



Institute of Economics
Polish Academy of Sciences

ORGANIZATIONS IN THE FACE OF GROWING COMPETITION IN THE MARKET



Edited by

**Anna Ujwary-Gil
Natalia R. Potoczek**

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Introduction

The essence of the functioning of any organization, whether commercial or non-profit, is to provide value to groups of recipients whose expectations undoubtedly change over time. Various competition mechanisms in the market apply to both business-oriented organizations and organizations operating in the sphere of public utilities. This monograph includes examples of the problems facing contemporary organizations, and at the same time provides evidence, confirmed by research results, that indicates the direction of current changes. The analysis of changes taking place in organizations was carried out in many dimensions. The content layout adopted in the monograph presents four research perspectives, where the subject of the research is the organization; the modern tools used in organization management, the impact of the market economy on organizations, and sectoral or industry aspects of the organization's functioning.

In the first chapter, four studies related to commercial and non-commercial organizations have been collated. Researchers of academic organizations who in order to meet the expectations of students increase their activity in the field of entrepreneurship and their support for the most talented students. Both examples show the need to conduct research, develop knowledge about own activities, and focus on the needs of the environment. Entrepreneurial universities are open to the implementation of joint ventures with entities in their environment, which affect the development of the university, its students, as well as the entities. Entrepreneurship, which is based on the ability to take advantage of market opportunities, also creates opportunities for developing the ability to flexibly shape and adapt programs, methods and operating principles to the growing expectations of their environment. The ability to develop your potential as well as the potential of your students plays a crucial role. In the pursuit of excellence, a strong focus should be placed on talented students and the development of all possible forms of support that could determine an output of graduates with particularly high development

potential. In the research presented in this monograph, the authors compare the activity of universities in the USA, the Netherlands, and Poland in the area of talent development. The comparative analysis becomes a valuable source of indicating imperfections, but also examples of potential forms of positive activity in this area.

Equally important in this part of the monograph is the research on the learning organization. Through a bibliometric analysis, the author identified the fields of research on the learning organization. In addition to research areas related to various dimensions, primarily human, cultural and managerial, the types of organizations in which such research is most often conducted have been indicated. They also include the organizations of the two sectors presented: education and healthcare. The same part of the monograph also presents the results of research in the hotel sector, where the main research problem was the creation of customer value, taking into account the conditions stimulating the dynamics of the business models of hotel enterprises. Referring to business models was considered important because of the significance of decision-making patterns that help to build a competitive advantage and achieve market success by creating value for customers. The concept of creating value for customers is currently treated in cross-sectoral or industry categories and is a universal approach to managing organizations.

The second chapter of the monograph presents research on the modern tools used in organization management. Concepts such as work–life balance, shaping the innovation process within the framework of decisions taken in the process, marketing communication, or the use of gamification in research and development, are examples of a wide range of relationships between today’s organization and its surroundings. Finding employees, and retaining them, is also a growing challenge in developing countries, where labor supply is steadily decreasing. The expectations of employees are increasing, especially in relation to respecting the personal, non-professional side of life. Thus, it should be recognized that research on work–life balance is a developing space for organization and management researchers. Modeling the innovation process in an organization is another research trend that is important today, especially in terms of developing competitiveness. Decision-making is one of the key components of the innovation process. This aspect, in qualitative terms, was presented in the next study in the second part of the monograph. Similarly, marketing communication is invariably an important area of research in organizations, which has evolved due to rapidly developing information technologies and, at the same time, the changing preferences of users of these technologies. The last study in this second part of the monograph relates to innovation and the use of computer games. The tools of gamification are used to shape the attitudes of individual energy consumers. The observations

presented show that it is worth making attempts to use unconventional methods and tools, in this case, to develop customer knowledge and strengthen the behaviors desired in the energy market.

The third chapter of the monograph is devoted to the financial aspects of the functioning of commercial and non-profit organizations in a market economy. Increasing the efficiency of public entities, specifically conditioned in economic policies and dependent on political decisions, has been the subject of numerous studies. The research study presented in the monograph refers to the relationship between financial strategies and profit management in public industrial companies listed on the Warsaw Stock Exchange. It is worth noting that no research in this field has been conducted to date in the context of the Polish capital market. The next study refers to the French market. Its purpose was to evaluate and test long-term memory in the French stock exchanges. Research results contribute significantly to explaining the lack of consensus regarding long memory in stock returns. The research covers a significant, 25-year period of operation of the Euronext platform during which 6634 observations were provided. The conclusions of the study may be particularly important for regulators and risk managers. Another study presents the results of bankruptcy risk tests for Polish and Czech logistics companies using a comprehensive classification approach. As a result of the research, a tool for risk assessment and forecasting was developed, enabling the early prediction of bankruptcy of enterprises. At the end of the third chapter of the monograph, the results of health expenditure analysis based on information provided by the Health Account System are presented. Particular attention has been focused on the programming sources of financing healthcare in new European Union countries.

Socio-technical and environmental aspects of the organization are the subject of interest of researchers presenting the results of their research in the fourth chapter of the monograph. The problems of economic migration and working conditions have been the subject of interest for many years in the strongly developing trend of labor market research. The research results contained in the study relate primarily to the issues of occupational safety of Ukrainians employed in Poland. These issues are gaining importance, especially when the number of people migrating from Ukraine to Poland in search of work has been growing for several years. In the face of such a large scale of Ukrainian immigrants employed in Polish enterprises, there is still a lack of regulations protecting or securing the interests of employees and employers. The next research presentation highlights the problems of the "circular economy," which, according to the author, is developing too slowly in Poland. The research is valuable for systematizing the idea of a circular economy based on the theoretical and practical aspects of this phenomenon. The results of the analysis are also of practical importance for the process

of modeling and implementing this idea in Poland. Further, the innovation paradigm of economic health and the prosperity of society is the subject of the research carried out, based on a review of the health economy considering innovation and its impact on population growth and prosperity in the world. The research particularly highlights the consequences of socio-demographic, environmental and business changes in the field of consumer goods. The socio-technical, as well as the environmental, aspects of the organization are also included in the last study presented. The purpose of this study was to identify the attitudes of IT employees in the Polish ITC sector towards remote work. Since the effective and efficient collaboration of distributed employees performing remote work has become even more necessary for the success of projects, numerous research works are being conducted focusing on the consequences of remote work. The presented research results are an important contribution to the discussion of researchers and management practitioners.

By publishing this monograph, which covers a wide spectrum of research problems in contemporary commercial and non-profit organizations, the editors and authors presenting the results of their research express a hope that they are contributing to the widespread dissemination and enrichment of knowledge and, consequently, socio-economic development.

Anna Ujwary-Gil, Natalia R. Potoczek
October, 2019

Chapter 1.

Organizations as the object of research

The uniqueness of individual studies results from various research perspectives. Selected aspects prove how dynamic the environment of the organization is, as well as how the scope of research issues changes. Individual authors presenting the results of their research are part of a wide stream of research on both commercial and non-profit organizations, thus contributing to the development of knowledge from which both researchers and practitioners can draw.

Researchers from the Cracow University of Economics, Izabela Czaja and Tomasz Kafel, conducting research in the field of university entrepreneurship, highlighted a case study on their parent organization, in which they presented an original set of criteria based on the HEInnovate tool, justifying that this tool may be useful in implementing the entrepreneurial concept of the university. The case study itself can provide interested universities with the basis for benchmarking studies supporting the process of implementing a new approach to university management or inspiring the entrepreneurial development of the university.

The next study was prepared by a team of researchers representing three different scientific centers, Beata M. Jones from Neeley School of Business at The Texas Christian University, Katarzyna Perez from Poznań University of Economics and Business and Maarten Hogenstijn from Hanze University of Applied Sciences. The researchers jointly analyzed actions to identify and develop talented students using the perspective and experience of research centers in their countries. The researchers found it appropriate to undertake a study that will fill the gap by highlighting the importance of talent development among university students and explaining the different approaches to student talent development used worldwide, in particular in the United States, the Netherlands, and Poland.

Research presented by Andrzej Lis, representing Nicolaus Copernicus University in Toruń, significantly broadens the perspective and usability of bibliometric research. The example of learning organizations presents the

mapping of leading and emerging topics contributing to a better understanding of the concept and the accumulation of scientific knowledge in this field. From the point of view of business practice, according to the author, identifying leading and emerging topics increases awareness of problems that are important for building and developing learning organizations. The originality and innovation of the work result from the use of a bibliometric methodology to map the research field. The research methodology presented combines the quantitative analysis of publications with the use of keyword citation analysis, some aspects of research profiling, and a qualitative, systematic review of the literature of basic references. VOSviewer software is used to support bibliometric analysis, especially in identifying leading research topics.

The study by Małgorzata Sztorec from Kielce University of Technology expands the perspective of research on business models focused on delivering value to clients. The research entities were hotel enterprises, thanks to which it was possible to attempt to fill the research gap in terms of creating customer value, taking into account the conditions stimulating the dynamics of the business models of hotel enterprises. The business model is now a modern method of business management, known as a decision-making model that helps build competitive advantage and achieve market success. In line with the latest research current, the focus on delivering value to clients is being developed. According to the author's conviction, the obtained research results can be an inspiration to increase competence in creating customer value among hotel management companies.

Implementation of the entrepreneurial university concept at the Cracow University of Economics

Izabela Czaja¹, Tomasz Kafel²

Abstract

The researchers made an attempt to provide evidence and evaluate the application of the entrepreneurial university concept at the Cracow University of Economics. The main purpose was to present the best practices at the Cracow University of Economics throughout the transition into the Entrepreneurial University. The researchers used a case study method in order to analyze the concept of the entrepreneurial university. The authors implemented an embedded single-case design, where, within a single case, attention was focused on administrative units or faculties at the Cracow University of Economics. Interviews and direct observations were used as the research methods to identify best practices. The research can be of value to other universities of economics. They may learn from the best practices of the Cracow University of Economics and implement the same methods of transition into the Entrepreneurial University. The researchers developed a set of criteria – based on the HEInnovate tool – which may be useful in the implementation of the entrepreneurial university concept.

Keywords: *entrepreneurial university, case study method, Cracow University of Economics, best practices, HEInnovate.*

1. Introduction

The literature reveals a diversity of university functions from: employment, entrepreneurial skills development and preparation of graduates for the labor market (European Commission, 2005), closer cooperation with industry and stakeholders (Watson, 2010), an innovation and knowledge center

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playing a major role in determining the dynamics of growth on a national and regional economics level (Solow, 1956; Romer, 1990; Altmann & Ebersberger, 2013), the source of university spillover effects and benefits from its scientific activity (Acs, Braunerhjelm, Audretsch, & Carlsson, 2009; Altmann & Ebersberger, 2013) eventually serving as an element in the triple helix model of university-industry-government relations and transfer of technology, forming a 'socio-technical world' (Etzkowitz & Leydesdorff, 1999; Truskolaski & Waligóra, 2015). On a regional level, the diffusion of information and knowledge proceeds more intensely through social networks and labor market mobility than on national and international levels (Agrawal et al., 2006). A crucial change in the university's corporate culture is a major need, which requires professional management to replace part-time academics with a new vision and perspective of university identity transformation (Sporn, 1996; Jacob, 2003; Gjerding, 2006; Matzler & Abfalter, 2013). The growth and expansion of higher education have brought a shift moving beyond collegial approaches of horizontal governance by part-time academics towards models combining autonomy with self-governance on lower levels of the organizational structure (Gibb, 2012). It is believed that bureaucratic and, above all, organizational and financial problems are the cause of the poor flexibility of Polish universities. The fundamental problems that Polish universities face as compared to the global leaders include quite limited funds for research, too many weak universities with reduced academic requirements for students, relatively low mobility of researchers at home and abroad, and excessive bureaucratization of scientific and teaching activities (Sułkowski, 2014, p.67). At this point, the question should be raised about the readiness of Polish universities, in particular economics universities, to transform into entrepreneurial organizations. Launched in 2018, the process of the higher education system reform in Poland has already started and assumes a more intensified relationship between universities and the environment, especially the business environment, in line with the global trend (Makiela, 2017a, 2017b; Makowiec & Adamczyk, 2016).

In this paper, the authors address the idea of an entrepreneurial university in the Polish reality with special reference to the Cracow University of Economics. The aim of the research was to give evidence of entrepreneurial university concept application at the Cracow University of Economics and identify the best practices which have made the institution more environment-oriented, market-oriented, and business-oriented.

