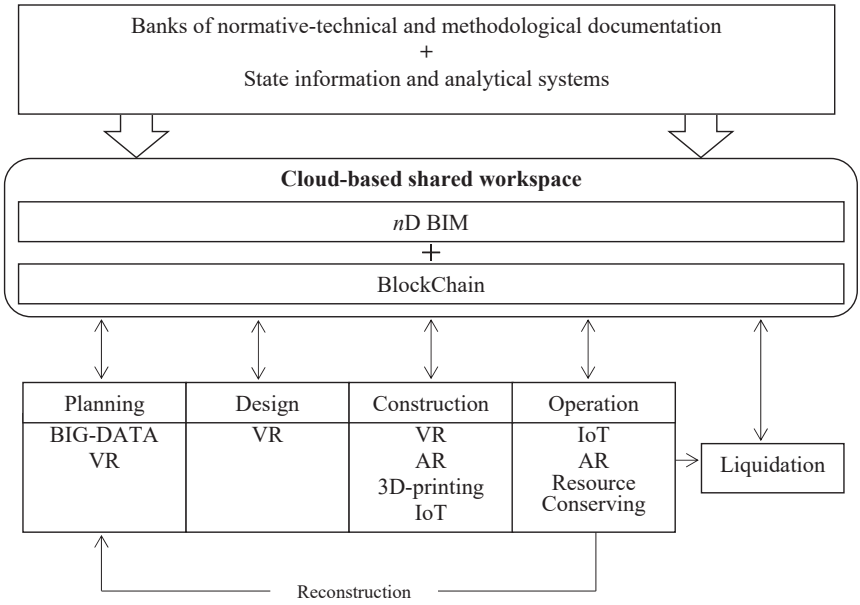

Fig. 1. The model of Creation of Digital Ecosystem in the Sphere of Construction

Source: Authors' own study.

It should be noted that this model can function only if there is a sound, formal basis, namely, the presence of developed norms and standards, a state-controlled mechanism, technical and software infrastructure of all participants, as well as qualified specialists.

Integrating this model into real business life requires a high level of collaboration between partners. All participants need to overcome communication barriers and start active interaction. Innovative actors need to develop "supportive structures" which would be helpful in the process of integrating BIM technologies.

DISCUSSION

The BIM model becomes an ideal candidate for the becoming a role model in the root technology that integrates other technical means. Combining advanced digital technologies based on BIM modelling into a single digital ecosystem will reduce fragmentation in the use of various technological solutions and create conditions for a coherent, unified and continuous investment and construction process, which integrates all participants at all stages of the life cycle of the object. Moreover, the level of adaptability of the model to external changes increases, which leads to cost reduction of the project.

The widespread use of BIM-technology for the entire life cycle of the construction project entails the modernisation of the investment and construction process as a

unit. This may lead to a change from the traditional disintegrated model of interaction between the participants of the investment and the construction project to a partnership based on the information model of the facility, which allows concluding multilateral partnership agreements, as opposed to bilateral contracts.

Keywords: Digital Ecosystem, investment and construction project, BIM technology.

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NETWORK PARADIGM IN INDUSTRY 4.0

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INTRODUCTION

Since the phenomena of digital transformation taking place in the industrial sector were given a framework by defining the concept of Industry 4.0 at the 2011 Hannover Fair, the popularity of scientific publications dealing with both engineering-technical and social matters has been on the rise (Liao, Deschamps, Freitas, & Loures, 2017) (Saucedo-Martínez, Pérez-Lara, Marmolejo-Saucedo, Salais-Fierro, & Vasant, 2018). Despite a growing number of studies and analyses of phenomena accompanying industrial transformation, literature does not offer a strictly specific definition of Industry 4.0 (Ghobakhloo, 2018). The holistic scope and the revolutionary nature of changes caused by digitalisation in enterprises and in their environment make it difficult to define the concept in question in a clear and concise way. The authors of the article analyse selected ways to define Industry 4.0, isolating its key elements in order to identify a point of view shared by different authors. The conclusion to be drawn from the analysis is a thesis proposed by the authors of the article that the key to understanding and effectively implementing digital transformation solutions based on the concept of Industry 4.0 is to view the process taking place within and outside the company from the angle of network paradigm.

LITERATURE REVIEW

The analysis of definitions has pointed to two main perspectives of Industry 4.0: the technological-production perspective and the organisational-business perspective. Areas acting as components of the discussion explaining the effects of digitalisation in industry have been isolated within the said perspectives. These areas are: digital

factories, cyber-physical systems, business models, changes in value chains, smart products, and the customer in the process of value creation. Viewing the areas of change from the angle of the network theory plays a significant part in the understanding of each of these areas.

The authors juxtapose their observations with the design principles of Industry 4.0 as defined by Herman, Otto, Pentek (Hermann, Pentek, & Otto, 2015) and with assessment of digital maturity of businesses using the Singapore Smart Industry Readiness Index model (EDB Singapore, 2018).

RESULTS

The context for the functioning of businesses in the era of the fourth industrial revolution has been described in a form a set of principles of a digital business ecosystem that shapes the environment of the development of a network of interorganisational business collaboration and of value-oriented co-creation with the involvement of customers. Literature abounds in publications concerning network-based value creation and analyses of market collaboration within networks (Mazurek, 2013)(Lacoste, 2016), but the main goal of this article is to find a consistent way of interpreting the essence of Industry 4.0, both from a technological and a business angle. The authors of the article believe that this consistent way lies in taking advantage of the perspective of network paradigm (Borgatti & Foster, 2003).

Many experts define Industry 4.0 as a change in paradigms (Kagermann, Helbig, Hellinger, & Wahlster, 2013)(Pereira & Romero, 2017), not clearly specifying which paradigms do change and in what way they change. Therefore, a scientific analysis of the concept viewed as a paradigm shift becomes all the more legitimate and contributes to the current academic discussion taking place within the domain of management science.

Summarising the analysis, the authors of the article indicate the potential areas for future research into the matter in question, conducted using a network approach.

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STREAMS OF ENTERPRENEURSHIP AND THE FUTURE OF TECHNOSTARTERS. A CASE OF NORTH-EAST POLAND

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Universities as catalysts of streams of entrepreneurship in Poland developed from the most popular forms of teaching entrepreneurship organised by its staff as a special form of niche education (Burawski 2013, 34–35). In this paper the author analyses cases of organisational forms for student inventors as well as other examples of creating streams of entrepreneurship in academic environment according to the concept of Jan G Wissema (Wissema 2005, 64–74). The author focuses on organisational forms and tasks of children universities, as well as other cases of youth activities (students' inventions, technostarters) with regard to the process of creating streams of entrepreneurship in North-east Poland (Plawgo 2011).

Such modern entrepreneurs usually come from the university of technology and related surroundings, from normal students to active participants of student community. Nevertheless, an entrepreneur, in his/her mind, is a very traditional type of a market actor, equipped with an idea of self-employment, persistence, will of achieving success, and, moreover, the need for constant education and permanent personal growth, which as a consequence leads to self-fulfilment by starting and developing his/her own business. There is a proverb in Polish 'rozkręcić interes' e.g. "untwist business", that means "starting a company", but the meaning includes also doing it in a firmly resourceful and flexible way. Self-employment leads even to becoming a workaholic, because such a businessman is so dedicated to his/her company that sometimes s/he even sacrifices his/her family life and leisure time.

This paper presents cases of technostarters as an exceptional type of entrepreneurs, because they are pioneers of modern times and inventiveness. They cannot be called old-fashioned businessmen, but, before we put into words the exact definition of

technostartes, we need to consider a question (Wissema 2005, 60): how could it be possible that a human being, who is living a quiet life of a scientific worker, spending his time in laboratories and on conferences, suddenly puts himself into rapid business life, making a hard decision to enter the unknown, sometimes unfriendly world of business, where a pattern for success is completely different? So what feature is missing for a scientist to make such a risky life decision about becoming a technostarter? (Wissema, Verloop 2009, 96–104). Frequently, the decision about starting a company and becoming self-employed made by scientists has its roots in imperfections of their career path, especially for graduates of technological universities. Examples of this type of companies constitute representatives in the region of North-east Poland, particularly in the IT sector.

It is a common fact that universities of technology are rather tardy and slow in implementing innovations created in its laboratories (Siemieńska 2017, 30–53; Kukułowicz 2019). Sometimes, the cause lies in human behaviour; for example, a less talented boss blocks the way of promoting his gifted subordinate or ascribes the success of his worker to his own account. It happens so that academic projects are hard to introduce in practise, so they are abandoned at their designing phase and put away on dusty shelves. The lack of business practise and the desire for it often prompt scientists to start a company. Such enterprises are tremendously important for technical growth of countries which are leaders of inventiveness and innovation. Accoridng to Jan Wissema, technostarters are *a front guard* as well as *a drive wheel* in achieving technological advantage of the country. Wissema claims that the majority of technostarters are hidden entrepreneurs. What he means by that is that scientists manifest their attitude only in favourable circumstances and hopefully this leads them to starting a business. Whereas, in regular conditions, these scientists do not reveal themselves as entrepreneurs and do not consider setting up a company. Only after the Second World War governments noticed hidden entrepreneurship and decided to supported it financially, which lead to the transition to an open form of self-employment. Significant changes in legal regulations simplified setting up this type of companies and revealed innovation-centred entrepreneurship. Similar circumstances also lead to cooperation established between concerns and universities, technological parks or other based on innovation activities institutions, for example foundations, set up by means of donation from stakeholders, typically former university graduates (Szabłowski 2001, 158–162).

There is a whole range of reasons why universities should support technostarters. The most important are self-fulfilment in the economic practise of scientific workers, the will to put yourself to the challenge in new environment, the possibly to learn and grow and all development challenges as well as raising attractiveness of the region in which a technostarter operates, on account of the role of innovation animators and business factors. Another significant aspect is the development of education market, where the competition for international and national programmes and grants is commonplace. In this case, regional strategies of innovation play even

a more important role in animation of connections between science and practise (particularly in the European Union) (Gorzelak 2007, 88–111).

The changes result in new functions of a scientific community, a strengthening connection between science and industry and high demand for scientific research, more and more often financed by international concerns. The awareness of university staff increases so that it is possible to use one's research results and, moreover, treat it as a basis for self-employment and an idea to start a company. Scientific titles are frequently seen in the names of big companies, such as Dr Oetker in Germany or Dr Irena Eris in Poland. Comarch was set up by a professor of the University of Science and Technology in Cracow and a huge Polish IT company, Assecco, was strongly influenced by a private university in Rzeszow. These companies constitute the best evidence that it is possible to use scientific knowledge while implementing the rules of entrepreneurship. Everyone heard about the myth of garage companies (Microsoft, Apple), whose owners dropped out of college in order to make their business idea into reality. However, it can be wholeheartedly said that the number of companies set up by academic professors and doctors is much bigger than garage ones. Nowadays, in the field of pharmacy or cosmetics nothing happens without expert knowledge and well-equipped laboratories. Hence, both entrepreneurship awareness and aversion to staying within university walls (while having tenure) have recently become a more common attitude in scientific community (Popławski 2007).

Unfortunately, in Poland there still exists strong primacy for achievements just for having an academic title on paper rather than supporting entrepreneurship, which result in that a bad book is more appreciated than a big invention or a project implemented in a company or municipal government. Then, the streams of entrepreneurship receive no support in the institutional system, nor do they ensure recognition and prestige in the scientific community. It is slowly changing since it is hard to achieve economic growth without strong involvement of the government and companies in the area of research and development. Currently, related financial support amounts to 0.8% of the government budget, while in the European Union the average is 2.5% (Truskolaski 2004, 151–4, Jasiński 1997, 98–102).

The only rescue from this situation rests in individual entrepreneurship of scientists, which can be implemented thanks to increasing awareness and willingness to self-employment. A very interesting concept of linking entrepreneurs and institutional systems that shape and support them was developed by a Dutch engineer and professor at Delft University of Technology, Jan G. Wissema. In his scientific-implementation proposition, he forms a crucial concept – a definition of technostarters as entrepreneurs, who are willing to take the risk of being innovators, are fascinated by technology, passionate about creating something new, taking up the challenge with a focus on invention and, obviously, implementing the production of invention. Wissema formed it in the following statement: 'Technostarters are a litmus papier for universities'.

The University of Third Generation, based on know-how, entrepreneurship and expert knowledge replaces traditional education for own needs, as exemplified

by Humboldt University (wawak, Jacko 2016, 31–38). It is worth noticing that companies created by technostarters from Massachusetts Institute of Technology are valued at approximately 240 billion dollars and have brought to the world many useful inventions, such as PDF files or Adobe Acrobat without taking a penny for it. Moreover, these companies have founded laboratories which have already earned another hundreds of millions of dollars. What is this kind of university? In the following sentences, the author describes the most characteristic features of such an institution, based on the principal concepts of Jan Wissema:

- It is based on exact, technical and applied sciences (J. G. Wissema, J. Verloop 2009);
- It is independent from the state, not financed by the state directly;
- Its language of communication is English (D. Burawski 2013);
- It is an international, innovative centre of know-how exchange (P.Drucker 1992);
- It is financed by grants, donations, business angel's capital, agencies funding research work, and to a lesser less extent – government subsidies and student fees;
- It provides education in university colleges (high level of research and education) and departments (low level of research, mass education) (T.Gołebiewski, M.Dąbrowski, B.Mierzejewska 2005);
- It is based on the rule of cultural entrepreneurship, leadership within STT (Specialized Thematic Themes) (Wozniak 2008: 545–7), which are groups of experts appointed to solve problems commissioned by the business-industry community and state institutions (J.Wissema 2005).

Such a university also has a purpose of commercialising research results and activities towards the transfer of technology for MSP, entrepreneurship incubation, signing contracts, reducing risks.

Adopting these rules is difficult, but important in order to institutionalise the process of incubating new enterprises, based on the streams of entrepreneurial students and young academic staff. But the important is the answer to the question on how to encourage the transformation of these streams into a new innovative businesses.

Key words: streams of entrepreneurship, incubation, technostarters

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PART II

COLLABORATIVE INNOVATION DEVELOPMENT IN PUBLIC SECTOR

COLLABORATIVE INNOVATION DEVELOPMENT IN PUBLIC SECTOR – GENERAL ISSUES

A MULTIFACETED ROLE OF PUBLIC AUTHORITIES IN COLLABORATIVE INNOVATION

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INTRODUCTION

This conceptual paper[2] aims at providing insights into a multifaceted role of public authorities in collaborative innovation (Torfing, 2016) at a local level. Different actors are considered within collective innovation, such as: citizens, enterprises, universities and other intermediaries. The role of public administration (or more precisely: public authorities) is regarded as granted. The authors claim that this function is diverse and changing. Therefore, the research objective is to identify and define functions of public authorities derived from the analysis conducted on the examples of collective innovations. The researchers will answer the following research question: what are the roles of local public authorities in collaborative innovation?

LITERATURE REVIEW

First, it is crucial to identify what kind of actors take part in collective and collaborative innovation processes and then to see how public administration is perceived. Collaborative innovation is understood as a process of public innovation in which multiple actors appear, which is simply expressed in phrase coined by Sørensen and Torfing (2011): public innovation through collaboration.

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We notice that depending on the approach accepted by the author, different actors are discussed as the key one. They are: 1) society representatives, 2) entrepreneurs, 3) universities, and 4) intermediaries.