2. Literature background

The entrepreneurial university concept has been the subject of scientific and practical considerations for over half a century. Described in the literature as entrepreneurial in the USA in the 1970s, these universities became prepared for an increased influx of university candidates. These were private sector institutions that took the risk of preparing an offer for the 1950s baby boomers. An accurate assessment of demographic data, taking account of the age distribution of population groups, risk-taking, preparation of staff and programs for new students, resulted in an increase in the number of students at these universities and higher ranks in university rankings. An entrepreneurial university was then an educational institution operating on the basis of a management strategy developed on the basis of data from the environment and the analysis of demographic data (Drucker, 1986, pp.113-116). A broad literature review on the development of a university shows different terms for the idea of entrepreneurial university, e.g. enterprising universities (Williams, 1992), “entrepreneurial and innovative universities” (Clark, 1998, 2001, 2004), “self-reliant and successful universities” (Shattock, 2003, 2010) and “adaptive universities” (Sporn, 1996). An entrepreneurial university is a managerial construct for managing a university (Pluta-Olearnik, 2015). A modern, entrepreneurial university is a multi-dimension institution operating in numerous fields, looking for new opportunities and actively creating its future (Jasiński, 2015). A useful working definition of the entrepreneurial and innovative higher education institution is provided by Gibb (2013) and mentioned in the HEInnovate Review on institutional diversity (HEInnovate, 2018): “Entrepreneurial higher education institutions are designed to empower staff and students to demonstrate enterprise, innovation and creativity in research, teaching as well as pursuit and use of knowledge across boundaries. They contribute effectively to the enhancement of learning in a societal environment characterized by high levels of uncertainty and complexity, and they are dedicated to creating public value through the process of open engagement, mutual learning, discovery, and exchange with all stakeholders in the society – local, national and international ones.”

Higher education institutions are required to demonstrate how they respond to the social and economic needs of contemporary society. Innovative activities such as facilitating broader access to higher education, enhancing graduate employability, facilitating social mobility, contributing to national economic growth and local development in the short and long term, stimulating new enterprises and innovation in existing firms become a university’s daily routine. Universities experience changes and adapt the paradigms of their activities to the conditions in which they operate. In the past, universities served education

and knowledge, were not responsible for the effects caused by their presence in the environment, or for graduates' careers or institutions in the immediate environment. The historical development of universities shows the way they have evolved from being science-based and funded mainly by government institutions, through research-based, into international and entrepreneurship-based entities (Wissema, 2009). To ensure that an institution operating in the changing and demanding environment can become more entrepreneurial, university management has to provide appropriate structures encouraging entrepreneurship (Friedman & Silberman, 2003), appropriate infrastructure (Gjerding, 2006) and implement an adjusted and decentralized management style (Drucker, 1985; Debackere & Veugelers, 2005). However, a university's activity is strictly connected with transfer of knowledge and it is important that universities play a significant role in the education market. The introduced structural, organizational and management changes reflect the university's mission (Sporn, 2001). There are three forms of models which illustrate how universities operate in the market and rely upon: science (1st generation university – 1GU), science and research (2nd generation university – 2GU) and science, research and knowledge transfer and commercialization (Wissema, 2009). The changing dynamic environment of higher education institutions and their respondent evolution have led the universities from individual curiosity-based excellence to societally shared knowledge-based excellence (Gibb, 2005; Gibb, Haskins, Hannon, & Robertson, 2012). To some extent, universities have taken a new role and become an incubator of new science and technology, undertaking commercial activities in order to share the outputs of their research and knowledge they are working on (Wissema, 2009; Głodek & Stawasz, 2015; Santarek, 2008). The existing empirical literature on entrepreneurial universities and the third generation higher education institutions has focused on the analysis of university entrepreneurship understood mainly as commercialization activities, i.e., firm creation by students and academics, research contracts, patenting/licensing, research quality, intellectual property protection (IPP) policies, incentive systems, technology and incubators, technology transfer offices (TTOs) and cooperation, among others (Etzkowitz & Leydesdorff, 1999, Etzkowitz 2003). However, an entrepreneurial university is a much broader concept than university entrepreneurship and goes far beyond the area of research and commercial activity done by scientists, university staff and students, who are conditioned (promoted or limited) by university resources (knowledge, co-working, funding, and infrastructure). An entrepreneurial university embraces managerial values: such as strategic orientation, culture or leadership, involvement of all members of the university and support of an entrepreneurial culture, digital transformation, and capability, as well as their interaction (National Centre for Entrepreneurship in Education, 2012; Clark, 2004; HEInnovate, 2018)

The universities are under growing pressure to adopt business principles: privatization, entrepreneurship, standardization, sustainability and accountability, which may overshadow the historical goals of higher education and reduce both the traditional values of universities and the faculty’s autonomy (Hursh & Wall, 2011; Segrera, 2010; OECD, 2012). Entrepreneurial universities may put their autonomy at risk if they rely mainly on entrepreneurial activities and economic interests (Slaughter & Leslie, 1997). The concept of the entrepreneurial organization is embracing different elements which constitute the idea of a modern university. Five key components of an entrepreneurial university were distinguished by Clark on the basis of a case study research: a strong central steering core to embrace management groups and academics, an expanded development periphery involving a growth of units that reach out beyond the traditional areas in the university, diversity in the funding base, not only by using third stream government funding but also funds from a wide variety of sources, a stimulated academic heartland with academics committed to the entrepreneurial concept; and an integrated entrepreneurial culture defined in terms of common commitment to change (Clark, 2004). On the basis of selected domestic and foreign literature sources, the authors have compiled a summary of key areas (Table 1.1), important for the implementation of the entrepreneurial university idea.

Table 1.1. Comparison of an entrepreneurial university’s strategic areas

Pluta-Olearnik (2009)	NCEE (2012)	Clark (2004)	HEInnovate (2018)
Economic orientation (university’s mission, efficiency-oriented goals, diversified funding sources, positive economic result and the balance sheet value are publicly known)	Mission, Governance and Strategy Mission and Strategy Governance Organization Design Knowledge Organization Measuring Excellence and Public Value Leveraging Public Finance	Strong central steering core to embrace management groups and academics	Leadership and Governance
Market orientation (monitoring the further path of the graduates, relations with employers, flexibility in line with labor market trends, adjustment to the competitive environment and building relations with entities within the environment)	Stakeholder Engagement Regional and Local Partnerships Business Partnerships Engaging Entrepreneurs Alumni Engagement Social Enterprise Student Ownership	Expanded development periphery involving growth of units that reach out beyond the traditional areas in the university	Organizational Capacity: Funding, People and Incentives

Pluta-Olearnik (2009)	NCEE (2012)	Clark (2004)	HEInnovate (2018)
Innovative orientation (creating new undertakings and syllabi, individualized (ordered) teaching schemes, purchasing real properties, constructing new or expanding the existing buildings, upgrading equipment, development of international contacts and growth in the number of foreign partners.	Knowledge Transfer, Exchange and Support Knowledge Transfer IP Policies Spin-offs Incubators Science Park Engagement Loan and Equity Finance Academic Entrepreneurship	Diversity in the funding base, not only by use of government third stream funding but from a wide variety of sources	Entrepreneurial Teaching and Learning
Managerial orientation (efficient finance management system, systemic marketing activities: marketing planning, market research, operations in promotion and public relations, motivation system	Internationalization Sharing Culture Staff and Student Mobility Partnership and Network Building Overseas Campus	Stimulated academic heartland with academics committed to the entrepreneurial concept	Preparing and Supporting Entrepreneurs
	Entrepreneurship Education Exploring the Potential Linking to University Goals Organizing and Locating the Effort Pedagogy and Staff Development Cross Campus Initiatives Supporting Students	Integrated entrepreneurial culture defined in terms of common commitment to change	Digital Transformation and Capability
			Knowledge Exchange and Collaboration The Internationalized Institution Measuring Impact

Source: own study based on Pluta-Olearnik (2009); Gibb (2007); Gibb, Haskins, Hannon, & Robertson (NCEE), (2012); Clark (2004); HEInnovate (2018).

Special attention is given to the strategic areas of entrepreneurial activities proposed by HEInnovate, whose questionnaire – a dedicated research method – is applied to recognize and measure the level of entrepreneurship in higher education institutions, mainly universities in Europe. HEI is the acronym standing for Higher Education Institution. HEInnovate is a self-assessment tool which allows higher education institutions to evaluate and map out their status on leadership and governance, organizational capacity, teaching and learning,

pathways for entrepreneurs, knowledge exchange, internationalization, measuring impact and digital transformation and capabilities. In an entrepreneurial and innovative higher education institution, all the activities are interwoven, including teaching, research, business cooperation, and societal engagement. Leadership, governance and external stakeholder involvement create a continuous synergy and dynamic exchange between the higher education institution and the business environment. The objective of the tool is to provide higher education institutions with a guidance framework helping them to identify hidden opportunities and strategically develop their entrepreneurial and innovative potential (HEInnovate, 2018, p.1). Due to the possible application of the case study method at the stage of identifying the form and types of entrepreneurial activities initiated and implemented by a university, the authors have decided to introduce the mapping and description of the indicated entrepreneurial initiatives by respondents in order to search for the best practices at the Cracow University of Economics.

3. Research approach and methods

The researchers applied the case study as a tool to analyze the concept of the entrepreneurial university at the Cracow University of Economics. The essence of a case study lies in that it tries to illuminate a decision or a set of decisions: why they were made, how they were implemented, and with what result (Shramm, 1971). A case study is seen as the appropriate strategy in organizational research for investigating both unusual events and everyday, culturally-conditioned practices (Tharenou, Donohue, & Cooper, 2007, p.75. as cited by Ćwiklicki & Urbaniak, 2018). Therefore its popularity is rising and it is often applied in management research both to atypical problems and to those that arise in the day-to-day life of an organization under normal conditions. The following have been distinguished in literature as the most recognized arguments for using the case study method in the study of organizations: the possibility of using a specific theoretical framework in the research process, the ability to explore, describe and explain processes and phenomena that are not well understood in theory and require a multi-faceted context analysis, the possibility of using a specific theoretical framework in the research process, ability to explore, describe and explain processes and phenomena that are not well understood in theory and require multi-faceted context analysis. The method allows the research model to be tested, and, consequently, not only provides a better understanding of the identified factors and relationships, but also a possibility to modify and complement the identified cognitive gaps and refine the theory (Dondajewska, 2016, p. 43; Yin, 2015, pp. 48-49; Ćwiklicki & Urbaniak, 2018, pp. 6-7; Haller & Stott, 2010). The case

study method may eventually include different epistemological orientations and allows for combining quantitative and qualitative research techniques (Ćwiklicki & Urbaniak, 2018, p. 2; Yin, 2009, p. 49, 51). The above-indicated strengths of the case study method have made the authors choose this method in conducting their research. For the purpose of this research, the authors used the embedded single-case design, where, within a single case, attention can be paid to a unit or subunits (Yin, 2009, p.50). The researchers analyzed a single case – the Cracow University of Economics, but there were few units of analysis, where the best practices were identified. The researchers decided to apply the HEInnovate model as a tool to evaluate implementation of the entrepreneurial university concept at the Cracow University of Economics. The areas of entrepreneurial activity at the Cracow University of Economics used in Figure 1.1 follow the HEInnovate model presented in Table 1.1.



Figure 1.1. Areas of entrepreneurial activity (HEInnovate concept) at the Cracow University of Economics

Source: authors' own study on the basis of HEInnovate (2018).

In order to ensure the reliability of the studies, differentiated research techniques were used, along with obtaining source data such as document analysis, surveys, interviews and participating observation. Although all the techniques were used, the authors concentrated on two main sources of evidence: interviews and direct observations. In order to preliminarily recognize the concept of an entrepreneurial university (recognition and connotation of the term, knowledge of areas and exemplary initiatives), a pilot interview and participating observation were conducted in March 2019 with 60 academics from the Cracow University of Economics. The selected method also gives the possibility to repeat the procedure and to compile the results of different cases with each other. The researchers used the most common techniques in case study, such as pattern matching, explanation building (Yin, 2009, p. 34).

4. Discussion and results

Following the interviews with 60 members of the scientific and teaching staff, several examples of good practice were identified, which demonstrate an understanding of the entrepreneurial university idea at the Cracow University of Economics. They were considered as best practices and presented by the areas highlighted in the HEInnovate model (see Tables 1.2-1.9).

Table 1.2. Leadership and governance

Key characteristics	Best practices at the Cracow University of Economics
<p>Strong leadership and good governance are crucial to developing an entrepreneurial and innovative culture within an HEI. Many HEIs include the words ‘enterprise’ and ‘entrepreneurship’ in their mission statements, but in entrepreneurial institutions, this is more than a reference. This section highlights some of the important factors HEIs may consider in order to strengthen their entrepreneurial agenda.</p>	<p>Cracow University of Economics has developed the <i>Strategy</i> for the years 2011-2020.</p> <p>There are two organizational units coordinating the cooperation of the University with companies:</p> <ul style="list-style-type: none"> -Knowledge Transfer Department (cooperation with business, research and development), -Science Department (research projects, personal development).

The BLOOM project is another good example in this area. The Cracow University of Economics, together with the LifeScience Cluster, joined the BLOOM project (Boosting European Citizens’ Knowledge and Awareness of Bio-Economy Research and Innovation), financed under the program H2020-EU.3.2.4.3. - Supporting market development for bio-based products and processes. The total value of the project is €2,400,000. The main

objective of the project is to disseminate knowledge about the bioeconomy and to increase the involvement of various groups in the planning and implementation of scientific research and practical solutions in this area. On the part of the University of Economics in Krakow, the project will be implemented by Dr. Eng. M. Wojnarowska from the Department of Product Technology and Ecology and Dr. M. Sołtysik from the Department of Processes Management. The Polish edition of BLOOM is coordinated by the Hugo Kołłątaj University of Agriculture in Krakow (Dr. Małgorzata Pink) and the Copernicus Science Center (B. Davidson).