Ad 1. Society or social partners are underlined in the social innovation concept (BEPA, 2011; Murray, Caulier-Grice, & Mulgan, 2010), or more precisely city users (like in the smart city (Deakin, 2014)), citizens in a *quadruple helix* (Carayannis & Campbell, 2009) or in living labs (Eskelinen, Robles, Lindy, Marsh, & Muente Kunigami, 2015). Society inclusion in this collaborative process results from the democratisation of innovation (Von Hippel, 2006).

Ad 2. Entrepreneurs are exposed in the context of open innovation (Chesbrough, Van Haverbeke, & West, 2006), smart specialisation and entrepreneurial discovery processes (Foray, 2015), or in – a somewhat forgotten already – idea of regional innovation systems (Edquist, 2005).

Ad 3. Universities appear a in triple helix (Etzkowitz & Leydesdorff, 2000) as necessary for building knowledge-based economy in close relationship with enterprises and public authorities.

Ad 4. Intermediaries are sometimes omitted in the mentioned approaches and ideas, whereas they are highlighted in the concept of "working regions" (Clark, 2013).

As the above mentioned actors are extensively elaborated in the quoted books and papers, the authors have decided not to discuss them in detail. For example, M. Leminen (2015) provides enumeration of roles (like: mediator, planner, facilitator, advocate, etc.) derived from stakeholders theory applied to a living lab concept (which is one of the type of open innovation platforms), or – in more general terms – to innovation networks. The researchers focus on one more actor, it being public authorities. This actor is signalled in these ideas, yet a still missing element is the deeper consideration for the changing role of it in the face of phenomena such as open innovation or user innovation.

There exists no clear definition of public administration's significance in collaborative innovations as well as its strengthening. The authors of the paper propose that public administration can be considered as: coordinator, facilitator, mediator, negotiator or persuader. However, this proposition will be stipulated and assessed. It is assumed that in most situations such interpretations are correct. However, there exist situations where, in spite of many efforts in cooperation among different actors, public authorities fail to reach consensus on the implemented innovation because the majority of sides are opposed to it.

RESEARCH METHOD

In their studies, the researchers use a scoping review for identifying relevant papers on the role of public authorities in collaborative innovation (as they were used as key terms). They use the following databases in order to search for publications: Web of Science, Scopus, and Google Scholar. They analyse them according to the identified

key roles which are: *initiator, creator, accelerator,* and *executor*. In the full version of the paper, the authors intend to provide more details about the cases used as examples.

RESULTS

Public administration as an initiator

Public administration is a depositary of knowledge flowing from enterprises, but also obtains information from the scientific sector. The knowledge on social expectations may contradict alarming scientific messages, and awareness campaigns may turn out to be insufficient and at the same time switching enterprises to new technologies may be unprofitable for them. In such situations, public administration should act as an initiator of changes – by introducing appropriate regulations even against the will of other actors. Example: global warming.

Public administration as a creator

Sometimes public administration cannot only act as an initiator, but also as a creator of changes, i.e. in planning and plan implementation. Example 1: the area of pedestrian traffic zones (conflict with drivers). Example 2: a zone free from buildings (a conflict with housing companies).

Public administration as an accelerator

Some technological solutions appear on the market, but decisions of the public administration acting as an accelerator are necessary for their dissemination. It happens against the will of some companies and countries that would like to preserve the status quo, and often also against the will of citizens who prefer tried and cheaper solutions. Example: driving a car running on electric energy is an idea from the nineteenth century, developed in the next century. However, it was only the 21st century that brought a real breakthrough in this area. Switching from petrol and oil-powered cars to electric cars would not be possible without the involvement of public administration.

Public administration as an executor

The executor's role seems to be the most important role of public administration. Even the best intentions of the public authorities, preceded by social consensus will not help unless the public administration is equipped with appropriate legal instruments of enforcement of these compromises. For instance, in Poland, municipal police does not have the authority to punish unauthorised vehicles for entering a restricted traffic zone on the basis of camera records. What's more, the municipal authorities cannot restrict the entry of vehicles that do not meet the emission standards, or charge them for entering the city centre. With simultaneous low charges for parking cars in cities (up to less than 1 euro per hour), this results in occupying public space and environmental pollution by an increasing number of vehicles.

DISCUSSION

The above considerations are only the beginning of thinking about the role of the public authorities in the context of collaborative innovation. It seems that this way of perception depends on the context. Sometimes the right method of coordination will be multi-level governance, another time a Neo-Weberian State (Mazur & Kopycinski, 2017; Pollitt & Bouckaert, 2011). Nevertheless, it is necessary to abandon the conviction that all collaborative innovation activities must take place through consultations and consensus. Sometimes, there is a need for public administration to take a decisive action against the majority of actors, which in the short term may bring public dissatisfaction, but in the long run will gain appreciation for the introduced changes. Obviously, any transformation must be developed within the framework of basic democratic rules. What's more, even the most sincere desire of local authorities will not help if they are not provided by national authorities with appropriate legal tools and ways to enforce them.

Keywords: role; public authorities; collective innovation, collaborative innovation

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COLLABORATIVE INNOVATION DEVELOPMENT – REGIONAL PERSPECTIVE

INTERINSTITUTIONAL COOPERATION – CONTRIBUTIONS TO INNOVATION AND TOURISM DEVELOPMENT IN RURAL TERRITORIES – BEST PRACTICES OF TOURISM NETWORKS IN PORTUGAL

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INTRODUCTION

Cooperative behaviour in tourism destination communities is a condition for sustainable planning and development. However, evidence is lacking on how actors choose to cooperate. Previous research in institutions, organizations, and communities show that formal, contract-based as well as informal, relation-based cooperation occur jointly or in substitution, depending on the context and the subject of research (Beritelli, 2011).

Based on the great reflections on the need for sustainability in tourism, the observation of the practices of cooperation and collaboration among actors acquires the dominant problem (Getz & Jamal, 1995; Parker, 2000), due to the fact that the main studies in the field of sustainable tourism have that the various actors can achieve by collaborating together.

Tourism is seen as an important agent for regeneration and the economic development of certain rural and isolated regions of attraction that these present, constituting a means of sustenance and diversification of the rural economies and societies (Jackson & Murphy, 2006; Sharpley & Telfer, 2002; Fotiadis, 2009). In this sense, all efforts should be based on the development of innovative and differentiated products, for the reinforcement of strategic partnerships and for preservation of the environmental balance and the enhancement of cultural heritage. Therefore,

the success of tourism activity is clearly based on local, quantitative and qualitative resources (Ribeiro & Vareiro, 2007).

Tourism plays a key role in underdeveloped regions where the lack of 'Modern civilization' may be a factor of attraction (Kastenholz, 2002). In rural areas this sector provides opportunities for job creation and entrepreneurship and can be seen as a possibility of economic support and an alternative to the economies of regions where traditional activities were losing importance satisfy their populations (Sousa, 2006; Sharpley, 2005). Finally, but not less important, is an excellent way of recovering and relying on the management of local and rural space for its success, also contributes to the protection of the environment and for the conservation of the natural, historical and cultural heritage of this environment, stimulating the management and sustainable use of the local space, priority is given to the local population, directly and indirectly, involved in tourist activities (Campanhola & Silva, 1999).

In the recent past, all changes occurring in economic and social terms (e.g. globalization, information and technology), the development of more have highlighted the importance of studying alternative ways of planning and development processes and the organizations. Hence the research on cooperation between actors the theme of partnerships, networks and, ultimately, collaborative relationships assuming that the effectiveness and efficiency of this sector are associated with the quality of those relations between the different actors and agents (Goeldner & Ritchie, 2009). In studying co-operation relations and partnerships and sharing, the experiences can be drawn from it.

This is, therefore, the main premise of this article, which aims to present what has been investigated in terms of interinstitutional cooperation and the creation of cooperation tourism networks in Portugal within the need for innovation in tourism sector. It also seeks to analyze the impact of this networks on rural tourism development based on the analysis of well-known examples of tourism interinstitutional cooperation networks in the country ("Aldeias do Xisto"; "Heranças do Alentejo"; "TuriHab"; "Associação Casas Brancas").

LITERATURE REVIEW

Social scientists who investigate tourism as a phenomenon of modern societies consider that successful tourism from a perspective of sustainability results, essentially, from the cooperation that is established between the various stakeholders who, directly or indirectly, act in the process of tourism development (Amaral, 2013).

The promotion of rural development and peripheral areas arouses interest in rejuvenation of these territories, through tourism. Rural tourism is, therefore, considered a useful tool for development, although it is not to balance demand and optimize benefits for both tourists and areas they visit (Fotiadis, 2009). Tourism has a connection with development in particular in peripheral, rural or developing countries, and this is justified because of the various resources involved and the

investments made by communities, governments, and development associations, all over the world.

Some of the benefits are identified by the authors (e.g. Bramwell & Sharman, 1999), namely, the fact that reduces conflicts between 'opponents'; legitimize actors in the decision-making process; improves policy coordination and brings knowledge and ability of the actors in the destination management.

Innovation is considered by literature to be essential for small businesses although there is some controversy at this level. A number of barriers may arise that prevent or hinder the development of innovation activities also among tourism enterprises and which result, for example, from difficulties in accessing finance; lack of skilled labor to develop innovation activities; lack of infrastructure; lack of information about the technologies or markets needed to develop an innovation and finding appropriate partners for joint innovation projects (Sacramento &Teixeira, 2014). In this context it is clearly that we must have an interrelated perspective, and that's why the literature (e.g. Zhang, Yan & Lo, 2009; Jamal & Getz, 1995) considers it essential to combine efforts among the stakeholders of various subsectors under cooperation formulas, collaboration, partnerships and/or networks, constituting an interactive, rule-sharing, standards and structures at a given organizational level within a defined geographical area, seeking to decide on aspects and issues related to tourist development (Long, 1997 as quoted by Caffyn, 2000; Long, 2000). The stakeholders in the tourism sector see the different forms of partnerships as a tool to solve some of the problems with which organizations and destinations deal nowadays. In fact, the establishment of long-term partnerships and productive is not really an easy task (Costa, Santos & Ferreira, 2007).

RESEARCH METHOD

The study has a qualitative characteristic and it was based on an exploratory research sustained mostly on the bibliographical research on the main variables under study (interinstitutional cooperation, rural tourism, partnerships, networks of cooperation and innovation in tourism). In a more empirical perspective, the study was based in a comparative study about formal networks of cooperation between stakeholders in Portuguese rural tourism offer that work together with the common purpose to develop their territories.

This resulted in the identification of four well known case studies that were characterized and analyzed considering the existing literature that focused on the study of their economic and social impact on the development of regions of influence.

It was also carried out a set of interviews with the managers of cooperation networks to understand the history of the initiatives and the values and objectives that guide them; to understand how they influence tourism in the territory and its contribution for the improvement of the relations between stakeholders and tourists vs. community; and to analyze the territorial contexts in which they are inserted and its impacts in the territorial tourism development.

RESULTS AND DISCUSSION

The Aldeias do Xisto Network is made up of 27 villages distributed in the interior of the Central Region of Portugal. These small clusters add regional tourism potential reflected in architecture, environmental amenities, gastronomy and traditions, among other distinctive cultural elements presented in products and services of excellence.

The Aldeias do Xisto Network is a regional sustainable development project led by the Agency for Tourism Development of Aldeias do Xisto, in partnership with 21 municipalities in the Central Region and with more than 100 private operators operating in the territory.

The objectives of the this network are the preservation and promotion of the cultural landscape of the territory, the valorization of the built architectural heritage, the dynamization of the socio-economic fabric and the renovation of the arts and crafts (quoted from https://aldeiasdoxisto.pt/content/Rede).

Through the Association Herança do Alentejo there was created a formal network of cooperation between rural touristic enterprises and a digital platform (portal) that provides consumers with a practical and quick way of getting in touch with each of the hotel units that cooperate with the network, consult prices, availability of accommodation or even find out about what must not miss when traveling through the Alentejo (south of Portugal). The network makes available an important set of rural tourism houses and small hotels of charm that represent the most genuine resources of the region. This network is an association of hotel entrepreneurs of the Alentejo, (associated, in turn, with the public regional administrative Tourism of the Alentejo) (quoted from https://www.herancasdoalentejo.net/).

TURIHAB – Solares de Portugal (Association of Housing Tourism) located in Ponte de Lima, Northern Portugal, was founded in 1983. Ten years later, when it organied the First National Meeting of Turismo de Habitação, it created the brand Solares de Portugal (quoted from https://www.turihab.pt/EN/quem_somos.html). It is also the President of an *International network, which is Europe of Traditionae Consortium* (https://www.europetraditions.com/). It's a Consortium of five organisations, offering a personal style of hospitality in homes of character, all interested in preserving and helping their costumers to enjoy the heritage and culture of their country and their region, be this reflected in the arquitecture, or food and wine. The main objectives are promoting a unique product – quality accommodation in private homes; improving marketing skills and brochure distribution; facilitating the exchange of ideas and networking; promoting tourism to Europe, particularly from Japan, America and Australia; to lobby on behalf of members In relation to EU legislation and finaly, to work towards the conservation and development of the culture and heritage of member countries.

The Association "Casas Brancas" had a growing development as a tourist supply network in the Portuguese southwest region. Born from the cooperation of a group of rural tourism owners, as a way to better promote the sustained development of the region, working with a single voice, thus attracting a greater range of visitors

who, increasingly, chose this territory in full bloom in the national and international tourism (quoted from http://casasbrancas.pt/files/Manual_CB_pb.pdf). All these cooperation networks were created with the financing of European funds.

This networks contribute to increase innovation and profitability for the rural tourism enterprises; to preserve and revitalise cultural and environmental resources with a strong impact in the increasing of attractivity for destinations and for the during stay of the tourists. For instance, in the case of Aldeias do Xisto, the network represented the opportunity to contribute to the revitalization of the rural typical villages (that were abandoned) and heritage.

Considering the results, we must conclude that these networks are very successful and are socially innovative in the field of tourism having a great importance in the sustainable development considerations and in the sense that, in a rural territory, several municipalities work together, and they have the view that it is possible to have a quality tourism from the work of small businesses inserted with the communities and coordinate the actions on reversing the abandonment of villages and territory with tourism.

Keywords: best practices; innovation; interinstitutional cooperation; rural tourism; tourism development; tourism networks.

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COOPERATION OF ENTITIES OF TOURISM ECONOMY FOR CREATING THE BRAND OF THE REGION

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INTRODUCTION

Cities, territorial units or countries, in general, need a marketing strategy to use their resources most effectively (Frolov et al., 2017). The resources possessed by modern territorial units contribute to the economic and technological development, and additionally, they can be used to attract visitors, including tourists and business (Romão et al, 2018). Due to high competition among regions for people, finance, business and other resources, regional strategies have to contain a marketing component. This marketing component and regional policies have mutual influence and contribute to the improvement or supporting of the place to the benefit of residents, businesses and visitors (Boisen et al., 2018).

Recently, the marketing components of regional strategies are shaped as branding strategies with a growing frequency (Kavaratzis, 2008), which means creating regional brand strategies. Marketing efforts of territorial entities, including regions, are more and more often focused on producing associations with a given place that are emotional rather than functional in character (this, however, does not mean that those associations are wholly ignored within the process of building a brand) (Florek, 2014).

In Poland, as well as worldwide, the importance of tourism as an element of creating a regional brand is growing (Kiryluk, Glińska, 2015), and tourists and visitors are framing one of the most important target markets for regional branding.

It should be mentioned that the term "regional brand" originated from the theory of tourism destination branding (Morrison, Anderson, 2002).

The creation of a regional tourism brand and the related development of tourism economy require the involvement and cooperation of different entities directly and indirectly involved in providing tourism movement (public and private sectors, non-profit organisations). This stems from the fact of complementing tourist supply, a complex character of demand and its spatial concentration (Zmyślony 2005, 2008; Kiryluk 2016).

The cooperation of different tourism economic entities in the process of regional branding is connected to the participatory character of this process. According to Kavaratzis and Hatch (2013), place branding should be understood as a multi-dialogue between stakeholders since brands are built from the "raw material" of identity while identity emerges as a result of the exchange between the interested parties and all things which they share. This, therefore, means that the role of local government consists in initiating, facilitating and stimulating the dialogue essential for building a regional brand.

The entity responsible for managing the tourist brand in the region is the voivodship-level local government (Panasiuk, 2013). Additionally, regional tourism organisations play a significant role in creating a regional tourism brand as a platform for cooperation of local government units with tourist enterprises, local tourism organisations, institutions and social organisations (Borzyszkowski, 2011). As practice shows, regional tourism organisations participate in the creation of a regional tourism product to a broad extent (in its broad sense) as well as the promotion and creation of a regional tourism brand, which is to a large extent conditioned by the quality of cooperation of the involved entities of tourism economy.

The interaction between organisations is described by several economic theories, of which the following are worth mentioning: the theory of dependence on resources, the theory of relational exchange, the theory of transaction costs (Rudolf 2016). For the description of inter-organisational relations in the context of governance processes, the theory of dependence on resources is the most frequently used (Klijn, Koppenjan, 2016). It is based on the assumption of existing interdependencies between organisations, which is a consequence of availability or deficit of different resources (financial, material, relational, symbolic), needed to achieve organisational goals.

In the above context, the main aim of the paper is to identify dimensions and ways of cooperation of the local government and other members of regional tourism organisations to develop a regional brand. The authors focus on: establishing ways to reach a common vision of the regional brand identity, determining the actual and potential categories of initiatives executed by the voivodship government and the members of the regional tourism organisation meant to develop a regional brand, diagnosing benefits and barriers for this type of cooperation, and developing conditions necessary to make this cooperation more effective.

To achieve this goal, the authors used a research method involving a case study of a region, specifically Podlaskie Voivodship. In the frames of the case study 7–8

individual in-depth interviews (IDI) are planned, comprising representatives of the organisations – members of the Podlaskie Regional Tourism Organisation. The research made for the purposes of the article is of exploratory nature. It will be used in the formulation of research hypotheses regarding the levels, forms and conditions of effective cooperation of regional tourism economy entities for the purpose of building the region's brand.

LITERATURE REVIEW

According to Skorobogatykh (Skorobogatykh et al., 2017), in the broadest sense, a "region" can be defined as "a naturally historical space where people living within its boundaries carry out social, economic and public activities". That means that each region has specific features distinguishing it from others. That specificity predetermines a variety of approaches toward selecting a regional marketing/branding strategy. The topic of the connection between branding and regionalisation is popular among researchers (Zenker and Jacobsen 2015). Widespread practices of developing and implementing regional marketing strategies for different purposes – tourism development, the attraction of business and companies, etc. – give a rich research background, though the theoretical development of the topic is less advanced than the practical component. Due to its immaturity as a scientific topic, territorial marketing faces the issue of underdevelopment of the methodological, theoretical, methodological, and instrumental base (Frolov et al., 2017).

Similar to the majority of other contemporary emerging theoretical topics, territorial marketing faces an issue of exploiting different terms that may seem to be synonyms, though, in fact, they differ in details. Thus, the term "territorial/regional/place marketing" is sometimes used in the same context as "territorial/regional/place branding" (Braun, 2008; Zenker and Braun, 2017). The accumulation of definitions points to the following elements: the existing and desirable image of the territory from the perspective of different groups of stakeholders; values and resources that the territory possesses; tools and activities for communication and promotion of the information about the territory (Skorobogatykh et al., 2017; Ward and Gold, 1994; Zenker and Braun, 2017).

In recent years many state governments have recognised the importance of the elaboration and implementation of the marketing strategy and decided to devote significant financial resources to the promotion of their own brands (France – 3.1 billion dollars, Great Britain, Germany – 1.2 billion dollars) (Schwab, 2016; Lyulyov et al., 2018). Based on the analysis of scientific literature, it can be observed that most commonly the marketing determinants of sustainability and stability are approached from the perspective of economic entities. However, during the last decades the topic of territorial marketing (cities, municipalities, regions, territorial communities, countries) was elaborated (Lyulyov et al., 2018). Territorial marketing and marketing of business/companies have a number of similar features. One of the principle differences in those directions is the "marketing product"; consequently, in the case of territorial marketing,

the region itself will be considered as a product. A region can be considered as a "socially responsible multi-stakeholder spacial corporation", and the aim of its activities covers a wide range of interests related to the provision of sustainable growth, and involve different groups of stakeholders and interested parties, including investors, tourists, entrepreneurs, local population, and the state (Frolov et al., 2017). From the specificity of a region as a "marketing product", another difference appears. Most commonly marketing is demand-oriented, which means marketers first should understand the needs of the customers and later produce the product that can satisfy those needs. However, the case of territorial marketing is opposite, oriented on demand, which means marketers need to attract and retain consumers for the existing product (Frolov et al., 2017).

Generally, regions elaborate and implement marketing/branding strategies in order to gain competitive advantage and attract target audiences (Skorobogatykh et al, 2017). Kotler and co-authors (1995) consider the principle aim of territory marketing in attracting and retaining tangible and intangible resources in a region through presenting its unique characteristics and advantages to the broader public. According to Hereźniak, Florek and Augustyn (2018), a regional brand consists of various components, both tangible and intangible, such as perception of the region, level of development of infrastructure, and general progress of regional activity. Sepe and Pitt (2017) assume that "place identity is a result of a constant, and often subconscious negotiation between individuals and the potpourri of experiences, objects, and even idealised places they encounter during their lives". The most common research objects can involve brand, reputation, cultural and national identity, and the image of territorial entities (Lyulyov et al., 2018).

In terms of directions of territorial marketing research, the majority of studies investigate the country level, while studies on the local (also regional) level are less frequent (Lorenzini et al., 2011).

The tourist brand is perceived today as an important instrument for the management of regional tourism economy (Panasiuk, 2013). In practice, more frequent attempts are being made to create tourist brands of specific places. However, there still exists quite a big gap in marketing activities at the regional level.

RESEARCH METHOD

A significant trend currently observed within the area of management science is the utilisation of qualitative methods allowing for a more precise grasp of the specific character of the phenomena accounting for the impact of non-measurable or difficult to measure variables with regard to the processes of managing contemporary organisations. One of such qualitative methods is the case study (Matejun, 2011). According to Paton and Appelbaum (2003), case studies represent an important research track in organisational science, not only as a method of generating hypotheses for quantitative studies, but for generating and testing theory.

Based on literature analysis it can be observed that, in general terms, researchers base case studies on more popular touristic regions. However, an investigation

into less attractive regions, such as Podlaskie, can open a different perspective and contribute to a better understanding of territorial marketing mechanisms. Moreover, Podlaskie voivodship has a large, still unused tourist potential and the creation of a regional brand as a result of effective cooperation of many regional stakeholders can boost the development of tourism economy. This is confirmed by research conducted in the field of tourism development in the Podlasie Voivodship (Dobrzanski et al., 2014, Kiryluk, Szymańska (2014), Panfiluk (2017), Szpilko (2015, 2016).

The verification of the theses and assumptions adopted within the research will be based on the results of the research conducted in Individual In-depth Interviews (IDI) with representatives of selected economic tourist entities cooperating in the frames of the Podlaska Regional Tourism Organisation (associating 11 regional local government units, 5 local tourism organisations, 9 associations or tourist foundations, one university, two cultural, sport and recreation platforms, and 33 economic entities from the tourism sector).

In total, 7–8 interviews will be conducted for the purposes of the current study, covering representatives at higher managerial positions in organisations – members of the Podlaska Regional Tourism Organisation. As a research tool, the interview scenario including open questions that refer to the central issues of the article will be developed.

EXPECTED RESULTS AND DISCUSSION

The tourism brand of a region allows for gaining a competitive advantage over other regions. The main benefits of possessing a strong tourist area brand include: increased awareness and recognition of the area, boosted tourists' interest in it (including a growing number of loyal tourists), increase in the market share and improvement of the region's competitive position, enhanced investment attractiveness, which results in increased impact on local governments' budgets and improvement of the quality of life of inhabitants (cited in Fedyk et al, 2014). Gryszel and Nawrocka observe that (2011) from the consumers' (tourists') perspective, the selection decision of a tourist region is primarily related to the selection of specific tourist services in a given area. Therefore, there is a need to coordinate the activities of individual tourism economy entities in order to create attractive, high-quality integrated tourism products of the area, their commercialisation and promotion, and the creation of a familiar, well-known tourist brand of the region. The above mentioned requires interaction and cooperation of tourism enterprises, local government units, government administration and other entities of tourism economy at many levels.

The cooperation of entities operating within tourism economy aimed at the creation of a regional brand may take various forms, with higher or lower formality nature (Rapacz and Gryszel, 2010). However, in the case of its effectiveness, it fosters the development of innovation and competitiveness of tourist products and obtaining a competitive advantage of the region (Argasiński, 2014). It allows, inter alia, transfer of knowledge and innovation between entities, co-creation of the new values, strengthening of the regional and local identity of the partners, consistent promotion

of the region, combining capital sources and spreading the costs of promotion as well as responsibility for decisions taken in a framework of a partnership. On the other hand, partnership cooperation also encounters numerous barriers and problems (mainly formal and mental barriers) (Rapacz and Gryszel 2010).

The first interviews conducted for the purposes of this study confirm that the main benefits of cooperation within the regional tourism organization include: cohesive tourism promotion of the region, greater legal freedom which means more flexible formula in the legal sense, especially when it comes to promotion issues, possibility to combine several financing sources (from private, public and social sector).

In turn among the barriers of this type of cooperation, the following are appearing: finance issues, perception of other local entities of the tourist economy in terms of competitors and not partners for cooperation, low awareness of people about the effects of cooperation, communication barrier and political issues.

The results of the research carried out for the purposes of the article will allow for the formulation of the survey questionnaire that will be used in a quantitative research project planned by the authors as the next stage of the study.

From the point of view of managerial contribution, the results of research will help to evaluate the current practice of cooperation of the organisations associated with the Podlaska Regional Tourism Organisation. This allows for identifying the perception of benefits and barriers with regard to cooperation in creating a regional tourism brand. It also allows for indicating directions and forms of regional promotion of a tourist product and the region's brand.

Keywords: territorial marketing; tourism economy; cooperation; regional brand

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DETERMINANTS OF PORTUGUESE LOCAL MUNICIPALITIES` INDEBTEDNESS

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INTRODUCTION

In the European Union the topics of indebtedness and control of public finances had been a concern since the signature of the Maastricht treaty (1992) and the Stability Pact (1996). In recent years these topics have taken a renewed importance, particularly for countries like Portugal, due to its economic and financial situation that emerged from the sovereign and international crisis. It is yet in the recent past that Portugal was under an economic and financial assistance program negotiated between the Portuguese authorities and the European Commission (EC), the European Central Bank (ECB) and the International Monetary Fund (IMF) – the Troika (from May 2011 to May 2014). The bailout agreement required fiscal consolidation and several structural reforms. Among them, the requirement of greater discipline and control in public expenditures.

The current Local Finance Law (Law 51/2018) maintains the limits for municipal indebtedness, already defined in article 52 of Law 73/2013. There has been a concern to ensure stability in the national legal framework. But it is important to understand and control the indebtedness of the Portuguese municipalities and for that purpose, to ascertain which factors can explain the amount of debt.

Additionally, in Portugal, now it is being discussed the attribution of new competences and responsibilities to municipalities. As already mentioned in Ferreira (2011), the increasing transfer of responsibilities from the central government to the municipalities has not always been accompanied by transfers of sufficient financial resources and patrimony, nor by adequate means of action. In this situation, municipalities have to use credit to ensure the pursuit of the public interest. But as highlighted by João (2014), cases of excessive and chronic indebtedness are problematic and bring high risks for public bodies and, above all, for future

generations, particularly when there are delays in debt repayment with extremely high financial costs.

Past research on the topic of Portuguese municipalities' indebtedness is focused on the Law 2/2007. See for instance, Ferreira (2011), Lobo (2013), Melo (2013), Ribeiro et al. (2012) and Veiga & Veiga (2014). Therefore, this empirical analysis aims to revisit the topic of local governments' indebtedness using the Law 73/ 2013 and the new understanding of indebtedness used in this legal framework (not changed with the recent publication of Law 51/2018).

To accomplish this goal, we follow the literature on the field and a set of socioeconomic, political and financial variables are used for the years of 2015 and 2016 (the most recent year available), through multiple linear regressions. Using only two years of analysis prevent us from adopting more robust econometric techniques, such as panel data analysis.

LITERATURE REVIEW

Several factors have been studied in the empirical literature as determinants of local governments' indebtedness. Three main domains have been explored: socioeconomic, financial and political factors.

Socioeconomic variables characterize municipalities in social, demographic and economic features. These variables are among the most tested empirically and influence the financial management of each municipality in an indirect way. Examples of these variables are income, population or its density, the littoral proximity, the level of economic or touristic development, the education level, the dependency ratio, among others. However the results concerning the expected effects of these variables are mixed in the literature.

Some authors argue that there is a positive relationship between *income* and the demand for public goods and services (Cabasés et al, 2007, Bastida & Benito, 2004), but on the other hand, Lobo (2013) found evidence to support a negative relationship between the purchasing power capacity and the indebtedness for Portuguese municipalities. The number of inhabitants is another factor that determines the local government growth. The larger the *population* the greater will be the need for the municipality to provide goods and services and have adequate infrastructure, which may imply a greater need to use debt. Zafra Gómez et al. (2009) found statistical evidence of a positive relationship between population and debt but the opposite result was obtained by Bastida & Benito (2004). Yet for Benito, Bastida & Munoz (2010) and Bolívar et al. (2016) no significant influence between population size or population density and debt was found.

In respect to fiscal and financial factors, several factors have been studied, being the most relevant the lagged debt level, fiscal autonomy, the maximum legal limit of indebtedness, budget balances and capital expenditures, among others.

About the *lagged debt level*, several authors reported a significant positive effect (Lobo, 2013; Melo, 2013; Macedo & Corbari, 2009). Typically, municipalities that

systematically use credit, have few own resources to meet their expenses given the fact that they allocate part of their revenues to pay amortization expenses, interest and charges on the debt already incurred. Therefore, a positive relationship with debt is expected, indicating that the more indebted the municipality is, the more likely it is to opt for more debt (until the limit authorized by legislation).

Concerning **political factors**, in general the literature addresses factors such as political fragmentation or how long the governing parties remain in power, political ideology and electoral cycles. These variables were used extensively but the empirical results were mixed.