Table 1.3. Organizational capacity: Funding, people and incentives

Key characteristics	Best practices at the Cracow University of Economics
<p>The organizational capacity of an HEI drives its ability to deliver on its strategy. If an HEI is committed to carrying out entrepreneurial activities to support its strategic objectives, then key resources such as funding and investments, people, expertise and knowledge, and incentive systems need to be in place to sustain and grow its capacity for entrepreneurship.</p>	<p>The pioneer dual educational programme ‘The Future of Global Business Services’ co-created by GAP Faculty has been started at the Cracow University of Economics with ASPIRE member companies (Hitachi Vantara, Abbvie, Alexander Mann Solutions, Amer Sports, Aon, Brown Brothers Harriman, Ecolab, Electrolux, IBM, IG, State Street Bank, UPM). The programme is a response to the market needs as Krakow has already joined the world’s 10 best global outsourcing cities and, according to the available data, 18 new jobs are being created each day. The programme is based on the integration of knowledge and students’ competencies. For over three semesters, students participate in 7 courses and 3 project modules. The courses are taught in teams – CUE instructor cooperating with a group of experts from selected companies – the syllabi for the courses are a result of a joint effort between CUE faculty members and companies involved in the partnership. The project modules play an important role – students working in small groups have the opportunity to practice the theories directly in partner companies. Students working on their projects are advised by mentors from the companies, they also get methodological support from faculty members.</p>

Table 1.4. Entrepreneurial teaching and learning

Key characteristics	Best practices at the Cracow University of Economics
<p>Entrepreneurial teaching and learning involve exploring innovative teaching methods and finding ways to stimulate entrepreneurial mindsets. It is not just learning about entrepreneurship; it is also about being exposed to entrepreneurial experiences and acquiring the skills and competences for developing entrepreneurial mindsets.</p>	<p>The Cracow School of Business is the successor of the former School of Entrepreneurship and Management founded in 1991 at the Cracow University of Economics. CSB continues to offer post-graduate studies and educational programs aimed at employees of enterprises, business owners and people interested in raising their qualifications.</p>

Table 1.5. Preparing and supporting entrepreneurs

Key characteristics	Best practices at the Cracow University of Economics
<p>HEIs can help students, graduates and staff to consider starting a business as a career option. At the outset, it is important to help individuals reflect on the commercial, social, and environmental or lifestyle objectives related to their entrepreneurial aspirations and intentions. For those who decide to proceed to start a business, or another type of venture, targeted assistance can then be offered in generating, evaluating and acting upon the idea, building the skills necessary for successful entrepreneurship, and importantly finding relevant team members and getting access to appropriate finance and effective networks. In offering such support, an HEI should ideally act as part of a wider business support ecosystem rather than operating in isolation.</p>	<p>“Together with the Partner” – the Association for the Development of Jodłówka Tuchowska and its residents, the „IDEA” Scientific Association operating at the Department of Organizational Behaviors has already won, for the third year in a row, a grant within open tender for the implementation of public tasks within the Małopolska Region in the area of Education in 2018, entitled: „Scientific inspirations – interesting and creative”. The prepared project is called „SCIENCE – BUSINESS. Creating and developing entrepreneurial attitudes of the academic community includes activities aimed at students and the entire scientific community of Polish universities. They are aimed at raising the awareness of possible commercialization of technologies created at the university by establishing innovative start-up companies, supporting academic entrepreneurship, promoting entrepreneurial attitudes, encouraging academics to continue research in the field of innovative entrepreneurship and commercialization as well as identifying and describing new phenomena and changes in the economy and enterprises.</p>

The University of Economics in Krakow has been a participant in the project since 2014, being responsible for organizing classes in the thematic areas: entrepreneurship (2014 – now), mathematics (2018/2019) and civil society (2014/2015). The problems of entrepreneurship discussed include:

shaping organizational and communication skills and competences, reporting and presenting business ideas, and improving projects. Classes offered for pupils from 9 secondary schools on a selected subject of entrepreneurship include 2 modules of 30 hours each, and are supported by two academic staff members. Classes are organized in two forms: on-line classes: (1) lectures, classes, laboratories, reverse lessons, and stationary classes: (2) workshops and (3) summer school. Classes (4) of scientific clubs take the form of on-line and stationary meetings.

Table 1.6. Digital transformation and capability

Key characteristics	Best practices at the Cracow University of Economics
<p>HEIs are already deploying digital technologies; however the uptake and integration vary among and within institutions. HEIs should make the most out of the opportunities presented by digital transformation and consider digital technologies as a key enabler. This section of the self-assessment provides a number of statements to reflect on HEI's digital capability, defined as the ability to integrate, optimize and transform digital technologies to support innovation and entrepreneurship.</p>	<p>Małopolska Educational Cloud (Małopolska Educational Cloud Computing Project) is a project aimed at introducing students' academic achievements and academic knowledge from 20 thematic areas (e.g., mathematics, biology, chemistry, construction, information technology, physics, geography, entrepreneurship, English, cognitive science, journalism), industries: mechanical and mechatronics, food, environment, electricity and electronics, tourism, German, French) with the use of information and telecommunications technologies. Establishing a cooperation framework at the level of developing students' interests using the ICT infrastructure is to encourage students to study in the fields that are in line with the region's smart specialization.</p>

Modernization of the vocational education in the Małopolska Voivodeship under the Regional Operational Program WM 2014-2020 is carried out in 130 schools (including 22 poviats) by 10 partners responsible for educational content (i.e. UJ, AGH, UP, UEK, PK, UR, PWSZ in Tarnów, Higher School of Tourism and Ecology in Sucha Beskidzka and the Center of the Copernicus Foundation). The change in the transfer of educational content applies to students taking part in classes (24,000), number of hours of classes taught in schools (over 20,000, number of classes taught at universities (7,500), prepared scenarios (1200), teacher training with ICT (2,600) and teaching of classes in libraries for school students that will not be equipped with cloud equipment.

5. Conclusion

The mindmap used to describe the problem of implementing the entrepreneurial university idea at the Cracow University of Economics based solely on the HEInnovate model. The best practices described above were identified within each of the areas highlighted in the HEInnovate model. Unfortunately, this is not a proof that the Cracow University of Economics has implemented a coherent model or strategy of entrepreneurial university. The answer to the question of what should be done in order for such a model to be implemented requires further research and an in-depth analysis. HEInnovate model may be considered as a tool for preparing more thorough research in this area.

Conducted interviews showed some significant focal points of the emerging entrepreneurial initiatives, but they also revealed a significant communication problem. General and university-wide initiatives are recognizable when they are initiated at a higher interdepartmental and top authority level, and these examples came to mind during the interview. The awareness of initiatives, projects, and entrepreneurship research conducted at the lower level (departments) within the faculties is very low. However, the examples of good practices of entrepreneurial activities (including proven cooperation projects within faculties or between faculties and the environment) obtained at this preliminary, pilot stage of the research can be transferred to parallel faculties at the current stage without any obstacles. The implementation of the entrepreneurial university idea presented at the Cracow University of Economics should be further developed by a proper strategy of research-based cooperation between the University and its business environment, especially between the university and the business sector.

Table 1.7. Knowledge exchange and collaboration

Key characteristics	Best practices at the Cracow University of Economics
<p>Knowledge exchange is an important catalyst for organizational innovation, the advancement of teaching and research, and local development. It is a continuous process which includes the 'third mission' of an HEI, defined as the stimulation and direct application and exploitation of knowledge for the benefit of the social, cultural and economic development of society. The motivation for increased collaboration and knowledge exchange is to create value for the HEI and society.</p>	<p>The Marketing Directors' Board was established at the University of Economics in 2017 at the Faculty of Management, at the Marketing and Market Communications Major. Once a year, meetings of the Board are organized, during which interpersonal contacts are established between the representatives of the university and business – teachers and business practitioners. The purpose of establishing the Board is to enhance the quality of education at the Faculty of Management and within the Major and to define specific features of the university graduate's profile whose knowledge gained in this field will be easier to find in the labor market.</p>

Key characteristics	Best practices at the Cracow University of Economics
<p>Knowledge exchange is an important catalyst for organizational innovation, the advancement of teaching and research, and local development. It is a continuous process which includes the 'third mission' of an HEI, defined as the stimulation and direct application and exploitation of knowledge for the benefit of the social, cultural and economic development of society. The motivation for increased collaboration and knowledge exchange is to create value for the HEI and society.</p>	<p>The implementation of these goals is intended to help tailor the modern curricula and the teaching content to the needs of business practice. The Marketing Directors' Board indicates trends on the market, taking account of the needs of enterprises seeking employees for the marketing, sales, trade, distribution, and broadly understood customer relationships. The board members are directors of 10 large enterprises and plants from various industries, operating mainly in the Małopolskie voivodeship. Each of the Board members has professional substantive competences and extensive marketing experience, also in international and global marketing (Buła, Guja & Kosała, 2015, p. 25-31). The Podhale Center for Economic Sciences (Podhalański Ośrodek Nauk Ekonomicznych – PONE) is the first in Poland, an innovative joint unit of two universities: the University of Economics in Krakow and the Podhale State Higher Vocational School in Nowy Targ. Educates students of economics in the system of dual studies based on the academic and didactic staff from the University of Economics in Krakow. The offered field of dual degree studies is Finance and Accounting (a practical profile) assumes a combination of academic knowledge and practical experience in the form of internships and apprenticeships in enterprises. The study program also includes three-monthly, paid internships in various institutions (accounting offices, municipal offices, and other enterprises) carried out on the basis of an internship agreement. Center for Economic Sciences</p>

Table 1.8. The internationalized institution

Key characteristics	Best practices at the Cracow University of Economics
<p>Internationalization is the process of integrating an international or global dimension into the design and delivery of education, research, and knowledge exchange. Internationalization is not an end in itself, but a vehicle for change and improvement. It introduces alternative ways of thinking, questions traditional teaching methods, and opens up governance and management to external stakeholders. Therefore, it is linked very strongly to being entrepreneurial. It is not possible for an HEI to be entrepreneurial without being international, but the HEI can be international without being entrepreneurial or innovative.</p>	<p>The Center for Strategic and International Entrepreneurship was established in 2013 as a unit within the Faculty of Economics and International Relations at the Cracow University of Economics. Although the Center pursues both research and educational goals, it mostly focuses on international research projects. Currently, the Center operates at the Department of Foreign Trade, staying with it in close symbiosis.</p>

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The basic tasks of the Center for Strategic and International Entrepreneurship include: conducting scientific research in the field of broadly understood entrepreneurship and innovation (including in particular strategic entrepreneurship and inclusive entrepreneurship) and international entrepreneurship and international business (especially European entrepreneurship), as well as public policy for entrepreneurship and small and medium-sized enterprises (including science and education policy and innovation policy). Other activities of the Center include the promotion of entrepreneurship and promotion of entrepreneurial attitudes among the academic and local communities, including research on the attitudes and intentions of enterprising students, organizing seminars, workshops, symposia and scientific conferences related to the problem area of entrepreneurship, including in particular international entrepreneurship, as well as publishing activities – Editing, including the publication of 2 scientific journals: „Entrepreneurial Business and Economics Review” (EBER) in English since 2013 and „Entrepreneurship International” (PM) bilingual academic semester from 2015.

Table 1.9. Measuring impact

Key characteristics	Best practices at the Cracow University of Economics
<p>Entrepreneurial /innovative HEIs need to understand the impact of the changes they bring about in their institution. The concept of an entrepreneurial /innovative HEI combines institutional self-perception, external reflection, and an evidence-based approach. However, impact measurement in HEIs remains underdeveloped. The current measurements typically focus on the number of spin-offs, the volume and quality of intellectual property generation and research income generation, rather than graduate entrepreneurship, teaching and learning outcomes, retaining talent, the contribution to local economic development or the impact of the broader entrepreneurial agenda. This section identifies the areas where an institution might measure impact.</p>	<p>Measuring the impact of implemented projects involves only specific, detailed projects and it seems that faculty members are having trouble identifying the overall impact of these projects on pursuing the entrepreneurial university idea. Measuring the impact of projects related to the entrepreneurial university idea at the Cracow University of Economics requires intense action, especially in the area of communication between employees.</p>

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Development of talented university students – the case of the United States, the Netherlands, and Poland

Beata Jones¹, Katarzyna Perez², Maarten Hogenstijn³

Abstract

The goal of this article is to fill the gap in research about the development of talented students in emerging regions, including Eastern Europe, partially by highlighting the importance of talent development among university students and by explaining various approaches to student talent development used across the globe, specifically in the USA, the Netherlands, and Poland. Furthermore, this research aims to establish a need for the development of talented students at Polish universities, beyond stipends for research and study abroad opportunities. We carried out the investigation by the method of theoretical generalization and analysis of practice, using descriptive approaches in comparative education and presenting widely available secondary data regarding talent development at universities. They obtained the insights for this article via a document review of government reports, books, websites, journal articles, and conference proceedings. The three countries selected use different methods, allowing the researchers to offer pragmatic new insights for universities, organizations, and researchers alike. The results show a void in local talent development programs at higher education institutions in Poland. At a time when Polish higher education is in a process of reform, and the Conference of Rectors of Academic Schools in Poland has identified improvement of education for talented individuals as one of its goals, this research presents compelling reasons to enrich the opportunities for the development of talented students at Polish universities, and to show alternative paths forward.