Political fragmentation was used for instance in Ashworth et al. (2005), testing for the hypothesis that greater political fragmentation leads to higher levels of debt and public deficit and in their empirical analysis, this finding was corroborated particularly in the short term, for the 298 Flemish Municipalities, using a panel dataset from 1977 to 2000. The existence of several parties in a coalition can lead to more public spending and greater indebtedness, due to the attempt of each party to satisfy its electorate.

A different definition of indebtedness is used, according to Law 73/2013, and several explanatory variables were tested in three dimensions: socioeconomic, political and financial / fiscal. The results obtained are not homogenous across both years and exhibit significant differences.

RESEARCH METHOD

Concerning the econometric methodology, the researcher's preferences seems to rest on panel data analysis, allowing: to control for variables not observed or measured (it accounts for individual heterogeneity), more accurate inference of model parameters and generate more accurate predictions. Panel data usually contain more degrees of freedom and more sample variability than cross-sectional or time series data hence improving the efficiency of econometric estimates. Recognizing that this methodology is the most appropriate for this kind of studies, we opt to use multiple linear regressions for 2015, 2016 and the simplest panel data model, a pooled regression, with robust standard errors, because our empirical analysis is based only in two years.

RESULTS

The estimations were conducted using STATA 13. To avoid collinearity problems, a statistical test was performed using the VIF (variance inflation factor) measure available in STATA, with no problems identified (mean VIF in 2015 and 2016 of 1.42).[3] Table 4 presents the OLS regression results for the years of 2015 and 2016, with robust standard errors. The third column presents the results of a pooled OLS

[3] VIF is an indicator of how much of the inflation of the standard error could be caused by collinearity. As a rule of thumb, values above 10 should be a cause for concern and must be corrected.

regression model, including all observations and a dummy for the year (1 if the year is 2016 and 0 for 2015).

Table 3. Regression results

Dependent variable: indebtedness_pc	OLS		
	2015	2016	Pooled regression
Previous year indebted_pc (lag y)	0.936***	0.945***	0.940***
Fiscal Autonomy	120.212*	−48.312	34.285
Capital Expenses to Total Exp.	178.151***	56.439	121.609***
Current Budget Balance	−0.146***	−0.082	−0.122**
Political ideology	2.01	1.82	1.783
Coastal dummy	−40.852**	−1.66	−21.687*
Population Density	0.002	0.001	0.002
Dependency ratio	0.778	−1.102**	−0.142
Earnings	0.015	−0.038	−0.015
year dummy			25.889***
Constant	−143.803***	88.927**	−36.328
Number of observations	308	308	616
R^2	0.984	0.99	0.986

Legend: * statistically significant at 10% level, ** at 5% level, *** at 1% level

Source: own elaboration based on STATA 13 results

The analysis of table below shows that the models exhibit a high explanatory capacity, with R^2 around 99%. Considering both years, the variable that explains best the indebtedness level per capita of each municipality is the previous year indebtedness level, corroborating the idea that debt generates debt.

Detailing the results for 2015, *Fiscal Autonomy* is statistically relevant but presents the opposite sign. This could be explained, following Cabasés et al. (2007) and Ribeiro et al. (2012), by the fact that municipalities by charging more tax revenues have less margin to increase them, so when they need resources they will have to resort to credit. The variables of *Capital Expenses to Total Expenses* and *Current Budget Balance* exhibit the expected signs. Higher investment expenses induce higher indebtedness, in line with the results of Melo (2013), Ribeiro et al. (2012) and Zafra Gómez et al. (2009). Also the results on the negative effect of the current budget balance on debt is verified, corroborating previous empirical findings of Benito & Bastida (2004) and Pascual et al. (2008). Finally, in 2015, the coastal dummy is statistically relevant but with the opposite sign. Nevertheless this result is similar to the obtained by Lobo (2013). The argument to justify this result may rest in the fact that municipalities near

the coast usually have higher levels of economic development and are able to collect more own revenues and needing less to resort to debt to finance its activities.

Results for 2016 are very different and besides the importance of the previous debt level, only statistically relevant appear the variable of the dependency ratio but exhibiting the opposite sign. This ratio measures the percentage of dependent population (those aged under 15 and over 65 years) and some authors have treated this variable dividing it in two, see for instance Bolívar et al., (2016). These authors have concluded for a strong positive effect on debt of both. Yet Veiga & Veiga (2014) used only the percentage of population over 65 years and found a negative effect on gross municipal debt, in line with our results.

DISCUSSION

The current research has several limitations. First, the present study uses only a time horizon of two years. Another difficulty is related to the unavailability of data. These features are a strong limitation to the development of a more complete model using additional variables studied in the international literature to evaluate the municipalities' indebtedness.

However, considering future research, it will be possible to use more advanced panel data methods if the time horizon of the analysis is extended.

Keywords: debt; municipalities; indebtedness.

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INNOVATION OF THE TOURIST REGION – NATURE, SCOPE AND SUPPORTING FACTORS

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INTRODUCTION

In today's economy, innovation is increasingly becoming a factor determining a competitive advantage of regions. It directly affects innovation of entities. Regional authorities become aware of the need to create conditions conducive to innovation, which is more and more common. This is evidenced by international, national and regional strategies and programmes supporting the creation of an innovative environment. The aim of the article is to identify entities responsible for creating the environment of an innovative tourist region and to identify instruments and activities creating them.

LITERATURE REVIEW

The performed analysis of literature from the field of tourism industry innovation allows us to state that innovation research focuses primarily on the study of tourism enterprises. Research is being conducted to identify categories of innovations being implemented, types of implemented innovations (Hjalager, 2010; Szymanska et al. 2017) and innovative tourist products (Edwards, Martinac, Miller, 2008; Panfiluk 2017). Researchers are trying to identify innovation systems used in the process of innovation implementation (Hall & Williams, 2008, Weidenfeld, 2013; Szymanska, et al. 2017), factors affecting the undertaking of innovative activities by tourism enterprises (Szymanska et al. 2017; Panfiluk 2017), including the impact of the use of ICT technology, communication, and management (Moscardo, 2008), as well as the impact of belonging to tourist clusters (Borkowska-Niszczota 2015, 2017; Novelli, Schmitz and Spencer, 2006). Despite a growing interest in empirical research

on innovations, no attempt was made to study innovation at the level of the tourist region.

The concept of a region's innovation should be treated as an innovative environment in which the industry functions (Aydalot, 1986). Sources of innovation should be found in the environment in which it operates, not in the enterprise itself. This idea provides evidence of a territorial nature of the process of innovation development. The review of literature in the field of innovation in territorial terms allows for the identification of at least two categories describing the innovation of economies. The first category is the ability to create and adapt innovations that enables an assessment of resources available within an economy, used to create and commercialise new products (Waresa 2006; Świtalski 2005). It mainly relates to human, material, capital and information resources existing in the region as well as predispositions to create innovations (Jabłońska 2016). It leads to the economic development of the region. The second approach is related to the innovative position as the effect of combining the creativity of a given nation with financial resources in a specific economic and often its effect is the region's brand (Kiryluk, Glińska, 2015) and institutional environment (Waresa 2006) and is examined as a result of new technological solutions and new products implemented into the production process, the share of new and modernised products in sales, the share of modern sectors of the economy in employment, as well as other ones (Lichniak 2010). Therefore, the region is an appropriate level of formulating strategic plans for the development of mechanisms that promote and support innovation processes, especially in the aspect of creating an appropriate approach to innovation.

Entities managing the region may influence the innovation process by developing a network of connections between entrepreneurs and tourism organisations from an area that has advantages and tourist attractions, tourist infrastructure, and where tourist services are provided. The role of public entities in the field of tourism is to determine an optimal configuration of competitive advantages in relation to the region (Jaremen et al., 2010) and the implementation of innovation policy (Rodríguez et al., 2014; Panasiuk, 2014; Waluch, 2012) and the concept of sustainable development (Kiryluk 2018).

RESEARCH METHOD

The research involved the expert method. 12 experts representing theoretical knowledge as well as practical knowledge and experience were invited to the study. The selection of experts was based on three differentiating criteria: generational group, scientific experience, contact with the practical sphere defined by an expert according to the point scoring scale from 1 to 5, where 5 is the maximum value. The structure differentiating experts is presented in Table 2.

Table 2. The structure differentiating experts

No.	Differentiating criterion	Number of experts
1.	Generational group: • *Baby Boomers* (born before 1965) • *Generation X* (born between 1965 and 1981) • *Generation Y* or *digital natives* (born after 1981)	 5 3 4
2.	Academic title: • Professor • Doctor of science • Master's degree, BA	 2 6 4
3.	Practical knowledge • from 1.0 to 2.0 • from 2.1 to 3.0 • from 3.1 to 5.0	 4 4 4

Source: own study.

The first stage of the research, using the snowball method, was to identify organisational structures that have a significant impact on the development of tourism in the region. The obtained results were used to develop a basic research questionnaire. The identified organisational structures were divided into four groups: tourism entities, tourism management entities in the tourist region, technology and science transfer institutions as well as institutions for the transfer of knowledge and information. The second stage of the research involved prioritisation of the identified organisational structures operating in the region with regard to their impact on the innovativeness of the tourist region and the indication of the most important instruments for managing the tourist region which are responsible for the innovation of the tourist region. Respondents performed an evaluation using the point scoring method on a 5-point scale, where 1 means – non-significant impact, 5 means – very significant impact. The research was carried out from November 2017 to June 2018.

RESULTS

Respondents indicated that among institutions managing tourism in the region, the most important ones are regional financing institutions 83%, followed by the activity of regional governments (department in charge of tourism) (75% of respondents). The highest potential among technology and knowledge transfer institutions is held by universities (83%) and research centres (66%), whereas technology incubators (58%), technology transfer centres (58%) as well as science and technology parks are of lesser importance. The greatest impact on the development of innovation in the regions among information transfer institutions is caused by tourism clusters (75%), training and consulting industry companies (66%). Slightly lower importance is assigned to the activity of organisations, including the Regional Tourist Organisation.

The most often indicated management instrument affecting the innovation of regions are programmes for financing innovation in the region, including the ones

financing tourism and their accessibility (92% of respondents) and the regional strategy of tourism innovation (83% of respondents).

In order to create favourable conditions for the innovation of the tourist region, the tourism management system should carry out tasks related to (83% of responses):

- creating conditions for cooperation between science, academia, the sphere of business and the management system,
- creating a tourist offer, for which there are no substitutes,
- creating the image and brand of the tourist reception area,

Among the most important activities (83% of responses) in the area of scientific research and the flow of knowledge that support innovation processes, the following factors were distinguished:

- gaining knowledge about the market and the environment,
- research and development potential,
- availability of information about the latest innovations,
- participation of enterprises in research and development projects,
- diffusion of knowledge and learning as a result of support of science and technology parks (66% of responses) and availability of knowledge concerning inventions (58% of responses).

Studies have shown that the most important sources of knowledge about innovation are fairs and exhibitions, as well as researching tourists' expectations. Equally important factors, in the opinion of experts, are courses, trainings, studies, conferences, cooperation with scientific institutions and study visits, as well as the activity of training and industry institutions for whom 66% of respondents awarded 4 points.

In case of actions in the social area that support innovation processes, the following ones were deemed the most important: improving human capital, affiliation with partner networks, openness to association, recognising common challenges and willingness to cooperate based on trust which was considered very important – 60% of respondents awarded this factor highest marks.

DISCUSSION

The research has led to the finding that a region's tourism innovation is influenced not only by the tourism management system, but also by technology transfer institutions, scientific and research institutions, as well as information transfer institutions. This is consistent with studies conducted by Jabłońska and Waresa, who provide evidence that the region's innovation is related with human, material, capital and information resources existing in the region and predispositions for the creation of innovation (Waresa, 2006; Jabłońska 2016), the activity of tourism clusters (Borkowska-Niszczota 2015) and their cooperation with local governments (Borkowska-Niszczota 2017). The biggest significance with regard to the innovation management system in a tourist region has been assigned to regional financing institutions, higher education institutions, local governments (tourism department), and tourist clusters.

According to the respondents, this system should operate on the basis of regional innovation strategies in the tourist region and programmes funding innovative actions in tourism. The management system should be aimed at creating conditions for cooperation between science, academia, the business sector, and the management system. This system should ensure a flow of knowledge and information about the needs of the clients of the tourist sector and the latest innovations. Finally, it should foster cooperation between the research sector and the businesses.

Keywords: innovation, innovation of the tourist region, management of the tourist region

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TRENDS ON THE LABOUR MARKET

GERMAN AND POLISH LABOUR MARKETS FOR HEALTH CARE PROFESSIONALS

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INTRODUCTION

European economies face various challenges with respect to health care markets: an ageing society, ever increasing health care expenditure, sectoral barriers that hamper innovation, disincentives for health care providers (e.g. overprovision and misprovision of services), strong regulation, shortages of doctors and regional disparities leading to undersupply in rural areas, to name a few. Consequently, most countries have undertaken health care reforms since the early 2000s to increase efficiency and innovativeness in health care provision.

From an economic perspective it is interesting to take into consideration the different starting situations for these reforms due to the countries' diverse health systems back in the last century. At the same time, health care reform is one of the few policy areas that is still rarely visible on the European agenda and, hence, lacks a broad coordination and cross-country cooperation at the European level.

On the one hand, this lack of coordination may be responsible for existing inefficiencies in health care provision at a supranational level. On the other hand, it provides enormous potential for future cooperation and it provides an opportunity to identify case studies and best practices based on the distinct health care concepts applied by European countries ("learning from your neighbours"). It is one aim of the present paper to identify such distinct approaches with respect to health care labour markets in Germany and Poland, and to evaluate their transferability across countries.

More precisely, we will focus on a cross-country labour market comparison for physicians. This is of particular interest as the "Bismarckian" German and the tax financed Polish health systems are largely comparable from an economic point of view (though not with respect to the health care GDP share, see below): both are based on federal/national health funds as ultimate contracting partners of health care providers (although individual sickness funds play a larger role in Germany and, for the future, Poland will move to the Beveridge system entirely funded through government revenues similar to the NHS in the UK). As such, the systems face similar challenges. Economically, health care labour markets are characterized by strict entrance limitations, budget constraints, asymmetric information in patient-physician relationships, and physicians' incentives to over-expand their supply (due to partially loose reimbursement schemes for any service they offer to their patients, although upper budget limits are frequently set, see e.g. Zweifel, Breyer, & Kifmann, 2009). In the case of Germany, the latter finding has created an urban oversupply of the number of physicians and, at the same time, a rural undersupply: Germany's physicians just don't like to settle in rural areas – whether this is actually based on purely economic reasoning is an open question. The situation is so serious that even (financial) premiums for medical students to settle down as country doctors have been discussed. Interestingly, the case for Poland seems to be different as the net migration for rural areas is positive from 2000 (at the same time net migration for urban areas is negative, Statistics Poland, 2018). Settling down in rural and suburban districts in Poland next to agglomerations is connected with the phenomenon of "resident migration", which is typical for people with a higher social status like for example physicians. Of course, this raises the question whether alternative economic strategies to handle the problem can be identified and learnt from the Polish example.

The strategy of this paper is twofold. First, we compare German and Polish labour markets for health care professionals and identify their specifics in terms of labour demand, labour supply, migration trends, freedom of movement for doctors, elements of market failure, and general rigidities of the market, see Table 1 below. This will help us to extract and analyse well-functioning elements of German and Polish physician labour markets in order to derive suitable policy recommendations (both at the EU and cross-country level) to increase the functioning and efficiency of health care markets to benefit both, patients and society. In a second step, hypotheses and questions for a future survey among German and Polish health care professionals and students will be derived based on the above findings. The aim of this survey (which is scheduled for 2020) will be to follow up both quantitatively and qualitatively on the findings of the literature review and official statistics to provide further details about the underlying working mechanisms and driving forces of physicians' individual decisions regarding location, type of work (e.g. self-employed vs. permanently employed) and working time.

LITERATURE REVIEW

To assess the financial efficiency of the Polish health care system it is necessary to consider its modest financial, human and material health care resources and the corresponding outcomes. However, both allocative and technical efficiency leave room for improvement. Limited resources, a general aversion to cost-sharing stemming from a long experience with broad public coverage and shortages in health workforce have the highest priority in view of future reforms (Sagan et al., 2011).

The German system, on the other hand, is often described to be ineffective in terms of fund management, cooperation/collaboration across sectoral borders, and monopolistic structures in terms of powerful professional associations. Economically, this results in relatively low quality of services in connections with relatively high costs.

In Poland, the number of medical personnel is small. These values are not only lower than in Germany, but also in comparison with other EU countries. In 2016, in Poland there was recorded the lowest ratio of practising physicians per capita in the EU (242 physicians per 100 000 inhabitants, Eurostat). At the same time that ratio for Germany reached 419 physicians per 100 000 inhabitants. The main reason for the low availability of medical staff in Poland is an outflow of physicians employed in the Polish health care system to work outside of the country – mainly to the United Kingdom, Ireland, Germany, Sweden, Norway and Denmark (Kludacz & Piekut, 2014).

What is typical for the Polish labour market is its strong regional heterogeneity. This is mainly due to the unevenly distributed demand for labour. In the case of the health care labour market it is noticed analyzing the differences in the proportion of public and private hospitals between regions. Voivodeships with the highest proportions of private hospitals (such as Kujawsko-Pomorskie, Pomorskie and Dolnośląskie) are those that are economically well developed or are located close to national borders (Panteli, Sagan, 2011).

A general discussion of challenges and future priorities of the Polish health care system is given by (Nieszporska, 2017) where e.g. the monopolistic financing by the NHF with very limited market mechanisms and comparatively low levels of nationwide health care spending are critically discussed. In addition (Sagan et al., 2011) discuss the relatively high level of out of pocket spendings in Polish health care. A comprehensive discussion and comparison of international health care indicators with Polish data is given in (Joumard, Andre, & Nicq, 2010) where also a grouping of different countries' health care systems based on a set of quantitative indicators is provided (e.g. Poland together with Hungary, Ireland, Italy, New Zealand, Norway and the United Kingdom as prototypes of highly regulated public health care systems). The structure of Germany's health care system is discussed e.g. in (Jodkowski, 2014).

The health economic potential of doctors' cross border cooperation and patient mobility between Germany and Poland is considered in (Ried & Marschall, 2016; Rudawska & Fedorowski, 2016). There, it is emphasized that cross border cooperation

may increase competition and, hence, extend treatment options for patients and the set of potential employers for physicians. However, the authors expect a marked asymmetry between statutory health care (where German services appear to be more attractive) and private health care (where Polish services are highly competitive due to their generally lower level of fees, see Olkiewicz, 2016). In (Jodkowski, 2014) the Polish NFZ is critically discussed as a labour market monopsony with negative consequences for its economic attractiveness for doctors.

The resulting empirical evidence for emigrating physicians to western EU countries is summarized in (Boboc & Ţiţan, 2014). The underlying shortcomings of Poland's labour market for physicians are analysed in (Kludacz & Piekut, 2014).

Finally, turning to the rural labour market for physicians and the determinants for practice location potential influencing factors for German physicians have been analysed by (Schmidt, Marten, Kühne, Zeidler, & Frank, 2017), (Günther, Kürstein, Riedel-Heller, & König, 2010) and (Kreiser et al., 2014; Maenner et al., 2015; Steinhäuser, Joos, Szecsenyi, & Götz, 2013). Corresponding theoretical models of physician behaviour are discussed in (Cooper, Heald, & Samuels, 1977; von der Schulenburg, 2014). Empirically, a location's earnings potential and its compatibility with the family's needs (and corresponding infrastructure) play a major role for physicians' location choice. A potential indicator for measuring and comparing degrees of rurality across countries is discussed in (Steinhaeuser, Otto, Goetz, Szecsenyi, & Joos, 2014).

RESEARCH METHOD

The study is based on a comprehensive systematic literature review with respect to German and Polish health care labour markets. To guarantee up-to-date results (and to reflect the recent major changes/reforms in both countries' health care systems) an analysis of the current literature has been made. In addition, official statistical data from Eurostat resources were applied as key economic indicators reflecting the state of both countries' health care (labour) markets.

RESULTS

The literature and statistical data analysis ensured the identification of specifics of the selected features of health care labour markets in Germany and Poland. Key results are summarized in Table 1 below.

Table 1. Selected features of health care labour markets in Germany and Poland

Germany	Poland
labour demand	
high and expected to increase (demographic change, increasing health care expenditure)	regional heterogeneity
labour supply	
only insufficient increases in the number of university graduates	shortages in the health workforce
migration trends	
migration to urban areas, rural undersupply	emigration to the western EU countries
practice type	
75% of ambulatory physicians with own practice (self-employed);	high level of self-employment
private practice / private patients	
87% of population in social health insurance, 11% with private insurance	98% of population in social health insurance
level of professional organization	
strong influence e.g. of German Medical Association	strong influence, e.g. of Green Mountain Agreement (gathering GPs)
remuneration system	
mix of per capita and fee for service, upper budget limits	per capita, no limits (GPs), lower and upper budget limits (specialists)
level of regulation/market entry barriers	
high (e.g. state examinations, specialist examinations, upper regional limits on the number of practices)	average (state medical examination, 6 years residency, specialist examination)
degree of competitiveness	
low, but increasing (e.g. through out-of-pocket individual health services or specialized treatment programs)	low, underdeveloped private health care services
regional heterogeneity	
high (with undersupply in rural areas and oversupply in metropolitan areas)	average (rural areas attract physicians by attractive remuneration)

Source: own study.

DISCUSSION

The greatest threat to the Polish health care labour market are shortages in the health workforce caused mainly by emigration of the labour force. The main factors motivating medical staff to search jobs abroad are: low wages, difficult working

conditions and limited career opportunities in Poland (Jędrkiewicz, 2012). It causes limited access of the society to medical staff and development of private healthcare services (also in rural areas).

At the same time, Germany's health care labour market suffers from an urban oversupply and rural undersupply of the number of physicians. Numbers of prospective medical university graduates are increasing not fast enough to meet the future demands for physicians in an ageing society.

Poland represents relatively better access to health care labour markets and lower regional heterogeneity. However, lower diversification of labour supply between rural and urban areas seems to be the result of income effects rather than specific public policy. A deeper analysis of that problem requires additional empirical research.

Keywords: health care system, labour market, Poland, Germany

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FUTURE-ORIENTATION OF CAREER COUNSELLING PRACTITIONERS IN POLAND – MEASURING THE COMPETENCY GAP

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INTRODUCTION

Conscious planning and creating a vision of one's career and development of competences is today not only an essential factor for the successful professional career development, but also a prerequisite for functioning on a dynamically changing labour market. There is no doubt that the role and nature of the work will continue to change, the question that remains is 'how?'. Many professions may disappear as the result of adoption of AI and new, emerging technologies but at the same time new jobs may emerge. According to A. Toffler's statement, the so-called The "third wave" in the 21st century means the need to have the ability to "learn, unlearn and learn again". Key actions in coping with the changing labour market should therefore include such elements as managing one's own competences, including planning one's educational path in accordance with the paradigm of *lifelong learning* (e. g Mocker & Spear 1982; Knapper & Cropley 2000; Volles 2016); the ability to cope with change and adapt to new conditions. Career development thus becomes a process of managing learning, experience and change in order to achieve a personally determined, preferred future.

In such outlined conditions, the role of vocational counselling services increases, although the character of this work also evolve. There are new challenges in supporting the development of careers of new generations – functioning on or just entering the labour market. Counsellors are therefore expected to poses new competences, and the tendency to create models of career guidance as a holistic, contextual and preventive

solutions, such as life-designing, life-constructing, becomes noticeable (Savickas et al. 2009; Dauwalder 2014).

The article presents the results of a research survey conducted in the first quarter of 2019 in the framework of the "Horizons of the Future" Project. The purpose of the survey was to identify potential "competency gaps" through self-assessment and comparison of the selected list of competences in the context of their proficiency levels and suitability in professional practice of career counselling.

LITERATURE REVIEW AND RESEARCH METHOD

The research methodology was composed of the following stages: i) creating a catalogue of thematic areas of convergences between the competency frameworks targeting career advisors and counselling practitioners, and competences that enable to deal with future-oriented tasks (Kononiuk et al. 2017); and challenges; ii) creating the research tool to assess the level and importance of the specific competences through the prism of two thematic areas of the project, that is: (a) analysis of the labour market in the context of scientific and technological trends; (b) creating alternative personal career development paths.

The analysis of four basic sources of information regarding the scope of professional tasks, professional competences (knowledge, skills and social competences), and the content of education in the field of career counselling in Poland allowed to select thematic areas of the project, according to two basic criteria: i) thematic connection to the issues of the labour market and career paths; ii) possibilities of potential use of knowledge and methodology of future studies and foresight in a given area of career counselling.

Desk research was based on the literature review comprising of the revision of: scientific articles according to the main key words: career counselling, vocational counsellor, career counsellor competences, and their Polish-language counterparts; overview of European and national qualifications frameworks for career counselling and career development practitioners (e.g. OECD 2017; Hiebert & Neault 2013); review of legal acts regulating vocational tasks in the area of career counselling in Poland; evaluation of a framework program of post-graduate studies in the field of education and vocational counselling (Bielecki et al. 2015), as well as postgraduate programs in the field of career counselling at universities in Poland. This stage was supplemented with direct expert consultations with the executors of the Infodoradca + and beFORE projects. The first project provided the detailed description of the profession of career advisor and the second contributed the list of twelve competences combining entrepreneurial skills and future-oriented thinking, and recommended as crucial from the perspective of realizing future-oriented, professional tasks.

Statistical methods, including correspondence analysis were used to analyse the results of the survey.

RESULTS

The survey was completed by 240 respondents. The majority of respondents have been actively working as vocational advisors for several years. Respondents were asked to evaluate 12 competences in two dimensions. The first dimension focused on the self-assessment of the competence level. The second one referred to the assessment of the usefulness of the same competence in the career counselling practice. The aim of the research was to assess the potential competency gaps (Lester & Religa, 2017). The competences being the subject of the research were:

- C1 – moderating work in a group (e.g. using workshop methods, games, open group discussion);
- C2 – inspiring others to action
- C3 – system thinking, taking into account the complex nature of the environment, cause-effect relationships and unobvious relations between phenomena
- C4 – knowledge, and use of scenario methods (methods of creating alternative career paths) in the advisory process;
- C5 – the ability to apply creative techniques in the advisory process, (e.g. mind maps, design thinking, visualizations to create professional plans);
- C6 – the ability to create an individual vision of the professional future;
- C7 – the ability to analyze trends and megatrends affecting the labor market;
- C8 – the ability to interpret signals of impending changes in the external environment (signs of new trends);
- C9 – the ability to analyze and use of data and information from various sources and inferencing on this basis;
- C10 – the ability to adapt and understand a different perspective, overcoming the existing patterns of thinking;
- C11 – knowledge of coaching tools and techniques in effective interpersonal communication (e.g. ability to ask the right questions, paraphrasing);
- C12 – knowledge of coaching models aimed at working with clients' professional goals, e.g. GROW.

The survey results were analysed using statistical measures and methods and by graphical data representation. The competences that were assessed by respondents at the lowest level were: C11, C7, C5, and C8. In the same time, career advisors feel perfectly competent in C9, C2, and C10. By comparing the average results of self-assessment of respondents' competences and the average from the assessments of the suitability of each competence in the practice of the vocational advisors, the differences illustrating competence gaps were obtained. The biggest gap can be noticed in the same competences that are the advisor's weaknesses, namely: C11 – knowledge of coaching models focused on working with clients' professional goals, C7 – the ability to analyze trends and megatrends affecting the labour market, C5 – the ability to apply creative techniques in the advisory process, C11 – knowledge of coaching tools and techniques and C8 – the ability to interpret signals of impending changes in the external environment. Generally, from the perspective of the practice

of career counselling the respondents considered the following competences as most important: C9 – the ability to analyse and use of data and information from various sources and inferencing on this basis; C5 – the ability to apply creative techniques in the advisory process, C3 – system thinking, C11 – knowledge of coaching tools and techniques in effective interpersonal communication and C7 – the ability to analyze trends and megatrends affecting the labour market. Furthermore, with the usage of correspondence analysis it was shown that career counsellor who have completed any study degree in the field of vocational counselling evaluate their competences higher than those who did not receive any education in career counselling.

DISCUSSION

Taking into account the challenges faced by modern career counselling, the adaptation of methodologies for studying the future to advisory and educational practice seems to be an interesting prospect. Basic knowledge and skills referring to the exploration and "use" of the future in various fields – the so-called futures literacy – is considered the ability to create and process complex visions of the future and give them a new sense. We are talking about "using" the future, what is unknown and uncertain, through a critical and creative approach to problems, the ability to question your own assumptions, using collective intelligence and the ability to understand and accept complexity. Exploring the future not only develops individual planning and adaptation skills, but also allows you to detect and identify upcoming trends. It means the ability to adapt to new conditions, or proactive creation of the future in a way that is favourable to us (Bednarczyk et al. 2018). The approach of the "Horizons of the Future" Project is a unique proposition, based on interdisciplinary knowledge combining career counseling and planning with future studies and foresight methodology. Therefore, one of the important questions we are asking in the project is, inter alia, the one about the attitude of vocational counselors to the future, especially in the dimension of professional practice. We are taking a challenge to collectively create a "working methodological tool" for successful career counseling, which is based on the mysterious and abstract category that is the future, which is both complex and uncertain.

Keywords: competences, competency gap, career counselling.

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FUTURE COMPETENCES OF CAREER COUNSELLORS – ANALYSIS OF QUALITATIVE RESEARCH RESULTS

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INTRODUCTION

The variety of clients of career counsellors (e.g. different groups of the unemployed, students, working adults) enforces comprehensive qualifications and competences of that position. The specificity of profession of career counsellor has been evolving depending on the needs of clients, reflecting the current situation in the labour market (Pryor & Bright 2018).