Keywords: *talent development, higher education, honors education, high-achieving students.*

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1. Introduction

The demand for high-performing, talented workers, has been steadily increasing in companies across the globe (Farndale, Scullion, & Sparrow, 2010) as companies strive to achieve a competitive advantage. According to a recent study at Mercer (2019), “Mindful of the human capital risks associated with constant change, organizations are realizing that people-centered transformation is the key to transferring the shockwaves of disruption into sparks of brilliance.” People are the key to transforming the workplace, as organizations face the ongoing disruption brought by information technology innovations and globalization (Narayanan, Rajithakumar, & Menon, 2018). Talented employees are particularly important in this transformation process as they possess unique skill sets to function effectively in such an environment (Hewitt, 2008). A number of researchers consider talented individuals as a source of competitive advantage in organizations, often influencing the performance of their organizations (Michaels, Handfield-Jones, & Axelrod, 2001; Paauwe & Richardson, 1997; Mazurkiewicz, 2017). A loss of that talent, or lack of available talent pool, often threatens organizations’ abilities to perform in the new economy and makes talent attraction and retention one of the top strategic priorities according to Schwartz, Bersin, & Pelster (2014), Ashton and Morton (2005), and Stec, Filip, Grzebyk, & Pierscieniak (2014).

While scholars have studied extensively the topic of talent development and talent retention in organizations, there is a shortage of studies on talent development in the emerging markets. Additionally, the subject of talent development among university students, who are feeding the potential talent pool in businesses, has not received as much research attention as talent development in organizations. Institutions of higher education within the developing regions, including Eastern Europe, lack significant research about the development of their talented students. The goal of this article is to partially fill this research gap by highlighting the importance of talent development among university students, and by showcasing various approaches to student talent development used in different countries. Furthermore, this research aims to establish a need for talent development of students at Polish universities, beyond stipends for research and study abroad opportunities.

The remainder of the article begins with a discussion of the concepts of talent and talent development, as they pertain to employees and students, within an organizational and university setting. Then, the researchers present the discussion of the three approaches to talent development of university students in the United States, the Netherlands, and Poland. In the final part of the study, the researchers present conclusions and a brief agenda for future research.

2. Research approach

The researchers carried out the study by the method of theoretical generalization and analysis of practice, using descriptive approaches in comparative education and presenting widely available secondary data regarding talent development approaches at universities in the United States, the Netherlands, and Poland. Relevant databases were scanned using keywords such as “honors education,” “talent development,” “gifted education,” together with “student,” “higher education,” “college,” or “university.” The authors obtained the insights via a document review of government reports, books, websites, journal articles, and conference proceedings. The three countries selected use radically different approaches to develop talented students: the USA is a country with the most developed institutionalized structure of university honors programs in the world, initiated almost 100 years ago; the Netherlands, the European pioneer of focusing on excellence, initiated honors programs in early 1990; and Poland – the sixth in population and seventh in GDP in the European Union, with over 400 universities (Sulkowski & Seliga, 2018) and 40% of Poles aged 25-34 with higher education (Ministry of Economic Development, 2017) – still has not much to offer talented students beyond money. The above choice of countries allows the researchers to compare the talent development approaches and offers pragmatic new insights for universities, organizations, and researchers alike.

3. Results and analysis

3.1. Talent development in organizations

Researchers have studied the concept of *talent* extensively, across various disciplines, proposing wide-ranging, blurry definitions. They have reached no consensus on talent definition (Brown & Tannock, 2009). In general, *talent* is an attribute of an individual: an above average ability or skill, or a high degree of aptitude (Mazurkiewicz, 2017). Scholars who write about the discovery of talent often cite the work of Renzulli (1978), who identified three characteristics of individuals recognized by professional colleagues as high achieving: above-average abilities, above-average task commitment, and above average creativity. Professional excellence results from a synthesis of these three characteristics. Sternberg (1993) identified criteria for individual talent identification as excellence, rarity, productivity, demonstrability, and value. From the organizational perspective, talent manifests itself in outstanding achievements (Simonton, 2011), and great human potential for further development (Glowacka-Stewart & Majcherczyk, 2006). Talented individuals show high levels of motivation, have more grit, are more curious, and want

to develop themselves personally and professionally. Another way to describe talent is by analyzing a set of core competencies, mental characteristics, and behavioral characteristics of an individual (Jokinen, 2005). To benefit from talented individuals, organizations must provide conditions for their employees to use their talents and offer appropriate development (Mazurkiewicz, 2017).

The topic of *talent development* has also attracted considerable research in organizational settings, yielding a range of definitions (Ashton & Morton, 2005; Collings & Mellahi, 2009; Gallardo-Gallardo, Nijs, Dries, & Gallo, 2015; Lewis & Hackman, 2006). Originally coined by McKinsey & Company's 1997 study, the term "talent development" involves organizational efforts to attract, develop, and retain talented individuals (Stahl, Björkman, Farndale, Morris, Paauwe, Stiles, & Wright, 2007). Talent development is important in an organizational setting because an organization can derive a competitive advantage if it has resources that are valuable, rare, and difficult to imitate, and have no substitutes (Barney, 1991). Intellectual capital is one such rare resource. According to De Vos & Dried (2013), talent development requires organizations to allow talented individuals to move within the organization, to offer career management tools, such as coaching, mentoring, individual development plans, and rotation, with a focus on individual achievement and responsibility. Berger & Berger (2004) identified the top factors for talent retention as competitive pay in the labor market, skill development, an understanding of highly talented personnel, clear expectations, and HR management in compliance with the business goal.

3.2. Talent development of university students

If universities want to prepare talented students for their careers in organizations, talent development in a university setting is a key issue to understand. Other reasons for developing talented students fall in one of the following categories (Wolfensberger, 2015, p. 16):

- 1) Building a culture toward excellence as a part of an agenda of an institution or a country;
- 2) An equal opportunity culture for realizing one's potential;
- 3) Competition between institutions of higher learning, including competition for talented students;
- 4) Competition between countries in national university performance rankings; and
- 5) The need for innovating

Talent development of university students has an almost 100-year-old, rich history in the United States, and in the last two decades has also become a focus in Europe (Sirius Programme, 2010), with the Netherlands leading the efforts

(Wolfensberger, 2015). Commonly referred to as “honors programs,” these talent development programs aim to promote excellence in higher education, offering unique opportunities to talented students. The number of honors programs offered at European universities over the last decade has been steadily increasing (Long & Mullins, 2012). While Wolfensberger (2015) presents an overview of honors education in 11 European countries (the Netherlands, Belgium, Luxemburg, Denmark, Norway, Sweden, Finland, Iceland, Germany, Austria, Switzerland), new programs are being created in other places in Europe, such as France, Italy, Russia, Romania, Lithuania, and across the globe — for example in Canada, Australia, Morocco, Saudi Arabia, and China.

Given the roots of U.S. honors in the liberal arts, the research models of their home disciplines have often driven U.S. practitioners. Thus, the literature on honors in the U.S. contains an array of inspiring essays about honors practices, captivating case studies, and an occasional survey across institutions (Jones, 2016). In contrast, European honors are more rooted in the sciences, which yielded more systematic studies of such programs that led to a more generalizable understanding of the field — e.g., Wolfensberger’s books in 2012 and 2015. Scientific research on how to teach talented students in tertiary education is still in its early stages, but a few studies are worth noting. Wolfensberger’s (2012) U.S. and Dutch-based investigation revealed the three-pronged approach to honors teaching: creating community, enhancing academic competence, and offering bounded freedom. Van Heugten and colleagues (2016) identified an evidence-based set of competencies required for highly talented international business professional to deliver excellent performance. Universities could use these competencies – which include achieving results, innovating, seeing patterns and interrelationships in a global context, communicating, and self-reflecting – to guide the development of their students and thus create a talent-rich pipeline of employees for organizations. A number of similar studies about excellent professionals in other fields have also been performed (e.g., Paans, Wijkamp, Wiltens, & Wolfensberger, 2013; Fuller, Heijne-Penninga, Kamans, van Vuuren, De Jong, & Wolfensberger, 2018).

Honors education has three different forms: as a disciplinary program, an interdisciplinary program, or a multidisciplinary program (Wolfensberger et al., 2012, p. 157). Disciplinary programs function within a given major or discipline, interdisciplinary programs exist university-wide, and multidisciplinary programs take the place of a regular bachelor program. Each institution brings a unique design to their programs, offering various talent development opportunities to select talented students, based on their need, desire, university mission, local context, and other variables. Scager, Akkerman, Keesen, Mainhard, Pilot, & Wubbels (2012), show that a typical honors student significantly differs from a non-honors counterpart by having more desire to learn and excel. Kaczvinsky

(2007) demonstrated that honors students have more confidence, are more intellectually interested, and are open to new ideas.

3.3. Talent development of university students in the United States

The concept of honors education in the United States dates back to the early 1920s and to the work of Aydelotte (1944), president at Swarthmore College. His initial goal was to instill in talented students a sense of confidence and ambition, based on the teaching practices he experienced at Oxford, U.K., as a Rhodes Scholar. Today, approximately half of the universities and colleges in the United States offer some form of honors undergraduate education (Wolfensberger 2012 p.13). Though their goals have somewhat changed over the years, the practice still reflects a focus on active learning, community learning of students and faculty acting as peers, and challenging, interdisciplinary work offered within the regular curriculum toward the degree (Clark & Zubizarreta, 2008).

The National Collegiate Honors Council (NCHC) is a professional association of undergraduate honors programs and colleges in the United States that supports the work of undergraduate honors students, faculty, administrators, and staff. It has been in existence since 1966 and today it continues to enrich the education of over 330,000 students across 900 member institutions. An online guide is available that lists all honors programs within the United States (NCHC, n.d. -b). These programs all differ in their guiding principles, such as mission, vision, values, students they serve, governance approach, curriculum, size, admission and retention criteria, faculty selection, opportunities provided to students, scholarship offerings, etc. (Jones, 2016). The NCHC offers no single definition for honors education, given the diversity of educational experiences across various institution of higher learning. However, the NCHC website provides basic characteristics of honors programs and honors colleges, as well as guidelines for the modes of honors learning (NCHC, n.d. -a). The goal of honors learning in the United States now is to offer “opportunities for measurably broader, deeper, and more complex learning-centered and learner-directed experiences” (NCHC, n.d. -a). The modes of learning include research and creative scholarship, “multi- or interdisciplinary learning,” service learning and leadership, experiential learning, and learning communities.

For example, Texas Christian University (TCU) in Fort Worth, Texas has an honors college, which started as a program over 50 years ago (John V. Roach Honors College, n.d.). At its core, it “seeks to empower, inspire, and motivate high-achieving students to become leaders in our global society.” To accomplish this mission, the college:

- 1) “Promotes self-discovery, critical thinking and conscientious understanding of world cultures through rigorous academic endeavors and creative inquiry in the context of big questions, great ideas, and relevant issues that transcend the curriculum.
- 2) Offers unique residential, curricular, and co-curricular opportunities, fostering a community of scholars for whom vigorous engagement with local, national, and global communities becomes a way of life.”

The honors curriculum consists of five courses taken during the first two years of the program for lower-division honors and three honors colloquia or an honors thesis project for upper-division honors. The focus of honors coursework is on engagement rather than on doing more work, or work that is more difficult. In many instances, the honors coursework completed counts toward the students’ degree requirements. For more details, please see John V. Roach Honors College (n.d.). Currently, more than ten percent of undergraduates at TCU are members of the honors college, established in 2009. The desirability of the honors offering has significantly improved the academic profile of the university, bringing applicants that are more talented.

NCHC publishes two journals with research dedicated to honors education: *Journal of the National Collegiate Honors Council*, and *Honors in Practice*, and the NCHC community meets annually at a conference to share student and faculty research, discuss professional development opportunities, share resources, and highlight membership achievements.

In a special issue of the *Journal of the National Collegiate Honors Council*, 39 university presidents hailed the value of honors education at their universities and colleges, naming such important outcomes as:

- 1) Institutional advancement through better retention, fundraising, and alumni relationship;
- 2) University innovation;
- 3) Improved critical skills among students, including lifelong learning;
- 4) A greater sense of community that extends beyond the honors cohorts and the campus into the greater community; and
- 5) Transformation of campuses, students, and surrounding communities (Forum on the Value of Honors, 2015).

The following quotation captures a typical student perspective on the value of honors education:

In my experience, an honors class is comprised of enthusiastic intellectuals who are not only smart but also supportive of each other. Among the other curious minds, I can share my ideas with people who will respond to me with their own perspectives. I have no fear of sounding “too smart,” or being labeled a “dork” for being knowledgeable or wanting to understand more. The teacher and students facilitate a stimulating environment where each

person is a welcome and prized contributor. As intellectuals, we seek insightful discussions and enlightening viewpoints, not just to pass a class but for our own personal enrichment. I believe that along with the heart, the mind is a person's greatest gift. In an honors program, both are nurtured. (NCHC, n.d. -c)

The quote above echoes the research findings of Kotschevar, Ngorsuraches, & Bott-Knutson (2018), who found that honors contribute to the lives of honors alumni not only professionally, but personally as well.