Living on the threshold of the next industrial revolution influences the labour market trends. Emerging innovative technological development, in addition to demographics and rising inequality, brings widespread automation and irreversible shifts in the structure of jobs giving rise to new opportunities but also creating new areas of uncertainty (Kergroach 2017; Harris et al., 2018). On the one hand, it is referred to potential risks to working conditions such as e.g.: flexibility in hours and location, short-term and casual contracts, longer working hours, low pay and payment uncertainty, reduced OSH policies, dissolution of workers' organisation and bargaining power, inexisting legal protection, informality (Balliester & Elsheikhi, 2018). On the other hand according to World Economic Forum the main technological drivers that positively affect business growth (and consequently the labour market) in the next three years are: 1) ubiquitous high-speed mobile internet; 2) artificial intelligence; 3) widespread adoption of big data analytics; and 4) cloud technology (The Future of Jobs Report 2018). It has been rising the major challenges for career counsellors on the one hand to predict, in the proactive way, future trends on the uncertain and changeable labour market and on the other hand to provide the efficient counselling service adjusted to the client profile, based on the creation and

proposal of alternative pathways for professional career development. They should reflect new perspectives, and consider the complexities of social change (Pryor & Bright, 2018). Uncertainty and changeability of the future labour market influence the need to develop new competences of vocational counsellors.

The aim of the article is to identify future competences of career counsellors in line with the ongoing trends in the labour market. The research question is "what new occupational skills of career counsellors are needed in conditions of the uncertainty and changeability of the labour market?".

LITERATURE REVIEW

Nowadays we are dealing with high level of uncertainty around what to expect from challenges and opportunities arising from current trends shaping future labour market. Despite this fact, attempts are being made to create a vision on the future of work. For example, it is predicted that in the near future, non-standard forms of employment will become more prevalent, with lower wages, less social protection and greater job uncertainty as a distinguishing features. (Balliester & Elsheikhi, 2018).

Studies support the hypothesis that computerisation is polarising the skill demand in the labour market (Michaels et al., 2014). At the same time, there is a need to develop new skills within key sectors (Frey et al., 2015).

Moreover, according to World Economic Forum in Easter Europe as emerging skills should be recognised: creativity, originality and initiative, analytical thinking and innovation, active learning and learning strategies, technology design and programming, emotional intelligence, critical thinking and analysis, leadership and social influence, complex problem-solving, systems analysis and evaluation, reasoning, problem-solving and ideation, in such areas of economic activity as: user and entity big data analytics, app- and web-enabled markets, machine learning, internet of things, cloud computing, augmented and virtual reality, digital trade, new materials, wearable electronics, encryption (The Future of Jobs Report, 2018).

On the basis of literature, the most important factor for the future labour market is the fourth industrial revolution. Other important factors are megatrends such as technology, climate change, globalisation, and demography (Balliester & Elsheikhi, 2018). According to the authors of this publication, the awareness and understanding of the correlation between the above determinants and the functioning of the future working environment seems to be one of the key skills of the future career counsellor.

Simultaneously, educational systems appear not to be adapting fast enough to respond to future labour demands imposed by Industry 4.0. This challenge may result in the required skills being undersupplied, thereby fueling disparities between labour supply and demand, which consequently may cause structural unemployment (Flynn et al., 2017).

These tendencies determine the need for new competences of career counsellors who support the adjustability of the labour supply toward labour demand on the stages of educational process as well as professional activity**. The National Career**

Development Association enumerates the basic career counselling competencies such as career development theory, individual and group counselling skills, individual/group assessment, information/resources, program management and implementation, consultation, diverse populations, supervision, ethical/legal issues, research/evaluation, and technology.

Many of the competencies required to deliver quality career services are likely also important to deliver quality services in other areas, not necessarily related to career guidance such as good communication skills, strengths and limitations analysis, demonstrating ethical behavior, ability to integrate theory into practice. However, there are some competencies typical for career counsellors. There can be included labour market information, knowledge of lifelong career development or work search strategies (Hiebert and Neault, 2014).

RESEARCH METHOD

The study uses the results of the critical literature analysis as well as primary research findings. The qualitative study (in depth interviews among 13 experts representing a diverse professional environment in 8 large cities in Poland) was carried out within the "Horizons of the Future" project. The project is implemented under the "Dialogue" programme of the Ministry of Science and Higher Education. The qualitative research was conducted among career counsellors, representatives of both public organizations (higher education institutions, public employment services, vocational schools) as well as private sector counselling organisations.

The study included two research areas related to: determinants of the quality of educational offer and teaching methodology in the field of career counseling and preferred features and functionalities of educational tools used by people educating career counsellors.

RESULTS

The respondents of qualitative studies pointed out the desirable competences and qualifications of teachers in the field of career counseling. They were mainly professional experience, industry knowledge (also in the field of trends in the labour market). Moreover, soft skills that ensure good contact with the client are also crucial for counselling process. Other competences were good relationality, positive attitude to the clients and the ability to listen, as well as the ability to work in a group. Experts also pointed to the basic analytical competences, enabling the identification of trends in the labour market, or digital competences ensuring that technological trends are followed.

According to the respondents, two factors will have an impact on the future career counselling: 1) technological changes, which may also make the counselling "automate"; 2) socio-demographic: life expectancy – the return of older people to the labour market; the return of economic emigrants, the need for constant training;

the return of women to the labour market after a break related to childbirth, general advice for adults, in accordance with the concept of lifelong learning, which translates into the so-called "lifelong guidance".

Participants of qualitative research also believe that it is becoming more important to approach career counselling for such groups as disabled people and foreigners. The respondents' opinions also suggest that there will be further "personalization" of counselling, approaching towards people, coaching methods, etc. and closer contact in the process of career counselling with practitioners as well as with employers and representatives of the business sphere.

Some respondents mentioned possible specialization in terms of selected target groups (children, adolescents, adults), especially in the context of specific competencies of the career counsellors. It was also underlined the necessity of a systemic approach (a new work organization based on comprehensive knowledge) for career counselling, especially at schools at the early stages of education (primary and secondary school). Some respondents consider that "there is luck of career counselling at schools".

DISCUSSION

Global labour markets are undergoing major transformations. We are witnessing a shift in the line between human and machine tasks and algorithms, which should create new opportunities for the training of employees (The Future of Work: Regional Perspectives, 2018). This has its specific implications, for example, in the form of the need to displace repurpose employee skills or retrain to acquire new skills. Fundamental role in helping in these processes should be played by career counsellors alongside policy-makers, regulators and educators (The Future of Jobs Report, 2018).

Other studies on the competences of counsellors indicate that they are important for the effectiveness of public policy. The study conducted among employment counsellors in public employment services (PES) in Europe proved that the skills and competences of counsellors were identified as being critical to achieving successful placement outcomes (Sienkiewicz, 2012). In relation to the core tasks for employment counsellors specialising in services for jobseekers in Europe, the adequate job profile includes: communication and interviewing skills, as well as client orientation (tasks focused on placement); counselling, assessment and matching skills, the ability to motivate and inspire clients, stress resistance, patience, understanding and the ability to listen non-judgmentally (tasks focused on counselling); knowledge of the current labour market situation and trends, communication skills and client orientation (tasks focused on information provision); communication and cooperation skills, and service-specific knowledge (tasks focused on administration and monitoring). In addition, 'soft skills' are increasingly important to facilitate not only contact with clients, but also other stakeholders linked to employment service delivery.

According to the authors, one of the key competences of career counsellors, due to its complexity and dynamics, is to have knowledge of future social and technological

trends. It is worth considering reliable research results in this context. For example in one of the European Union project – beFORE – there were recognized 12 main competences (identified by academics, students and entrepreneurs) divided in three main types, that will be needed in the future working environment: 1) more functional, task-oriented approaches (e.g. analytical thinking); 2) original thinking and acting (e.g. thinking creatively); 3) psychological traits and relations with others (e.g. reflexive capacity) (Hernaez et al., 2018).

Keywords: competences, career counsellor, labour market trends, future, uncertainty

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CONTEXTUAL FACTORS AND ENTREPRENEURIAL INTENTIONS ON THE EXAMPLE OF STUDENTS FROM POLAND AND SPAIN

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INTRODUCTION

The literature confirms the need to identify and strengthen the factors on which the process of creating new companies depends, due to the high influence that entrepreneurship has on the economic growth and development of the countries (Urbano, Aparicio and Audretsch, 2018). In the studies developed by the researchers and in the reports and documents prepared periodically by the GEM, it is confirmed that these factors are eminently contextual and personal (Busenitz et al., 2014). Although the contextual factors of entrepreneurship are important, the human capital approach predominates in the literature, according to which the entrepreneur is the key to success in the process of creating a new company (Fuller et al., 2018). It is the entrepreneur who must apply his enthusiasm and effort to create a new company, thereby obtaining intrinsic benefits (e.g., autonomy, personal satisfaction) and extrinsic benefits (economic benefit) (Werthes et al., 2018).

In the article, we present an integrated structural model that has been developed from the set of perceptions of young students from Poland and Spain. The small number of variables included in the model allows explaining and managing the formation of the intention in the context of higher education. This study provides answers to questions such as the following: what role do contextual variables play as motivation in the formation of entrepreneurship in the case of young people? Is the contextual variable are greater than that of personal? What are differences in the

perceptions and ratings of students in Poland and Spain? How can these variables be enhanced?

Regarding the structure of the work, the analysis of the intent to undertake and the hypotheses associated with the proposed model is addressed first, to subsequently present the results, discussion, conclusions and implications of the study.

LITERATURE REVIEW

The intention to undertake is a measure of the will and effort that the entrepreneur is willing to make to create the company (Fuller et al., 2018). It is the variable that best predicts entrepreneurial behavior, as was shown in the review work of 409 articles on entrepreneurship carried out by Liñán and Fayolle (2015). Previous work has shown that the intention to undertake depends above all on personal factors. This relationship is especially evident in the explanatory causal models of intention (Elfving, Brännback and Carsrud, 2009). The best-known models of the intention to undertake training are the planned behavior model (Ajzen, 1987, 1991) and the entrepreneurial event model of Shapero and Sokol (1982).

In the Shapero and Sokol model, the intention to undertake is formed based on perceived desirability, perceived viability and the propensity to act (Krueger et al., 2000). For its part, the theory of planned action argues that the intention to create a company depends on the influence of three variables: attitude toward behaviour, perceived behavioral control and the subjective norm, with attitude being the initial variable of the chain of direct and indirect effects that leads to intention (Ajzen and Fishbein, 2005, Ajzen and Cote, 2008). The attitude in this second model is equivalent to the perceived desirability included in the first model, and behavioral control is a form of perceived viability, included in the model of Shapero and Sokol (1982). Ajzen adds in the second model the subjective norm, which also influences the intention to undertake. Both models have been empirically contrasted and provide satisfactory predictions of the intention to undertake. However, both the entrepreneurial event model and the planned action model have received methodological criticism and many authors believe that efforts should be made to incorporate new personal variables and new relationships into the models (i.e. Autio and Acs, 2010). As has been noted, in explanatory models of the intention to undertake the attitude is the personal variable that initial succession of effects that lead to the intention to undertake. However, to address the suggestions of other authors in this study, values are included as a personal variable antecedent to the attitude that constitutes the link between contextual variables and personal variables. Although the literature accepts that companies are created voluntarily and intentionally (Bullough et al, 2014), it is the process of socialization that, to a large extent, makes possible the unconscious internalization of the values that will ultimately lead to develop attitudes favorable to entrepreneurship, on which the entrepreneurial behavior will depend (Lanero et al., 2014; Hui-Chen et al., 2014). The values are at the origin of any behavior, in addition

to having a high stability and to a large extent determined by the shared culture predominant in society (Jahanshahi et al., 2017).

RESEARCH METHOD

In carrying out this work, a causal quantitative methodology using structural equations (PLS) using the SmartPLS-3.0 program was used. The PLS model has been chosen for its advantages in the study of human behavior, for its optimal predictive potential and because it allows the use of reflective indicators (Hair et al., 2011). Discriminated analysis has also been used in a descriptive methodological context.

RESULTS

The reduced significance associated with the differences found by country in the responses to the items and in the causal relationships of the model confirm the premise that has been assumed in this study regarding the greater homogenizing weight of the generational approach to the differentiating effect of the contextual variables of each country (Nowak, Tach and Olsen, 2006). Therefore, it is confirmed that, regarding the variables included in this study, young students from Spain and Poland share perceptions, values and attitudes about entrepreneurship (Charters et al., 2011). The greater intention to undertake of the Spanish students in front of the Poles can be due to the weight of certain contextual factors linked to the existing entrepreneurship in both countries, which could include aspects such as the tradition and entrepreneurial history, the existing norms, infrastructure and bureaucracy, and even issues related to religion.

DISCUSSION

It has been noted in the review of the literature that universities are a potential source of future entrepreneurs and that the creation of a company is a job option increasingly valued by university students of any country (Tsordia and Papadimitriou, 2015). However, the students' assessments of their self-efficacy and their intention to undertake could be higher, without contradicting the previous statement. This may be due to the fact that, together with third and fourth year students, who are closest to making labor decisions, subjects belonging to the first and second year of the degree have been included in the sample, who must continue studying to finish their studies. and no work alternatives are proposed. On the other hand, the sample has been formed by a percentage of women similar to men, who are characterized by having a lower intention to undertake (García and Welter, 2013), lower perceived self-efficacy (Fielden, et al., 2003) and lower declared confidence (Maes et al., 2014).

Keywords: Entrepreneurial intention; contextual variables; personal variables, enterprising attitude

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STUDENTS' EXPECTATIONS, ASSESSMENTS AND SUGGESTIONS RELATED TO STUDIES IN THE CONTEXT OF RELATIONSHIP MARKETING OF UNIVERSITIES

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INTRODUCTION

Polish universities, being one of the most dynamically developing areas of social life, currently are operating under conditions of intense changes in the environment which are the source of threats and challenges that are important to them. These changes determine the process of university transition from the second to third generation model, i.e. from the Humboldtian to the market model. Also, a characteristic feature of a university is "market behaviour", a model of marketing achievements and experiences popular with enterprises. Considering that the essence and condition of the positive effects ensured by marketing operations of enterprises is customer satisfaction, the subject of an increasing interest of the university is the satisfaction of students as their key stakeholders, as well as the expectations of these entities.

The purpose of the article is to present students' expectations regarding studies, their evaluation of studies, an expression of the level of their satisfaction with studies and suggestions in the area of changes that universities could introduce to achieve a higher level of students' satisfaction with their studies and better relations between these institutions and students as key stakeholders of a university. The article incorporates the results of desk research as well as the author's own quantitative and qualitative research.

LITERATURE REVIEW

Students' satisfaction and the study of its level (among others in relation to expectations and distinguished criteria), due to the many, resulting tangible and immeasurable benefits for the university, are a popular subject of scholars' interest in Western countries (Abdullah, 2006; Alvis, Rapaso, 2006; Appleton-Knapp, Krentler, 2006; Clemes, Kao, 2007; DeShields Jr, Ali, Erdener, 2005; Elliott, Shin, 2002; Farahmandian, Minavand, Afshard, 2013; Malik, Danish, Usman, 2010; Shaltoni, Khraim, Abuhama, Amer, 2015; Wilkins, Balakrishnan, 2013). In Poland, this topic is also gaining importance, as evidenced by a gradually growing number of publications in this area (Drapińska, 2011; Dziewanowska 2018; Hall, 2013; Hall, 2014; Sojkin, Bartkowiak, Skuza, 2012). However, there is still little research going beyond the internal, university level, except the one regarding an assessment of employees and didactic activities conducted by them, and slightly wider but concerning the satisfaction of students with the specific direction of one university (Biesok, Wyród-Wróbel, 2015). Due to the turbulent surroundings of the university, the necessity to meet students' requirements and their expectations has now become one of their most important goals (Jurkowitsch, 2006), especially in the context of creating positive and lasting relations between the university and its stakeholders. Hence, the research accounts for the need for a more thorough and deeper consideration with regard to key stakeholders – students.