3.4. Talent development of university students in the Netherlands

Historically, the Dutch had an egalitarian education culture, believing that the weaker students needed special programs and that programs for talented students were inappropriate. However, with the new focus on excellence in the early 1990s, honors programs focused on talent development made their first appearances in Dutch university settings. Currently, all 14 research universities and the 17 largest universities of applied sciences (with over 5,000 students) have established honors programs (Wolfensberger, 2015). These honors programs first developed at the bachelor level and later expanded to master's programs, offering talent development opportunities typically above and beyond the coursework required for their select degree. An important trigger for the development of these programs was the government-funded Sirius Program, running from 2008-2014, with the specific goal of "promoting excellence in higher education," based on the need for more highly educated individuals capable of handling complex, multidisciplinary problems (Ministry of Education, Culture, & Science, 2011). A budget of around 60 million euros was available to start such programs (Wolfensberger 2015, 51). The Sirius Program's goal was for honors education to become self-supportive after the program ended, which has happened. While the focus of individual honors programs is continually shifting, institutions have generally kept on supporting honors education.

When the Sirius Program neared its end, the Ministry of Education, Culture, and Science commissioned research on the "excellence that has been realized through the program," resulting in a (Dutch-language) report (Allen et al., 2015). This report also compared the "Dutch approach" to honors in higher education to the approaches of other countries, identifying a number of specific factors:

- 1) The Dutch higher education system is a binary system of research universities and universities of applied sciences. In both types of institutions, honors programs have developed. The approach in the universities of applied sciences is unique, for example focusing on educating 'reflective professionals';

- 2) Programs have developed across a wide spectrum, from disciplinary programs focusing on deepening knowledge to multidisciplinary programs focused on broadening knowledge, with also a great variety in program sizes;
- 3) A focus in some institutions is on extracurricular programs;
- 4) There is a new development of honors education at the master's level;
- 5) A lack of additional financing for honors students (p. 17).

Regarding the effects of honors programs on students, it was still too early to draw major conclusions. Early signs indicated that some cognitive competencies develop more among honors students as they mature and that honors programs play a role in the retention of the most talented students (pp. 39-40). However, what became clear was the benefit to the institutions. Honors programs work as a laboratory for innovation: they have clear spin-offs into regular education programs and serve as an experimental setting for collaborative arrangements among research, education, and society (p. 89).

Research on the topic of “added value” of honors for students is emerging in different institutions, some of it taking a longitudinal approach (Scager et al., 2012; Banis-Den Hertog, 2016; Kolster, Dijk, & Jongbloed, 2016; Schutte, Kamans, Wolfensberger, & Veugelers, 2017; van Gorp, de Jong, Kamans, & Buttner, 2017). Work by Kool, Mainharda, Jaarsma, Brekelmans, & van Beukelen (2016) demonstrates that honors education in the Netherlands can have positive outcomes for students: not only did honors alumni have higher average grades at the end of their studies, but they also had a higher work engagement post-graduation. Banis-Den Hertog (2016) focused in her dissertation on the differences between honors and non-honors students in achieving professional excellence, concluding among other things that participation in an honors program influences innovative behavior.

Honors programs vary in size, duration, disciplinarity, and admission requirements, even within one institution. For example, Hanze University of Sciences in Groningen, the Netherlands offers over 50 different honors programs called ‘talent routes,’ tailored to talented students’ individual needs, the requirements, and set-up of the regular study programs. At the institution’s central level, Hanze Honours College is a small unit with dedicated staff performing, among other things, academic quality assurance. The programs offer more in-depth knowledge or more breadth of knowledge development through, e.g., inspiring and complex assignments at prestigious organizations (Hanze Honours College, n.d.). To receive an honors certificate upon graduation, students need to take courses at honors level totaling 30 credits (ECTS; equaling around 800 hours of work) in addition to their regular degree requirements.

In addition, there is substantial research on the roles of honors teachers (e.g., Wolfensberger, 2012; Heijne-Penninga, Wijkamp, Hogenstijn, &

Wolfensberger, 2018). Wolfensberger's (2015) work is the latest full overview of Dutch honors education. Since then, the Dutch honors community has organized itself in three informal networks: one for research universities, one for universities of applied sciences, and one joint network. This network regularly meets and has an online community (using the digital platform Slack), which allows the participants to access information, ask questions, and exchange good practices. More recently, a new website about the network was launched at www.honoursnetwerken.nl. Dutch universities are also a part of the European Honors Council (EHC) established in 2016, which focuses on networking, sharing and exchanging knowledge, and learning from its members (EHC, n.d.). EHC publishes a *Journal of the European Honors Council*, which recently published a special issue on Good Practices in Honors Education (2019). EHC is also involved in the organization of honors conferences, held annually from 2012-2018 in the Netherlands. In a notable development, honors or "excellence" programs have also spread to vocational education in the Netherlands starting in 2015, partly triggered by the availability of small, government grants to develop such programs, and additional research grants to follow these programs.

3.5. Talent development of university students in Poland

A wide range of internal and external challenges have influenced Polish universities in the last 30 years, including the introduction of market economies; aggressive, ongoing reforms in higher education; and the "Europeanization" and internationalization of education (Dobbins, 2017). Given the widespread perceptions of educational inferiority of Central and Eastern European education, and poor results of Polish universities in international university ranking (Best Global Universities in Poland, 2019), Poland continues to reform higher education to change that image. Strategy 2020 specifically identified the improvement of education for talented individuals as one of its goals (Woznicki 2010).

The approach to the development of talented students at higher education institutions in Poland currently is that of career management rather than talent management. Researchers typically interpret career management concept from the perspective of an individual, whereas they view talent development from the perspective of an organization (Mazurkiewicz, 2017). Until the end of the first decade of the 21st century, the career management practices in Poland were still far from converging with the Western models and facing many challenges (Skuzza, Scullion, & McDonnell, 2013). Lately, these career management practices have improved and become more standard, moving beyond the cultural constraints of the communist past (Waters-Sobkowiak,

Kowalski, & Smits, 2018). The talent management practices, however, have not progressed at the same pace. Sławiński & Woźnicki (2014) indicate the need for cooperation between lower and higher education institutions in order to improve the development of talented students, especially since, after the period of transition from communism to democracy in 1989, higher education became the new standard of education in Poland. The “massification” of higher education⁴ has consequences for universities and their graduates alike: it negatively affects the efficiency of academic teaching (Wolszczak-Delracz 2013; Brzezicki & Pietrzak 2018), and it reduces the labor market advantage of higher education graduates (Jasiński et al. 2017), which make the issue of developing talented students even more important.

The intellectual capital of Polish university students is high (Fazlagić 2012). They are known for being knowledgeable and skilled (Zupan, Dziwanowska, & Pearce, 2017). However, even today in Poland, each student must manage his or her own academic career, which often requires inter-organizational mobility – a move to study at another university – and can result in a talent drain for Poland, as individuals often chose to relocate internationally after graduation. Poland suffered the greatest brain drain in the EU during 2017, with the highest number of highly educated movers leaving the country (576,300 individuals) (European Committee for the Regions 2018, 12)

Unlike their U.S or Dutch counterparts, talented students in Poland primarily receive financial support in the form of stipends, scholarships, and grants for outstanding learning results and research, given internally (within the university) or externally (outside the university), with public or private means, mainly for the development of an individual student. The development of students as groups is available in some disciplines, but the focus is not on the most talented ones.

The universities in Poland finance their internal support for talented students from their own scholarship funds. The standard and most common form of support are the scholarships for the best students awarded by a rector of a higher education institution, whether public or private. According to Polish law on higher education, universities can grant such scholarships to a maximum of 10% of the best students of an institution who either had the high-grade average or have scientific, artistic, or sports results in international or national competitions. The best of the best students must apply for this scholarship. Social stipends apply to all students, not only talented ones, who are in a difficult financial situation.

⁴ The “massification” of higher education in Poland has become an issue after the period of transition. Until the beginning of the 1990s higher education degree in Poland was considered elite, as only about 10% of youth completing upper secondary school were admitted to university each year. Since the 1990s this number has continuously grown and from the middle of the 2000s until today it is at more than 50% with a net enrolment ratio of around 40% (Statistics Poland, 2015 after Janicki et al. 2017).

The external support for talented students comes from two main sources: public and private. Four institutions provide public funds for talented students:

- 1) Ministry of Science and Higher Education (MSHE) for scholarships and grants,
- 2) National Bank of Poland for students' stipends,
- 3) Province governors in Poland for talented student scholarships (Stypendium Marszałka Województwa), and
- 4) National Center of Research and Development (NCRD), which in August 2011 took over the implementation of strategic programs of EU, including national Operational Program Knowledge Education Development, where universities undertake projects for improving all students' competences.

The funds available from private sources include scholarships, awards, or internships through different student competitions offered by companies from a private sector in different areas of business activity, as well stipends/scholarships for studies abroad or in Poland, and additional activities offered by foundations. The following facts about external financial support are worth noting. Independently of the nature of their sponsor, all external forms of support require students to participate in a competition. Therefore, most talented students must apply and be among the winners of the competitions to get them. The constant competition for opportunities to develop takes away the students' time from actually growing their skill sets.

Programs financed from public funds started to appear in Poland since the country joined the European Union in 2004. However, after a serious amendment of the law on higher education in 2011, universities saw more of an increase in expenditure on higher education from the state budget and offer more funding opportunities to students. A few programs financed by private foundations have existed since the 1990s, but the number of offering grew in 2004 when the Polish government launched the 1% of income tax donation. The list of foundations sponsoring young talent is much richer now. A number of foundations not only sponsor the scholars financially but also offer additional activities, such as summer schools, workshops with specialists, networking, participation in conferences, etc. However, these foundations are highly distributed and the fact that students reach them is more their luck or determination in finding them, rather than a consequence of some national or at least regional, unified or a well-recognized student talent development approach. Interestingly, many foundations focus on talent development of students from poorer regions or families as well as smaller towns or villages. Also worth mentioning is the fact that many local foundations concentrate only on students from primary or secondary schools, which implies their potential participation in similar projects at the university level.

Table 1.10 presents some of the possible sources of support for the development of talented university students in Poland. It shows some of the possible sources of support for the development by public means, but it lists only select examples of the ones sponsored by private means. A long list of private sponsors of scholarships/stipends/internships and accompanied developmental activities for talented students are available at www.mojestypendium.pl.

Table 1.10. Possibilities of Polish talented students' development from external sponsors

Name of possibility	Sponsor	Duration	Amount granted total	Monthly salary	Other information
1	2	3	4	5	6
Public means					
Diamond Grant (Diamantowy Grant)	MSHE	max 48M	220 000 PLN	max 2500 PLN	Program for BAs, who conduct research and prepare a Ph.D. thesis without MA. Since 2012
Scholarship for students with outstanding achievements	MSHE	one payment	15 000 PLN	-	For outstanding achievements in the previous academic year
Bridge Scholarships (Stypendia pomostowe)	National Bank of Poland	10 M	5 000 PLN (1st and 2nd year of studies) or 10 000 PLN (3rd and 4th year of studies)	500 or 1000 PLN	Polish-American Liberty Foundation funds and manages the program. National Bank of Poland is one of the partners in this program.
Scholarship of the Province Governor for students with outstanding achievements	Province budget	one payment	around 6 000 PLN	-	Province governors offer scholarships for students with roots in their provinces of all levels of education (primary, secondary and higher). The possibility is not available in all provinces in Poland. Scholarships granted to all students or to some group of students, e.g. in Lubuskie Province for students of medicine, in Pomorskie for students with sports achievements, Province of Wielkopolskie and Podkarpackie finance all students

Name of possibility	Sponsor	Duration	Amount granted total	Monthly salary	Other information
1	2	3	4	5	6
Erasmus+ scholarship for studies or internship	EU	6 or 12 M	-	350-600 EUR depending on the location of studies or internship	3 groups of countries to visit; 1 semester of studies is the most popular among Polish students
Participation in Project of Increasing Students' Competencies	National Center of Research and Development	up to 3 years	max 20 000 PLN per student	none	Higher education institutions apply for a grant on financing a project of increasing students' competencies in the area of communication, IT, foreign languages and professional skills; a project must assume activity of a student in three of five areas of activities: professional training, workshops, projects with companies, language learning, and professional local and international visits;

Private means

1	2	3	4	5	6
Scholarships for studies in Germany	DAAD	1-2 years	-	850 EUR	For German and English speaking students, mainly of MA studies.
Graduate Student Award	Polish-American Fulbright Commission	1-2 years	max 47 000 USD, depending on the State of studies		For students with a BA degree;
Start2Star	Foundation of Jolanta and Leszek Czarnecki through Leslaw Paga Foundation	all studies (3 or 5 years)		1600 PLN	14 persons a year; for outstanding talents, not only best students but active in society, charity, etc.; by 2019 already 12 editions
Scholarship for talented students	"Talents" Stipend Fund (Fundusz Stypendialny Talenty)			400-1500 PLN	50 persons a year; scholars have many extra activities supporting the development of their talent (workshops, coaching programs, networking, summer camps, etc.)
Business Academy Deloitte		1-3 months of a competition	award and an internship/ job in Deloitte		Competitions in different areas of business (finance, law, taxes, accountancy, etc.)

Name of possibility	Sponsor	Duration	Amount granted total	Monthly salary	Other information
1	2	3	4	5	6
Stipends for best students from poor families	Absolwent Foundation	3 years, 10M a year	15 000 PLN	500 PLN	From 1998/1999 to 2015/2016 Foundation granted stipends for 77 students from small towns. Extra social and educative activities for them also provided.
Bridge Scholarships, Polish American Internships, Entrepreneurship, Finances, And Management Competition	Educational Enterprise Foundation				Since 1991; many activities (workshops, conferences, competitions, charity activities) for talented students;

Source: websites of sponsors.

4. Conclusions

Recently, educational institutions have made significant improvements in the education of talented individuals throughout the world. Despite a long history of talent development throughout the educational process in countries such as the United States, the education of talented university students in Europe has been gaining ground only over the last two decades, with the introduction of curricular, co-curricular, or extra-curricular honors programs. Research shows a strong connection between the country’s goal to be economically competitive in the global economy and its policies regarding the education of talented individuals (Avcu & Er, 2017). While the United States and the Netherlands currently offer talent development programs in addition to stipends for research, and study abroad opportunities, Poland limits their developmental efforts of talented university students to mainly financial investments in their future, potentially missing the opportunity to retain the talent at home and capitalize on its full potential. While talented students in Poland can pursue extracurricular opportunities that could lead to professional and personal development, these experiences do not appear to be focused, or specifically geared for bright young men and women. As Mirowska (2018) points out, the current university environment aims mainly at providing knowledge rather than developing skills, competence, or full potential of students so that they can make significant contributions to society.

With the current educational focus in Poland on creating linkages between universities and labor markets, and on service in the interest of both science and

society (Dobbins, 2013), this research has pragmatic implications for universities, organizations, and researchers alike. Higher education administrators in Poland might consider exploring honors education in their colleges and universities and pilot it to select talented students. Universities can use the National Center of Research and Development initiative for improving students' competencies as a template for the development of programs geared at talented students. If the National Center of Research and Development or any other public sources of funds are lacking, universities can collaborate with local business partners to develop effectively free curricula, as companies are interested in collaborating to develop highly talented business professionals for their employment pipelines. The implications of such actions could result in lowering the brain drain in Poland and a better-prepared pool of talented professionals. Researchers might delve further into establishing an honors research agenda in Poland, as we pave the way toward a science of honors education (Jones, 2016).

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Mapping the leading and emerging topics of research on the learning organization concept

Andrzej Lis¹

Abstract

The aim of the paper is to identify and explore the leading and emerging topics of research on the concept of the learning organization. The research process is focused on the following study questions: (1) What are the trends in productivity within the research field? (2) What are the leading topics of inquiry in the field? (3) What are the emerging topics in the field? (4) What is the research status within the identified leading topics of inquiry? The research methodology combines the quantitative analysis of publications with the use of keywords co-citation analysis, some aspects of research profiling and the qualitative systematic literature review of core references. VOSviewer software is used to support the bibliometric analysis. The study identifies and discusses leading topics of scientific inquiry in research on the concept of the learning organization. The findings indicate the following leading topics: (1) humans, organizational culture and HRM; (2) the learning organization concept and its relationships with knowledge management and organizational learning; (3) the learning organization in the context of management practice; (4) the learning organization and the education context; (5) learning, problem solving and the health care sector context; and (6) leadership, management and organizational change. Among the emerging topics within the research field are: (1) human-related aspects of managing learning organizations; (2) change management concepts; (3) information management; (4) studies within the context of the education and health care sectors. Mapping of leading and emerging topics contributes to a better understanding of the concept of the learning organization and amassing scientific output in the field. The originality and innovativeness of the paper results from using bibliometric methodology to map the research field. Neither Scopus nor Web of Science databases include similar studies.

Keywords: *learning organization, bibliometrics, keywords co-citation analysis, keywords clustering.*

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1. Introduction

The idea of the learning organization, which emerged at the turn of the 1980s and 1990s, has been one of the buzz-words within management theory and practice for the last thirty years. The seminal book on *The Fifth Discipline* by Senge (1990) introduced the learning organization concept to the canon of the literature related to contemporary management ideas. Other significant contributions to the development of the concept included among others the publications by: McGill, Slocum, and Lei (1992), Garvin (1993), Simonin (1997), Tsang (1997), Edmondson and Moingeon (1998), Örtenblad (2001, 2002, 2004), Yang, Watkins, and Marsick (2004), Garvin, Edmondson, and Gino (2008).

Senge (1999, p. 3) describes the learning organization as an “organization where people continually expand their capacity to create the results they truly desire, where new expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together.” Appreciating the aforementioned sophisticated and inspirational explanation of the learning organization idea by Senge, a more concrete and operationalized definition seems to be needed both for conducting research and practicing the concept in organizations. As observed by Tsang (1997, p. 75) “a learning organization is one which is good at organizational learning. Therefore, once the definition of organizational learning is settled, that of the learning organization will follow”. Applying the process-oriented perspective, Garvin (1993, p. 79) states that “[a] learning organization is an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behavior to reflect new knowledge and insights.”

Scanning the resources of the Scopus database shows that the learning organization remains a topic of scientific inquiry attracting the attention of new ranks of scholars. In March 2019, there were more than 3,800 publications registered in Scopus which included the phrase ‘learning organization’ in their titles, keywords, or abstracts. However, the research field related to the learning organization concept seems to lack a thorough and multidimensional mapping and clustering with the use bibliometric studies. So far, bibliometric methodology has been very rarely applied to explore the research field. Certainly, systematic literature reviews and extant narrative reviews, which are quite often found among publications dealing with the concept of the learning organization, could contribute to the understanding of the structure of the research field².

Nevertheless, in such approaches, clustering of analyzed publications is based on the subjective opinions of the researchers. Bibliometric methods are free of such biases which give them a natural advantage in mapping the research field. Moreover, bibliometric methods (e.g., keywords co-occurrence

² The author is grateful to the anonymous reviewer for pointing out this comment.

analysis, which is a method applied in this study) visualize relationships among the items in the research field and the strength of these relationships. Finally, as quantitative approaches, bibliometric methods are included in the analysis metadata (keywords) from a large number of publications, which enables the researcher to have a bird's eye view of the research field and facilitates mapping of the field. Taking into account the aforementioned arguments, literature reviews were excluded from the search while validating the identified research gap.

As of 09 April 2019, the following query was conducted in the Scopus and Web of Science Core Collection databases:

Searched for Topic (Title, Keywords, Abstracts): ('learning organi?ation') AND ('bibliometric' or 'bibliometrics' or "scientometrics"). Subject area: unlimited. Time span: unlimited.

As a result of the query, only six publications were retrieved meeting search requirements. Nevertheless, while studied thoroughly, none of them provided mapping and clustering of the research output related to the concept of the learning organization

Having recognized the knowledge gap, the aim of the paper is to identify and explore leading and emerging topics of research on the concept of the learning organization. The research process is focused on the following study questions: (1) What are the trends in productivity within the research field? (2) What are the leading topics of inquiry in the field? (3) What are the emerging topics in the field? (4) What is the research status within the identified leading topics of inquiry?

2. Method of a study

2.1. Research sample

In order to retrieve the research sample, the following query was conducted in the Scopus database as of 09 April 2019:

Searched for Title: ('learning organi?ation'). Subject area: unlimited. Time span: unlimited.

In result, 1,166 publications were retrieved. The scope of the search was purposely narrowed to those publications which include the searched phrase (i.e., 'learning organization') in their titles (i.e., title sample). The author is aware of limitations stemming from this operation as, for instance, the topic search (i.e., search extended to titles, abstracts, and keywords of publications) brings 3,849 items. Nevertheless, narrowing the research sampling process to the title sample was decided in order to select the publications which directly

refer to the studied concept. The same reason stands behind excluding from the search in the sampling procedure other expressions related to the concept of the learning organization such as: ‘organizational learning’ or ‘knowledge management.’ In the research sampling process, truncation technique (searching for the phrase ‘learning organi?ation’) was applied to include both spelling versions of the English language (i.e., British and American English). The search was unlimited in regard to either the date of publication or the subject area in order to comprise all relevant works and value the multidomain character of the concept and variety of the contexts where the idea of the learning organization is studied. Potential biases in the research procedure may also stem from the varied quality of the analyzed publications³. Indexation in the Scopus database was taken as a quality assurance of publications included in the research sample. Nevertheless, uneven quality of publications under the study should be considered as a limitation of the research procedure as no other measures have been taken in order to discriminate between items from leading journals in the field and other source titles indexed in Scopus.

The research sample is characterized by subject areas the publications are affiliated to, types of documents or the source of publication. The majority of 1,166 publications comprising the research sample are categorized within subject areas of Business, Management and Accounting (644 items) and Social Sciences (531). Other subject areas represented in the sample are: Engineering (132), Computer Science (115), Medicine (94), Decision Sciences (80), Economics, Econometrics and Finance (80), Arts and Humanities (47), Psychology (42), Nursing (29), Mathematics (23), Environmental Science (18), Energy (12), Material Science (11), Agricultural and Biological Sciences (8), Health Professions (7), Chemical Engineering (6), Multidisciplinary (6), Biochemistry, Genetics and Molecular Biology (6), Earth and Planetary Sciences (5), Pharmacology, Toxicology and Pharmaceutics (4), Physics and Astronomy (1), Veterinary (1). 10 publications are of undefined subject area. Journal articles (795) make up more than two-thirds of the research sample. Other types of publications are: conference papers (145), reviews (96), book chapters (83), editorials (21), books (8), notes (8), articles in the press (5), letters (3) and short surveys (2). *Learning Organization* with 158 publications is the unquestioned leader among source titles. The remaining are: *Management Learning* (24 publications), *Handbook of the Research on the Learning Organization Adaptation and Context* (21), *Human Resource Development Quarterly* (20), *Industrial and Commercial Training* (11), *Journal of European Industrial Training* (11), *Journal of Workplace Learning* (10), *Human Resource Development International* (10), *International Journal of Educational Management* (10), *Journal of Management Development* (10).

³ The author is grateful to the anonymous reviewer for pointing out this comment.

In order to identify emerging topics within the research field, searching of items for analysis was narrowed down to the 2010s sub-sample:

Searched for Title: ('learning organi?ation'). Subject area: unlimited. Time span: 2010-2019.

The 2010s sub-sample consists of 483 publications. Similarly to the main research sample, the majority of items is categorized within subject areas of Business, Management and Accounting (255) and Social Sciences (228). In regard to the document type, the leading categories are: articles (302 publications), conference papers (77) and book chapters (59). *Learning Organization* (with 58 publications) and *Handbook of the Research on the Learning Organization Adaptation and Context* (21) are found to be the most prolific source titles.

2.2. Research methods, techniques, and instruments

The research methodology included a combination of bibliometric studies and review surveys. Keywords co-occurrence analysis (He, 1999) was applied to map the research field and identify leading and emerging topics of scientific inquiry through categorizing high-frequency keywords into relevant clusters and identifying those keywords which have been most often cited, in recent years. The selected aspects of the research profiling (Porter, Kongthon, & Lu, 2002) method (i.e. core references/topic profiling) were used to recognize the most influential publications within the clusters and their links with other thematic areas. Finally, the contribution of the core references, the status of research within identified thematic clusters and research topics manifested in literature surveys in the field were studied with the method of a systematic literature review (Booth, Sutton, & Papaioannou, 2012; Czakon, 2011; Mazur & Orłowska, 2018).

The analysis of keywords co-occurrence was conducted with the use of the VOSviewer software application developed in the Centre for Science and Technology Studies of the University of Leiden, the Netherlands (van Eck & Waltman, 2010, 2014). All the publications in the main research sample included in total 2,913 keywords, among which 2,153 occurred only once. Following the formula provided by Donohue (1974; as cited in Guo, Chen, Long, Lu, & Long, 2017, p. 7), the number of high-frequency keywords for the co-occurrence analysis was 66. This means that the minimum number of occurrences of a keyword to be used for analysis was 11. In the second step, high-frequency keywords from the 2010s sub-sample were taken into the analysis in order to identify emerging research topics. In total, there were 1,834 such expressions, among which 1,458 had only one occurrence. Following the aforementioned

formula, 60 high-frequency keywords were selected (the minimum occurrence threshold was 6). Table 1.11 provides the parameters used for analyzing the bibliometric data related to publications retrieved from Scopus.

Table 1.11. VOSviewer parameters used for analysis

Item	Characteristic/ value
Type of analysis	Co-occurrence analysis
Unit of analysis	All keywords
Counting method	Full counting
Method of normalization of strength of the links between items	Association strength method
Layout	
Attraction	2
Repulsion	0
Clustering	
Resolution parameter (detail of clustering)	2
Minimum cluster size [N]	7
Merging small clusters	Switched on
High-frequency keywords used for analysis [N]	Main research sample – 66 2010s sub-sample – 60
Minimum occurrences of a keyword used for analysis [N]	Main research sample – 11 2010s sub-sample – 6

Research profiling methodology includes three aspects: general publication profiling, subject area profiling and topic profiling (Martinez, Jaime, & Camacho, 2012). Among them, one of the components of topic profiling, i.e. core references/topic profiling was used to enumerate leading publications within thematic clusters identified with keywords co-citation analysis. Then, these core references were used as entry data for a systematic literature review. Moreover, the review included the top ten most cited publications in the 2010s research sub-sample and all the publications issued in 2019 (with the exception of an editorial). In the discussion section, the findings from the bibliometric studies were compared with the outcomes of the literature review analysis.