METHODS

The research, the results of which are presented in this article, was carried out among students of Management science, studying at three, randomly selected technical universities in Poland, at the second and six semesters of full-time and part-time studies. The choice of the semesters was related to the assumption of a different perspective for the evaluation of studies and other suggestions for the university on the part of new-coming students (but already having some experience and who can evaluate their studies – 2nd semester) and close-to-graduates (6th semester).

Qualitative research was conducted using the methods of an individual interview (*In-Depth Interview*) among 10 students studying at = two semesters of studies and a group interview (*Focus Group Interview*) in 4 groups of 4–6 students of the universities mentioned (both full-time and part-time).

In qualitative research, carried out with the use of the above methods, medium intelligence scenarios were used as a measurement instrument. The selection of the sample was non-random (selection of typical units).

The quantitative research was carried out on a sample of 460 students. These studies were intended to be exhaustive, carried out in all lecture groups (where lectures were compulsory) or among all study groups from a given semester of studies. The study did not include people absent on the day of the study. The research

was carried out using the auditorium survey method, a questionnaire covering both closed questions with metrics and open scales.

The research (data collection stage) was carried out individually by the author of the article in the summer semester of 2018/2019.

RESULTS

As it results from the research carried out, the students' expectations focus on obtaining knowledge and skills that enable them to find a satisfactory job through their studies. They are, therefore, oriented to acquire knowledge as well as practical and current skills (transferring theoretical knowledge, perceived by the students as "obsolete", and introducing unhelpful subjects to the study plan that bears no relevance to students' professional work are the most common reason for dissonance and dissatisfaction as well as the will to resign from studying in general or change the university).

As one of the students of the second semester of full-time studies expressed in an open questionnaire: *"I still wonder whether I should give up my studies, because there is terribly little practical knowledge that one day I will need at work and a lot of unnecessary theory"*.

Expectations of the practical and current nature of the content provided in classes apply to all students. Some differences in students' expectations can be seen in the cross-section of the study mode. Part-time students more often declared their expectation of less time-consuming studies (in the context of the organisation of classes at the university as well as related to the preparation for classes, credits and exams) and an opportunity to reconcile studies, work and family life. Some answers provided to an open question were of the following type: "I am still thinking of giving up my studies and going to work because I have neither money nor time for my family and for myself" (sixth semester full-time student). What frequently occurred in case of the surveyed students was a lack of such a reconciling possibility, which determines students' low level of satisfaction.

Both the quantitative and qualitative aspects of the research involved exchanging other factors, which further on falls within the scope the article.

The research, in its both quantitative and qualitative phases, mentions as well other factors significant for students, including those related to the persons conducting classes. The author devotes particular attention to the relations between students and teachers and the factors mentioned by the students in this area due to their multifaceted nature and complexity.

These factors determine the main students' suggestions for changes at the university, which would affect a higher level of students' satisfaction, including the following:

- concentration on practical skills and knowledge in the education process,
- better timetable (i.e. schedule without "gaps" and "distraction" of classes all days of the week),
- control by the university authorities (departments) of the reliability and content of the activities carried out,

- personnel changes (students prefer young lecturers with practical experience and "ardent enthusiasts" of the subject which they teach as well as those deeply involved in teaching students and having a positive attitude towards them).

The results of the research carried out imply, among other things, that students put the biggest stress on the need for an analysis and a possible modification of study plans, with particular emphasis on practical classes and those conducted by teachers with practical experience as well as knowledge transfer skills (as the most important ones among criteria included in a large group that fall into the category of "perceived quality of education"). Beneficial effects in the area of students' satisfaction (as indicated, among other things, positive experience of students of one of the universities where the research was conducted) should also result from changes in the timetable, as a point of focus among many of them. Many other aspects of study evaluation and student proposals appearing in the study determine a number of subsequent conclusions, which will be discussed in the article.

DISCUSSION

The most important conclusion of the research seems to be the need to carry out systematic research among students, going beyond the standard assessment of employees and their classes, including expectations, criteria and assessment of students, as well as their proposals for change, providing invaluable knowledge for the effective creation of lasting, positive relationships with students as key university stakeholders.

The research results presented in the article can therefore be a particularly important source of information for the university authorities, conducting studies in the field of "Management" and management departments, as well as academic teachers who implement subjects in this field, enabling the creation of positive relationships with students by introducing the expected changes (among others in the area of the study programme, as well as methods of education and organisational aspects of studies). They can also be a source of knowledge about modern students, their perception of studies and preferences in the study process, for authorities other than the aforementioned universities and their internal units, despite potential differences in the field of the analysed phenomena among students at different faculties.

Keywords: relationship marketing of higher education institutions, university students' expectations**,** university students' satisfaction

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CITY MANAGEMENT – COLLABORATIVE PERSPECTIVE

"SMART" OR "WISE" CITY? A NEW APPROACH TO CITY MANAGEMENT

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INTRODUCTION

A city is a product of a man. It is a place of man's life and an environment of his various activities. It is perceived as a social and economic system. It is characterised by the complexity of many elements and connections between them which integrate the components of the city so that it can function and develop (Stawasz & Sikora-Fernandez, 2015).

In 2018, 55% of the world's population lived in urban areas covering only 3% of the land area, while in 1950 merely 30% of the world's population lived in cities. According to forecasts by the Population Division of the United Nations Department of Economic and Social Affairs (UN DESA), this percentage will increase to 68% in 2050. The world's urban population grew rapidly from 751 million in 1950 to 4.2 billion in 2018. Together with increasing urbanisation, gradual migration of population from rural to urban areas combined with the overall growth of the world population, the number of inhabitants in urban areas will increase by 2.5 billion till 2050 (United Nations, 2018). About 60% of the Polish population lives in cities, where about 80% of GDP is concentrated. The strategic objective of the 'National Urban Policy 2023' is to strengthen the ability of cities and urban areas to develop and create workplaces and improve the quality of life of their inhabitants (MPiT, 2018).

As the urban population grows worldwide, there is a growing demand for new and innovative ways to manage the complexity of city life. The objectives of the article are: (i) to identify the weaknesses of the "smart city" concept based on

literature review and (ii) to indicate the possibilities of implementing the "wise city" approach in future city development in the opinion of young people (aged 18–34) from Podlaskie Voivodship.

LITERATURE REVIEW

The 'smart city' concept assumes that the city should be a creative, sustainable area where the quality of life improves, the environment becomes friendlier and the prospects for economic development are stronger (Lee et al., 2014). A distinctive feature of this type of city is intelligence, which can be understood as a sum of various improvements in the functioning of the city infrastructure and resources as well as public services (Allwinkle & Cruickshank, 2011). According to the assumptions of Manville et al. (2014), a 'smart city' is a city in which public issues are solved with the use of information and communication technologies (ICT), with the involvement of various stakeholders acting in partnership with the city authorities. It is assumed that cities can be defined as intelligent if they have the following elements (Caragliu et al., 2011): smart economy, smart mobility, smart environment, smart people, smart living, smart governance.

With the growing popularity of the 'smart city' concept, numerous technology-based projects are appearing to help cities overcome modern challenges. Ultimately, many of them do not meet their initial objectives satisfactorily as they are not adapted to the complexity, diversity, and uncertainty that characterise modern cities.

Unfortunately, the concept of a 'smart city' carries weaknesses, which is also emphasised among practitioners dealing with strategic management of city development. Among these weaknesses, the following should be noted (Ravetz, 2017; Naphade et al., 2011; Krukowska, 2018; Proseedmag, 2017; What ..., 2018; Sikora-Fernandez, 2017):

- excessive concentration on investing in advanced technologies without the real perception of conflicts and problems in cities;
- deployment of smart technologies in cities with complex social problems that can exacerbate social inequalities through technical improvements;
- lack of implemented solutions to be used by the local community to co-manage the city;
- lack of a comprehensive view of Polish cities with regard to the needs in all areas of their functioning;
- changes related to the introduction of the 'smart city' concept, mainly including the technological aspect, that may lead to the loss of the existing character and unique charm of some agglomerations, especially those valued for their traditional character;
- the majority of investments in the development of the 'smart city' concept that focuses on creating new facilities instead of modernising the old ones;
- the development of smart city infrastructure requiring huge investments, which are indirectly made by citizens, e.g. in the form of a higher tax rate;

- managing cities, which is a huge challenge and requires, above all, intelligence, responsibility, and reasonableness that cannot be replaced by modern technologies and especially building cities from scratch – city innovation is not glass skyscrapers and cosmic architecture, but the creation of the best living and working conditions;
- incompetently or unknowingly used services by the so-called digitally illiterate people, which can cause considerable personal and systemic damage;
- cities equipped with modern technologies, e.g. housing, or newly built agglomerations that do not become an object of interest to the inhabitants due to high maintenance costs and a lack of social relationships (e.g. Masdar city or Tianjin Eco-city built near Beijing, where there are no schools, shops, transport to factories where people can work).

The current concept of a 'smart city' differs significantly from the definition popular more than a decade ago. Nowadays there is a return to the needs and preferences of the inhabitants. They are in the centre of interests now, and technical solutions are to serve their interests. The core of a modern city constitutes its inhabitant as well as its specific features and abilities (Mizielińska-Chmielewska, 2018).

Literature provides a concept of a 'wise city' on the basis of the emerging weaknesses of the 'smart city' concept. The concept of smart cities emerges from growing evidence that smart cities are unable to create more inclusive, sustainable and democratic cities. One of the greatest challenges facing city planners and managers of this century is to design a model that is human-centred and takes into account the cultural diversity of each city in order to avoid a 'one size fits all' approach. The ultimate goal of the wise city model should be the improvement of the life quality of its inhabitants, including their happiness and subjective well-being (CIBIDO, 2018).

As S. Molpeceres Arnáiz (2017) notes, according to some business and political discourses, a smart city seems to be the city of the future. Nevertheless, contrary to such an interpretation of the smart city, the concept of a 'wise city' is pointed out. It is a model of a city that focuses on the citizen, emphasising the relationship between its inhabitants and the relationship between its inhabitants and space. R. Hambleton (2015) adds that city leaders who want to make targeted changes in a modern city will have to go beyond the boundaries of the debate on 'smart cities'. He supports this view with the results of a study on bold territorial leadership conducted in seventeen innovative cities in fourteen countries. The results show that the judgments of social leaders, rather than technological advances in themselves, are key drivers of progressive change and improved urban governance. R. Hambleton puts a 'place' at the heart of his analysis and emphasises the potential of 'ordinary' people, not just the elite, who can come up with changes (Hambleton, 2015, 2014).

The concept of a 'wise city' does not deviate from the concept of a smart city but it strengthens the socialising aspect of the concept implementation process. The development of the 'smart city' concept focused mainly on the implementation of technology, while arbitrarily weakening the importance of social aspects. The

concept of a 'wise city' definitely reverses this trend, where the technological aspect is definitely supposed to play a servant role in relation to the social aspect.

RESEARCH METHOD

The aim of the research is to identify the level of current involvement of city inhabitants in their development, as well as orientation towards their future development. Due to the exploratory character of the research, the area covered by the research was Podlaskie County. The research group consisted of young people aged 18–34. The study was conducted from 17 September to 30 November 2018, using the method of the diagnostic survey with the CAWI survey technique. A total of 388 correctly supplemented questionnaires were obtained. The data obtained will be analysed statistically with the use of descriptive statistics and correlation analysis with the Statistica 13.3 software.

RESULTS

A representative group of respondents consisting of 201 women (51.8%) and 187 men (48.2%) participated in the survey. They lived in cities of various sizes. 68.3% of the respondents are interested in the issues of their city, with a much higher percentage, as high as 76.3%, feeling emotionally attached to it. 46.1% of the respondents are convinced about the possibility of real influence on their city's affairs, while only 29.4% try to be active in this matter. The attitude of city authorities towards the initiatives of the inhabitants is well evaluated by 45.9% of the respondents, 31.2% on average, and only 8.5% very well. So far, respondents have been involved in the development of their city mainly through: participation in elections and signatures to petitions (in both cases 65.5%), volunteering (59.0%), assistance in the implementation of a local event (54.1%), participation in meetings with city authorities (41.8%), active involvement in the affairs of the city community (41.2%). Only 13.9% of the respondents took part in the development of the city's strategy, while 16.5% declare that they will be active in this type of activities in the future. Most of the respondents indicate that they are interested in the future of their city (72.2%) and would like to have a real influence on its shaping (63.7%). They are not convinced that their city will be described in terms of a 'smart city' in the future (in 2050) (58.5%). On average, 45% of respondents are oriented towards the future in its individual dimension because they know what they would like to achieve in the perspective of 5, 10, 15 or even 20 years.

DISCUSSION

The obtained results of the research indicate that on average every second young inhabitant (aged 18–34) of a city from Podlaskie County is interested in the affairs of their city, and every third declares their present or future active involvement. The respondents also show orientation towards the future of their cities and their own.

When both activities are combined, they may have a real impact on the development and future of their small homelands. The more so because they see the need for the inhabitants to have a greater influence on the affairs of their city than the city authorities. The obtained results give an optimistic picture of the possibilities of young people's activity in city development, but it should be noted that they constitute only a part of the region's inhabitants. In order to present a full picture of the inhabitants' orientation towards future-oriented participation, a broader nationwide survey must be undertaken, in which a representative group of city residents of different ages and professional groups will take part. Then the results may differ significantly, which may be determined e.g. by age or occupation.

Cities striving for wise development need strategies that will make it possible, among other things, to socialise the vision of development or to identify trends affecting their activity as well as social and economic condition. These visions (strategies) can be successfully designed with the use of foresight, which allows for identifying changes in the micro and macro environment, with the involvement of a wide range of stakeholders, interpreting their impact on the city and formulating a strategy that will ensure the long-term development of a 'wise city'.

Keywords: city, smart city, wise city, city management

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THE PARTICIPATION OF INHABITANTS IN THE DEVELOPMENT OF AN INTELLIGENT TRANSPORT SYSTEM

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INTRODUCTION

Cities today must be able to deal with the effects of progressing globalisation trends, processes of integration and urbanisation. On the other hand, they also have to face the challenge of combining competitiveness and the balanced development of municipal regions which undoubtedly impacts local quality of life. Today 54% of population lives in urban areas. According to the UN forecasts, the continued increase of the number of city dwellers in will reach 66% in 2050. Cities in Europe currently house 73% of population and according to forecasts in 2050 it will be 80% (World Urbanisation Prospects, 2014). In the meantime, contemporary cities are facing the need to ensure efficient provision of public services to alleviate the loss of comfort resulting from excessive expansion. The dynamic development of cities is problematic for urban transport and leads to an increased need for individual modes of transport which, in turn, causes congestion and adds to the growing problems connected to environmental protection. An effective and efficient city transport system is of vital significance not only to the people who both permanently and temporarily reside within it but also to manufacturing and service companies which operate there. Local governments face the need to create an environment which favours the initiation, development and implementation of solutions enhancing the functioning of the city both through limiting congestion as well as the improvement of the mobility of all traffic participants (Bryx, 2014).

As a result of growing competition between urban centres local governments today must meet the expectations of the city's internal stakeholders, while at the same time executing the European Union policy connected with the development

of transport based on intelligent transport systems as well as that related to focusing on mobility issues. Residents more and more often participate in the development of various areas of the city, thus contributing to its appearance. Nowadays participatory budgeting has become a central topic of discussion and a significant field of innovation for those involved in democracy and local development (Cabannes, 2004).

The main aim of this paper is to present the possibility of citizen involvement (participation) in the process of designing urban transport systems identified within the local government perspective. The research method used in developing this paper was individual in-depth interviews (IDIs) carried out in the period March 2018 – April 2019 in three Polish cities: Wroclaw, Bialystok and Lodz. The theoretical contribution of this paper is to provide a deeper understanding on the possibilities for inhabitants' participation and their proposals for developing intelligent transport systems and to designate future research directions.

LITERATURE REVIEW

A transport system is a term which refers to the equipment and organisation of transport within a given area. It is a complex set of technical, organisational, financial and regulative sub-systems. Its backbone consists of the infrastructure system which determines the areas accessibility. Its utility is shaped by the accessibility and the quality of the available transport services (Strategy for Transport…, 2013). An urban transport system in that context exists to fulfil transport needs. It is an important sub-system of city logistics and one of the key elements influencing the improvement of transporting people. Rapid technological advancement of Intelligent Transport Systems (ITS) provides an opportunity for reaching a balance in the development of regions and cities. ITS aim to increase the safety of traffic participants and improve the effectiveness of the transport system as well as protect the natural environment. They undoubtedly comprise the most effective instruments for the improvement of city transport system effectiveness and quality (Strategy for Transport…, 2013). An ITS means an advanced mode of transportation systems that include many pieces of software (Chandra et al., 2017). The implementation of ITS carries a number of benefits, including: reduction of congestion in cities, improvement of traffic safety as well as the safety within public transport spaces, easier access to current information about public transport, positive impact on the natural environment and an increase in the effective use of municipal space (Chandra et al., 2017; Sokolowicz and Przygodzki, 2016; Kozlak, 2008).

Local authorities are becoming increasingly interested in intelligent solutions which help them build the city's competitive advantage and, in effect, attract human capital, business and investors. This means that territorial authorities must adopt a marketing orientation in their management of a city which accounts for the needs and opinions of residents to ensure adequate quality of public services including those connected to local transport. The popular concept of residents' participation concerning all dimensions of a city offers some help in this scope. One of the forms of

participatory democracy, which nowadays is becoming very popular at a local level, is participatory budgeting. In the scientific literature participatory budgets are usually understood as a decision-making process. Participatory budget, which is one of the forms of participatory democracy at a local level, defines a democratic procedure that allows an average citizen to participate in administering a part of public funds from the budget of a given administrative unit. It is a process that is open to any citizen who wants to participate, combining direct and representative democracy. This example of democratic procedure allows inhabitants to decide on a local budget by engaging them in this process. It must be emphasised that this issue is not something entirely new. According to the scientific literature on participatory budgeting, the Workers' Party already created it in Porto Alegre in 1989 (Goldfrank, 2007).

Participatory budgeting is a tool for educating, engaging, and empowering citizens and strengthening demand for good local governance. This instrument also strengthens inclusive local governance by giving inhabitants and, for example, marginalised groups the opportunity to have their voices heard and to influence public decision making vital to their interests. This is the way to learn about local government operations and to deliberate, debate, and influence the allocation of public resources (Shah, 2007).

RESEARCH METHOD

In the context mentioned above, the research problem of the paper is related to determining the involvement of inhabitants' participation in the development or improvement of intelligent transport systems and a significant contribution to the development of issues concerning city management collaboration with inhabitants. The research problem has been formulated in a form of a question: in what way can citizens co-decide on the appearance of urban transport system in the city and what kind of proposals regarding the transport system do they report?

The results focus on the representatives of the local government perspective – managers of municipal transport management/departments of traffic management and/or heads of intelligent transport system. The research method used in developing this paper was individual in-depth interview[4] (IDI's) carried out in the period March 2019 – April 2019. For the purposes of the article, the research was carried out in three Polish cities (selected on purpose): Wroclaw, Bialystok and Lodz. Initial reconnaissance studies have shown that in these selected cities, intelligent transport systems have been successfully implemented with a wide range. Each of five individual in-depth interviews lasted about an hour and was carried out by the author of the article.

[4] In-depth interview (IDI) is a qualitative research technique that involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, programme, or situation (Boyce, Neale 2006, p. 3).

RESULTS AND DISCUSSION

The respondents were asked about the possibility of residents to submit their own proposals for improvements to the existing transport system. In the light of the conducted research, the representatives of local governments share the view that the most popular form of inhabitants' participation in the appearance and shape of the urban transport system is the participatory budget (civil budget). The following respondent's opinions were included:

- *a participatory budget is a very friendly form of citizen participation,*
- *we have noted an increased interest among residents in the participating budget and a number of proposals for projects concerning transport and public transport,*
- *proposals for participation budget usually concern the purchase and installation of new board of variable content at bus/tram stops… for example there is a proposal: "101 boards of variable content at 101 bus/tram stops",*
- *sometimes inhabitants report the need to speed up the tram traffic and give it priority, but these are very rare initiatives.*
- *inhabitants' proposals within the participatory budget often concern the infrastructural component of the urban transport system, for example: improvement of bicycle infrastructure and the construction of new bicycle paths in the city, construction of a rental station for city bikes or the replacement of public transport vehicles.*

The respondents agreed that the inhabitants of the analysed cities very rarely report their appreciation and satisfaction especially in relation to public transport, transport facilities, and transport infrastructure. The following opinions were included:

- *in fact, the majority of inhabitants simply cannot see the elements of the intelligent transport system ... Many residents still think that the implementation of ITS has not improved moving around the city,*
- *boards of variable content are the primarily visible element, which is perceived best among residents. We are flooded with residents' proposals for installing new boards at subsequent bus/tram stops. However, this applies only to passengers of public transport because the boards of variable content for drivers are neither positively nor negatively evaluated .... maybe this is due to the fact that there are relatively few of them in the city,*
- *boards of variable content at bus/tram stops are the best rated element of ITS among inhabitants. It is a material, useful thing and it suddenly appeared after implementing ITS (which is noticeable for inhabitants).*
- *there is a large number of residents – drivers travelling by individual transport who negatively perceived the subordinated trip that passes through the tram traffic which is given priority.*

The respondents more often receive reports regarding the negative reception or failures of electronic devices (such as traffic lights, board of variable content etc.). The initial implementation of the intelligent transport system and disclosure of its construction costs were not positively received in each city. The representatives

of local governments of all the analysed cities emphasise that they are open to the needs reported by inhabitants and constantly work on improving and developing ITS, seeing in this a number of opportunities and benefits, whose ultimate recipient are the residents and other groups. None of the respondents questioned the issues regarding the possibility of residents' participation in developing an urban transport system and building in this way a higher morale on co-deciding about the directions of the city's development. On the other hand, the respondents stress that their task as a specialist is to prepare solutions that will meet the needs of residents in relation to transport services. They emphasised that we should not expect from an average citizen a specific high-tech initiative for improving ITS.

The necessity to undertake the research problem is the result of the increasing resident's awareness and interest in a tool of local government economy, which is the participatory budget. The literature on the subject of participatory budgeting in particular concerns the fact that residents are given the opportunity to decide how to expend a particular pool of public funds. They can submit their own ideas for investment projects, for example, related to public transport, ITS etc. that have a chance to be implemented in the near future.

Local governments which cater for the well-being of city residents are more and more willing to engage in a dialogue about their transportation needs. The most important issue is that local government authorities invite residents to submit projects and conduct a broad social consultation on what is needed in a given city from the point of view of the inhabitant. This knowledge gives the local authorities background information of urban intelligent transport systems based on the user's requirements related to daily perceptions. The existing scientific achievement proves that the perception of urban transport and communication is one of the most important dimensions of a city's image since they can eventually become an element of building a positive city image, a key marketing aim of a territorial entity. Undoubtedly, participatory budgeting is a tool of modern management in local government units which gives residents the chance to co-decide on the appearance of their city according to their needs. According to Ebdon and Franklin research (2015), citizen participation in the local budget process is not prevalent, despite encouragement from scholars and professional organisations, which is also confirmed by the author's research results. The participation of residents in such initiatives is still at a relatively low level in Polish cities. However, in recent years this form of public participation is gaining great popularity in Poland. From the local government perspective of the next few years, this interest will not be reduced and – to the contrary – will be characterised by an upward trend.

The limitations of the article concern focusing on the results of research conducted only in three selected cities. The author is also aware of the strengths and limitations of an in-depth interview technique. In the future, the scope of the analysis should be expanded in order to include other cities.

Keywords: intelligent transport systems; urban transport system; participatory budget

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INVOLVEMENT OF INHABITANTS THROUGH THE USE OF SOCIAL MEDIA IN THE PROCESS OF CITY BRANDING – A PILOT STUDY

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INTRODUCTION

At a time of growing rivalry cities compete with one another for tourists, investors and even inhabitants. The city as type of a marketing product (Warnaby, 2009; Warnaby and Medway, 2013, 2015) must be ready to undergo certain transformations to make it unique in respect to others and create a recognizable brand. According to some authors the citizens can play a significant role in the process of building a city brand (e.g. Braun et al., 2013; Zenker, and Erfgen, 2014). In connection to the recorded rise in the activity of Polish citizens within social media, through the present article, the author has made an attempt to assess the level of inhabitants' involvement in the building of a city's brand through the popular among Internet users social platform Facebook. It must be noted that the indicator of active social media users in Poland is reaching the level of 17 million (as of January 2019, source: www. statista.com, accessed on: March 14, 2019) which constitutes 44% of all the country's inhabitants (source: www.stat.gov.pl, accessed on: March 14, 2019). The present pilot study was conducted at the end of March and the beginning of April of 2019 with analysis encompassing 20 platforms of Polish cities with populations ranging from 10 thousand to 25 thousand residents. The study consisted of the systematic quantitative (number of posts) and qualitative (content) analysis of post published by individual cities for 30 consecutive days. The NVIVO software was chosen as the tool for the completion of the qualitative analysis.

LITERATURE REVIEW

Zenker and Braun (2010) define a place brand as "*a network of associations within the minds of consumers which are based on the visual, verbal and behavioral expression of a place that consists of aims, communication, values and culture of a given place's stakeholders and its overall appearance*". In an article titled " *Let them do the work: A participatory place branding approach*" the authors underline the importance of stakeholders in the building of a place brand. Braun defines *place marketing* as "*the coordinated use of marketing tools supported by a shared customer-oriented philosophy, for creating, communicating, delivering, and exchanging urban offerings that have value for the city's customers and the city's community at large*" (Braun, 2008).

According to Kavaratzis (2004) city branding should be treated as the constant process connected to planning and marketing activity aimed at the creation of a favorable image of a city or the change of a negative or neutral image of a city. The concept which takes into account the role of stakeholders as well as the co-creation of a brand in branding is service dominant logic utilized in marketing services (Vargo and Lusch, 2004). In 2009 Warnaby conceptualized it directly into place branding.

Relational approach to place branding presented by Hawkinson (2004) describes branding as the relations between stakeholders whom he positions at the core of the entire branding process. Along with their involvement there is also a concept of participatory branding (Ind and Bjerke, 2007) which significantly stresses the importance of internal stakeholders (Ind and Bjerke, 2007) or the inhabitants of a given place (Aitken and Campelo, 2011).

Braun et al. (2013) identify three roles which the inhabitants could play in the building of a city brand: (1) – inhabitants as the integral part of the place brand (through characteristics and behavior), (2) – inhabitants as ambassadors and (3) – inhabitants as citizens and voters who are essential to the political legitimization of a place brand. According to the authors these three roles make city residents a very important target group of place branding. Additionally, if the inhabitants are not treated as citizens it is very improbable that they will react positively to all efforts connected to the building of a brand (Braun et al, 2013). Residents can hold special positions as ambassadors of the place in which they live and are the most valuable capital in building a brand (Zenker and Erfgen, 2014). In the opinion of cited authors, an approach based on building a brand with the participation of the inhabitants is necessary. To implement this approach the following three stages are necessary:

- definition of a shared vision of a place, including its primary elements;
- implementation of the structure of participation;
- support of inhabitants in their own branding projects.

In recent time interest in social platforms among various groups of stakeholders, where they can express their opinions or take advantage of the abundance of content, has increased (Smith at al., 2012). According to the definition developed by Kaplan and Haenlein (2010) "*social media is a group of internet applications which are based*

on the ideological and technological foundations of Web 2.0 and allow the creation and exchange of content generated by users".

Florek (2011) defines two main trends of online place branding: channels of promotion and communication as well as internet communities connected to the place brand and the place. According to Florek (2011) "*Web 2.0 provides services which encourage users to engage in direct and strong participation*". In her opinion "*every person can potentially influence the way in which a [place] is perceived and judged*". Linders (2012) described the change in the interaction between the government and the citizens in times of Web 2.0 as the transition from "e-government" to "we-government" where the government treats citizens as partners rather than consumers.

An analysis of official Facebook accounts of, among others, administrative offices or city councils from Western Europe conducted by Bonsón et al. (2015) shows that the type of content and manner of utilized media impacts the level of citizens' involvement.

RESEARCH METHOD

The research portion of the present article consisted of the assessment of the level of involvement of inhabitants in the building of a city brand through the social media web site Facebook. The analysis encompassed 20 platforms of Polish cities with populations ranging from 10 to 25 thousand inhabitants. The study relied on the systematic quantitative (number of posts) and qualitative (content) analysis of posts published by individual cities over a period of 30 consecutive days. The NVIVO software was chosen as the tool for the completion of qualitative analysis. Currently it is one of the more popular programs used for qualitative research (Niedbalski, 2014).

RESULTS

As a result of the conducted research empirical material was obtained which was subjected to quantitative and qualitative analysis. At the start it was ascertained whether the web pages of cities being considered contained references to their official account on the social media web site Facebook. The number of subscriptions a given page had was investigated as well as whether the option allowing commenting of published posts had been activated. It was then ascertained whether the administrators interact with users – do they answer users' posts. The total of posts in the established research period was determined and, subsequently, the posts were divided into categories – text, photos/graphics, video and a mixture of those elements. The posts were also grouped thematically: social, economic, environmental protection, sport and recreation as well as culture. An assessment was made as to which posts the users reacted most readily to. Preliminary results of the conducted pilot study allowed the author to answer the research question: do and how the inhabitants become involved in the building of a city brand.

DISCUSSION

The obtained results will certainly not answer all pressing questions, they can, however, become a starting point for further in-depth analysis of the subject concerning the involvement of stakeholders in the process of city branding through social media. As has been mentioned earlier the issue of involvement has not been sufficiently described in subject-related literature while the simultaneous scrutiny of branding and co-creation boast a surprisingly small number of studies (Kavaratzis and Hatch, 2013). Considering the rapid social changes as well as the rising significance of social media, it might be worthwhile to take a closer look at this phenomenon and the processes connected to it, such as, for example: crowdsourcing, also known as citizen sourcing – a mechanism in which citizens share their knowledge and skills to solve a problem or launch an interesting social initiative (Nam, 2012).

Keywords: citizens, involvement, city branding, social media, Facebook

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