3. Research productivity in the field

Analyzing the number of publications in the research field and the number of citations they received over the period of time may be used to indicate the stage of the field development (Czakov, 2011, p. 59). The first publication on the learning organization included in the sample dates back to 1976. However,

there are only 6 items published in the 1970s and 1980s. The dawn of the studies on the concept of learning organizations starts in the early 1990s. The yearly distribution of research productivity from 1990 to 2019 (as of 09 April) is presented in Figure 1.2.

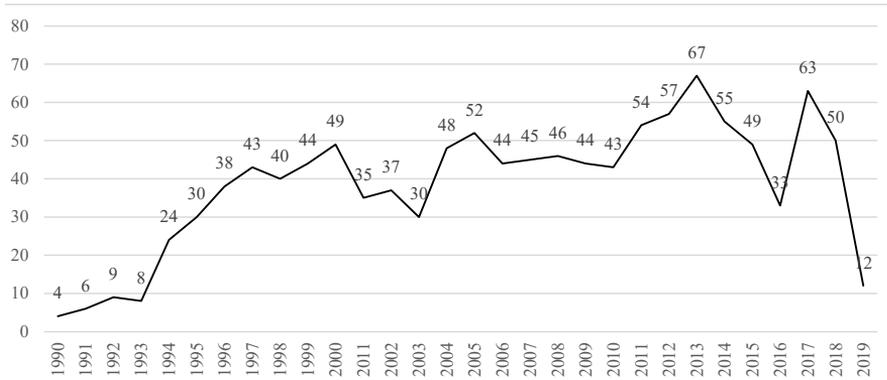


Figure 1.2. Scientific productivity of research on the concept of the learning organization (number of publications in 1990-2019)

Source: own study based on data retrieved from the Scopus database (accessed 09 April 2019).

The early 1990s (1990-1993) may be considered as the period of the concept emergence and introducing it to the research field. The second stage lasted from 1994 to 2000, when an increasing number of publications was observed, which may be considered as a manifestation of the growing attention of academia in the idea of learning organization. Next, in the early 2000s (2001-2003) a temporary decline in research productivity was observed. Fourthly, the period from 2004 to 2010 is characterized by the stability of the yearly research output at a level of about 40-50 publications per year. The decade of the 2010s is a period of ups and downs in regard to the number of research publications dealing with the concept of the learning organization. The peaks of the trend are noticed in 2013 (67 items) and 2017 (63), the downturn – in 2016 (only 33 publications issued this year). Similar tendencies regarding the increase in the number of publications in the 1990s, the decrease in the first half of the 2000s and continuation of the growth trend afterward is reported by Lis (2017, pp. 77–78), who analyzed the scientific productivity in the research field with data retrieved from the Web of Science Core Collection.

As of 19 May 2019, 1,166 publications comprising the research sample received in total 19,417 citations. The value of the h-index for the sample is 60. Prior to 1990 only 5 citations are reported. Distribution of the number of citations received between 1990 and 2019 is presented in Figure 1.3.

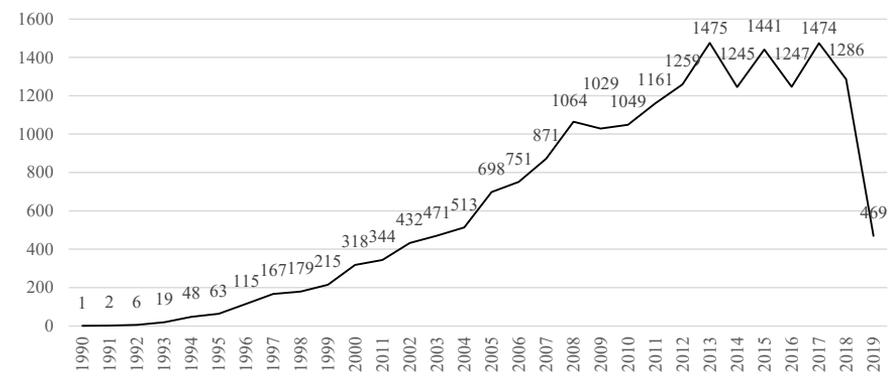


Figure 1.3. Scientific productivity of research on the concept of the learning organization (number of received citations in 1990-2019)

Source: own study based on data retrieved from the Scopus database (accessed 19 May 2019).

In regard to the number of received citations, for two decades of the 1990s and 2000s (up to 2012) a continuously growing trend was noticed. In the 2010s (precisely from 2012 to 2018), a stabilization of the trend is observed at a level ranging from 1,250 to almost 1,500 citations per year. The evidence confirms the findings from the citation frequency analysis of the title sample based on the data retrieved from the Web of Science Core Collection in the study by Lis (2017, pp. 78–79). Combining the outcomes of the analysis of the number of publications related to the idea of the learning organization and citations they received, the hypothesis may be derived that the research field has achieved its maturity stage or a least a temporary stabilization of its growth rate has been observed recently (since 2012).

4. Identifying leading research topics

4.1. High-frequency keywords clustering

Author keywords belong to the most important metadata linked with research papers. As observed by Uddin and Khan (2016, p. 1167), author-selected keywords “are mostly research domain-specific and represent authors’ understandings of their work within the thematic context of their research domains”. While papers are under the process of indexation in databases, additional keywords are attached to them (e.g., Indexed Keywords in Scopus or Keywords Plus in Web of Science Core Collection). In their comparative study of author keywords and keywords plus of the papers indexed in Web

The strength of relationship between items is visualized by the distance between them, i.e. the closer to each other the items are located, the stronger the interrelatedness between them is reported. Referring to the map of the research field presented in Figure 1.4, a cluster analysis was conducted. Data for this analysis is provided in Table 1.12.

Cluster 1 (marked in red in Figure 1.4) comprises 14 keywords cited in 191 publications. The cluster is located close to the right frontier of the map. The followings expressions are its main nodes: ‘human,’ ‘humans,’ ‘article,’ ‘organization,’ ‘organizational culture.’ Although they are linked with the most central keywords in the research field, i.e. ‘organizational learning’ and ‘learning organization,’ in general, the position of the cluster seems to be rather distant from these core items, which may be considered as a manifestation of moderate strength of relationships. The keywords grouped within the cluster highlight the research attention given to organizations and their members. Therefore, the cluster is labeled as ‘humans, organizational culture and HRM.’

Cluster 2 (marked in green in Figure 1.4) consists of 14 keywords distributed over 442 publications. The expression ‘learning organization’ occupies the most central and prominent position within the cluster. Other nodes of high visibility are such keywords as: ‘organizational learning’ and ‘knowledge management.’ The majority of items is centered around the aforementioned nodes. The most peripheral are such expressions as: ‘sustainable development,’ ‘competitive advantage,’ ‘information systems’ and ‘industry.’ Summing up, the cluster is labeled as the ‘learning organization concept and its relationships with knowledge management and organizational learning.’

Cluster 3 (marked in dark blue in Figure 1.4) includes 11 keywords from 345 publications. The cluster is located in the proximity of Cluster 1, which indicates a high strength of their relationships. ‘Learning organization’ is the focal node within the cluster. Two branches may be identified within it. The first of them, located at the left flank, is focused on management practice in the organizational context. It is represented by such keywords as: ‘societies and institutions,’ ‘industrial management,’ ‘management science,’ ‘strategic planning,’ ‘project management.’ The second branch, located in the center and the right flank of the cluster, deals with ‘learning systems,’ ‘personnel training,’ ‘training’ and ‘education.’ ‘Organizational performance’ is the keyword which occupies a peripheral position within the cluster, in fact being located among the items of Cluster 2. Summing up, the label ‘the learning organization in the context of management practice’ is given to the cluster.

Table 1.12. Clusters of high-frequency keywords related to the concept of the learning organization

Symbol/ Color	Items [N]	Keywords [occurrences N]	Label
C1/ red	14	article (63), human (81), humans (66), methodology (16), organization (55), organization and management (39), organizational culture (52), organizational innovation (32), personnel management (21), questionnaire (16), questionnaires (10), staff development (19), standard (13), United States (26)	humans, organizational culture and HRM
C2/ green	14	competition (28), competitive advantage (11), decision making (16), human resource management (11), industry (11), information management (22), information systems (13), innovation (35), knowledge management (94), learning organizations (294), organizational learning (95), performance (11), surveys (21), sustainable development (11)	LO concept and its relationships with KM and OL
C3/ dark blue	11	education (53), industrial management (19), learning organization (231), learning systems (28), management science (12), organizational performance (17), personnel training (15), project management (16), societies and institutions (59), strategic planning (17), training (16)	LO in the context of management practice
C4/ yellow	11	higher education (16), information technology (19), knowledge (17), learning culture (13), learning organization (62), organizational learning (18), research (11), students (12), systems thinking (16), teaching (18), team learning (19)	learning organization and education context
C5/ violet	9	health care (13), health care organization (29), health care personnel (12), learning (62), learning organizations (20), patient care (11), problem solving (13), review (17), total quality management (35)	learning, problem solving and the health care sector context
C6/ light blue	7	Australia (12), communication (12), leadership (63), management (31), organizational change (25), United Kingdom (13), workplace learning (14)	leadership, management and organizational change

Source: own study based on data retrieved from the Scopus database (accessed 09 April 2019) and analyzed with the use of VOSviewer (19 May 2019).

Cluster 4 (marked in yellow in Figure 1.4) comprises 11 keywords listed in 168 publications. Cluster is located in the proximity of clusters 2 (at its right border) and 3 (between the two branches of the cluster identified above). ‘Organizational learning’ is the central node. The issues covered by the cluster range from ‘higher education,’ ‘teaching,’ ‘research’ and ‘students’ through ‘team learning’ and ‘organizational learning,’ ‘learning culture,’ ‘information

technology' to 'knowledge.' In spite of some ambiguity to define the leading topics within the cluster, it is labeled as the 'learning organization and the education context.'

Cluster 5 (marked in violet in Figure 1.4) comprises 9 keywords cited in 162 publications. In regard to space proximity, it is located close to Cluster 1, and many of its items show direct relationships with this cluster. 'Learning' is found to be the focal point of the cluster. Analyzing the structure of the cluster, two branches may be identified. The first one gives attention to the issues of 'learning,' 'problem-solving' and 'total quality management,' while the second one is focused on the health care sector. Therefore, 'learning, problem-solving and the health care sector context' is a label attributed to the cluster.

Cluster 6 (marked in light blue in Figure 1.4) is made of 7 keywords listed in 145 publications. 'Leadership' is recognized as the most visible keyword within the cluster. Nevertheless, its centrality can be hardly observed as the items of the cluster are scattered over the map of the research field, which indicates a relatively weak strength of relationships among them. 'Management' and 'organizational change' are the other expressions worth mentioning. What is interesting, the items in this cluster fill the gap in the center of the map of the research field, linking Clusters 2 (green), 3 (dark blue) and 4 (yellow) at the left flank with Clusters 1 (red) and 5 (violet) at the right flank. Cluster 6 is labeled as 'leadership, management and organizational change.'

4.2. Core references / thematic clusters profiling

In order to explore the identified leading topics of research, core references/ clusters cross profiling was conducted. Five leading core references from each cluster were taken into analysis. Then, all the clusters were searched to find whether they include these items. Relevant positions occupied by the publications in each cluster were listed. The results of this operation are presented in Table 1.13.

Analyzing the structure of the cross-referencing matrix displayed in Table 1.13, co-sharing of many references by the clusters may be observed. This is particularly prominent in the case of Cluster 2. In the following part of the section, the five core references within each of the clusters will be discussed more thoroughly.

Table 1.13. Core references in the clusters of high-frequency keywords related to the concept of the learning organization [ranked by the number of citations]

Reference	Citations [N]	C1	C2	C3	C4	C5	C6
Garvin (1993)	1987	1	1	-	-	1	1
Tsang (1997)	348	-	2	1	-	-	-
Garvin, Edmondson, & Gino (2008)	325	2	-	-	-	-	2
Giles & Hargreaves (2006)	156	-	3	-	-	-	-
Örtenblad (2004)	137	-	4	-	-	-	3
Ellinger & Bostrom (1999)	134	-	5	-	-	-	-
Davis & Nutley (2000)	127	3	-	-	-	-	-
Örtenblad (2001)	119	-	6	2	-	-	-
Love, Li, Irani, & Faniran (2000)	115	-	7	3	-	2	-
Kriz (2003)	111	-	8	-	-	-	4
Örtenblad (2002)	111	-	9	4	-	-	-
Hannah & Lester (2009)	107	-	10	-	-	-	5
Chang & Lee (2007)	95	4	12	-	-	-	7
Silins & Mulford (2002)	89	-	13	-	1	-	8
Schianetz, Kavanagh, & Lockington (2007)	85	-	-	-	2	3	9
Holt, Love & Li (2000)	83	-	-	5	-	-	-
Wenger (1996)	77	5	-	-	-	4	-
Chinowsky & Carillo (2007)	56	6	21	6	3	-	-
Rushmer, Kelly, Lough, Wilinon & Davies (2004)	49	7	28	-	-	5	-
Grievies (2008)	42	-	41	-	4	-	-
Metaxiotis & Psarras (2003)	42	-	45	-	5	8	-

Source: own study based on data retrieved from the Scopus database (accessed 09 April 2019).

The seminal paper by Garvin (1993) entitled *Building a learning organization* is the most cited core reference in the sample. It is also the number one publication in all the identified thematic clusters, but Clusters 3 and 4. In his paper, Garvin operationalizes the definition of the learning organization to make it valuable for business practice. Such an organization should be skilled in organizational learning processes including: systematic problem solving, experimenting, experiential learning, learning from others and transferring knowledge (Garvin, 1993). In his next paper, co-authored by Edmondson and Gino, Garvin supplements the model of the aforementioned learning processes and practices with two additional building blocks of the learning organization i.e. supportive learning environment and leadership reinforcing learning processes (Garvin et al., 2008), which directly corresponds with the humanistic aspects being

the focus of Cluster 1 (labeled as ‘humans, organizational culture and HRM’). This orientation is likewise manifested in other core references identified within the cluster. For instance, Chang and Lee (2007) apply the quantitative approach, based on the questionnaire survey, to test the relationships among “leadership, organizational culture, the operation of learning organization, and employees’ job satisfaction” (Chang & Lee, 2007, p. 155). The role of humans for learning organizations is also explored by Wenger (1996), who focuses on communities of practice, labeling them as “the social fabric of a learning organization” (Wenger, 1996, p. 20). In the remaining core reference in Cluster 1, Davis and Nutley (2000) discuss the options for developing learning organizations in the context of the health system.

In Cluster 2 (labeled as the ‘learning organization concept and its relationships with knowledge management and organizational learning’), besides the seminal paper by Garvin (1993), the other core references are the works by Tsang (1997), Giles and Hargreaves (2006), Örtenblad (2004), and Ellinger and Bostrom (1999). Tsang (1997) compares and contrasts two streams of research within the field focusing on the concepts of organizational learning and the learning organization. Finally, some recommendations for integration of the concepts are provided. Giles and Hargreaves (2006) explore the potential of the learning organization concept to support innovative schools in maintaining their long-term, sustainable advantage. Örtenblad (2004) develops his proposal of an integrated model of the learning organization consisting of such components as: “learning at work, organizational learning, developing a learning climate, and creating learning structures” (Örtenblad, 2004, p. 129). Ellinger and Bostrom (1999) discuss the role of leaders’ behaviors for building learning organizations and keeping them operating. In their qualitative study, the main focus is given to exploring coaching behaviors of managers oriented at creating learning organizations.

The comparative analysis of organizational learning and the learning organization authored by Tsang (1997), co-shared with Cluster 2, is the top core reference in Cluster 3 (labeled as the ‘learning organization in the context of management practice’). The differences between the two aforementioned concepts are also the topic of the conceptual paper by Örtenblad (2001). In his next publication, Örtenblad (2002) identifies a typology of approaches to understanding the idea of the learning organization in management literature and business practice. This typology includes four components (i.e., ‘organizational learning,’ ‘learning at work,’ ‘learning climate’ and ‘learning structure’) used later by Örtenblad (2004) to construct his proposal of an integrated model of the learning organization. Love, Heng, Irani, and Faniran (2000) discuss relationships between the concepts of organizational learning, the learning organization and total quality management in order to

develop a model of the learning organization embedded in the context of the construction industry. Similarly, the study by Holt, Love, and Li (2000) is embedded in the context of the construction industry. The researchers apply the concept of the learning organization to develop the framework for effective learning in strategic alliances formed by construction companies and they analyze a case study to illustrate the benefits of their assumptions.

As already mentioned, Cluster 4 is centered on the idea of the learning organization and the education sector context. This dichotomy is manifested among core references. Under the umbrella of the first stream of research, Chinowsky and Carillo (2007) study the relationships between knowledge management and the learning organization. They make an attempt to define the level of the knowledge management concept implementation needed to start developing for the learning organization. Grives (2008) asks a provocative question manifested in the title of his paper *Why we should abandon the idea of the learning organization?*. The author claims that the concept of the learning organization, as a very artificial construct, should be given up as a stream of research due to lack of possibilities to apply it in business practice while the research effort should be shifted towards organizational learning showing more practical usefulness. The study of implementing the idea of the learning organization in a tourism industry context by Schianetz, Kavanagh, and Lockington (2007) is the last, but certainly not least, among core references in Cluster 4. This publication seems to be a little unexpectedly categorized in the cluster. However, it can be considered as an exemplification of a practical implementation of the idea of the learning organization, which as claimed by the scholars, “have the capacity to anticipate environmental changes and economic opportunities and adapt accordingly” while using “system dynamics modelling (SDM) for both strategic planning and the promotion of organizational learning” (Schianetz et al., 2007, p. 1485). In regard to the second stream of research within the cluster, Silins and Mulford (2002) analyze Australian schools as learning organizations. They report the findings from a government-sponsored project focused on school leadership, learning processes and their impact on students’ achievements. Metaxiotis and Psarras (2003) discuss the potential of knowledge management (with the focus on ‘human-computer interaction’) to transform higher education institutions into learning organizations.

Cluster 5 (focused on ‘learning, problem-solving and the health care sector context’) shares the majority of its core references, e.g. Garvin (1993), Love et al. (2000), Schianetz et al. (2007), Wenger (1996), with other clusters. The only item not discussed before is the paper by Rushmer, Kelly, Lough, Wilkinson, and Davies (2004), who analyze the application of the learning organization idea in the context of the primary health care sector. They introduce the construct of ‘learning practices’ which “include flatter team-

The overlay visualization in Figure 1.5 points out the following keywords manifesting the particular attention of scholars, which could be considered as emerging research topics: (1) 'leadership', (2) 'education', (3) 'innovation', (4) 'learning culture', (5) 'information management', (6) 'e-learning', (7) 'hospital', (8) 'quality improvement', (9) 'personnel management', and (10) 'staff development'. Taking these findings into account, firstly, the identified items (such as 'leadership,' 'learning culture,' 'personnel management' and 'staff development') confirm the growing interest of researchers in human-related aspects of managing learning organizations. Secondly, the issues related to change management concepts are appreciated by academia as an interesting area of exploration, which is manifested in such expressions as 'innovation' or 'quality improvement.' Thirdly, 'information management' (IM) is reported among these emerging topics, which may be caused by the supporting role IM plays for efficient and effective knowledge management processes. Fourthly, education and health care sectors are confirmed as the contexts of particular interest among the scholars cultivating the learning organization research field. This tendency is manifested by such expressions as 'education,' 'e-learning' or 'hospital' identified among emerging topics.

The aforementioned findings are confirmed by the systematic literature survey of the core (i.e., the most cited) references within the 2010s sub-sample. For instance, Jo and Joo (2011) test the role of organizational culture, organizational commitment and organizational citizenship behaviors for knowledge sharing. In their quantitative study, Park, Song, Yoon and Kim (2014) test the mediating role of work engagement and validate the cause-effect relationship between the variables of the learning organization culture and innovative behaviors of employees. In their qualitative study, Mishra and Uday Bhaskar (2011) compare knowledge management practices in 'high learning' and 'low learning' organizations operating in the IT industry. Örtenblad and Koris (2014) consider, from the perspectives of managers, employees and the society, whether the concept of the learning organization is applicable to higher education institutions. In their conceptual paper, Bui and Baruch (2010) develop the theoretical model explaining the antecedents and outcomes of the five components (disciplines) of the learning organization framework proposed by Senge (1990). Weldy and Gillis (2010) test the differences in perceiving the dimensions of the learning organization by members of organizations (managers and employees) of different levels in the hierarchy. Liao, Chang, and Wu (2010) develop and discuss a model of the learning organization in the context of a knowledge-intensive industry. Caldwell (2012) questions the weaknesses of the Senge's concept of the learning organization, makes an attempt to reconceptualize it into "a concept of organizational learning as a process of system-based organizational change",

but finally comes to the conclusion “that Senge’s concept of the learning organization now faces its final abandonment as a theoretical and practical guide to organizational change” (Caldwell, 2012, p. 145). The composition of core references confirms the identified research interest of academia in studies on learning organizations embedded in the context of education (Law, Yuen, & Fox, 2011; Örtenblad & Koris, 2014) or the health care industry (Bayley et al., 2013).

In spite of the aforementioned negative opinion expressed by Caldwell (2012) in regard to the potential of the learning organization idea, the concept still attracts new ranks of scholars. A short survey of the publications indexed in Scopus, which were issued in 2019, confirms this observation. Among them, there are conceptual papers, e.g. the study by Al Saifi (2019) aimed at discussing the influence of the learning organization (operationalized in Senge’s five disciplines) on knowledge management processes. Cunha and Clegg (2019) explore the issue of improvisation in the context of learning organizations. Arnesson and Albinsson (2019) discuss the applicability of the model of reflective talks in organizational learning processes. Pedler and Hsu (2019) revise the concepts of the learning organization and organizational learning and propose a new paradigm to understand the concepts. Antonacopoulou, Moldjord, Steiro, and Stokkeland (2019a) offer a reconceptualization of the learning organization concept in response to the challenges of volatility, uncertainty, complexity and ambiguity (VUCA) conditions. Their concept combines the principles of ‘institutional reflexivity,’ ‘high agility organizing’ and ‘learning leadership.’ Traditionally, research interest is observed in the contexts of education (Gil, Carrillo, & Fonseca-Pedrero, 2019; Moloj, 2019; Silva & Garcia, 2019) and the health care industry. However, military organizations emerge as a new area of exploration for the practical implementation of the learning organization idea (Antonacopoulou, Moldjord, Steiro, & Stokkeland, 2019b; Dyson, 2019).

6. Discussion

The learning organization has been one of the buzz-words within management theory and practice for the last thirty years, which has resulted in amassing research productivity in the field. Combining together the number of publications related to the idea of the learning organization issued between 1990 and 2018, and the citations they received, a hypothesis may be derived that the research field has achieved its maturity stage or a least a temporary stabilization of its growth rate has been observed recently. These findings based on data retrieved from the Scopus database go along with the analysis

outcomes of a similar study conducted by Lis (2017) on the Web of Science Core Collection research sample.

This study has been focused on identifying leading and emerging topics of inquiry in the research field related to the concept of the learning organization and discussing the research status within the identified leading areas. As a result of co-occurrence analysis of high-frequency keywords, six leading thematic clusters within the research field have been found: (1) ‘humans, organizational culture and HRM’; (2) ‘the learning organization concept and its relationships with knowledge management and organizational learning’; (3) ‘the learning organization in the context of management practice’; (4) ‘the learning organization and the education context’; (5) ‘learning, problem solving and the health care sector context’; and (6) ‘leadership, management and organizational change’. The findings from the frequency analysis of keywords cited in the publications issued in the 2010s, combined with the analysis of the most up-to-date core references, indicate the following emerging topics within the research field: (1) human-related aspects of managing learning organizations; (2) change management concepts; (3) information management; (4) studies within the context of the education and health care sectors.

As already mentioned in the introduction section, literature reviews cannot be considered as effective as bibliometric methods in the comprehensive mapping of research fields. Nevertheless, literature reviews indicating some trends and tendencies may be used to triangulate the findings from bibliometric studies. Therefore, discussion of the findings from this study will refer to earlier systematic or narrative literature reviews as we have found no other bibliometric studies exploring and mapping the research field focused on the concept of the learning organization⁴.

Among the papers comprising the research sample, there are 23 publications mentioning literature review as a research method in their titles, keywords, and abstracts. Analysis of these items shows that the search for the gist and characteristics of the idea of the learning organization is an observed tendency, which goes along with one of leading topics identified through bibliometric methods. This approach is found among others in the study by Grieves (2008), who asks a provocative question “why we should abandon the idea of the learning organization?”. Critical analysis of the learning organization concept against the features of a ‘good’ theory is provided by Santa (2015). Anwar and associates develop a conceptual framework of the learning organization based on knowledge, wisdom, leadership, and vision (Anwar, Hasnu, & Janjua, 2013). The role of human-related issues, such as empowerment, teamwork, trust, communication, and commitment, in the process of evolution towards the learning organization is highlighted by Jamali and associates (Jamali, Houry,

4 The author is grateful to the anonymous reviewer for this suggestion.

& Sahyoun, 2006). Discussing measures and measurement tools is also worth mentioning (Jamali, Sidani, & Zouein, 2009; Kim, Egan, & Tolson, 2015).

Similarly, to the findings from bibliometric studies, exploring relationships between the concepts of organizational learning and the learning organization is the topic of the integrative literature review conducted by Song and associates (Song, Jeung, & Cho, 2011).

Often, the findings from literature reviews aimed at exploring characteristics, manifestations, and measurements of the learning organization are used as a foundation for comparing and contrasting particular cases of business practice against the theoretical model. Such an approach is observed for instance in studies of the learning organization concept in the context of a developing country (Jamali & Sidani, 2008; Jamali et al., 2009). The Korean context is used to study the relationships between the learning organization environment and individual, team, and learning processes (Song et al., 2011).

In regard to research contexts, in general, the outcomes of the analysis of literature reviews show similarities with keywords co-citation analysis findings. For instance, Jain and Mutula (2008) discuss libraries as learning organizations and derive implications for managing organizational knowledge. The sector of higher education institutions is used as the context of the studies testing the antecedents of learning organizations identified through a literature review (Chawla & Lenka, 2016) or the influence of gender on perceptions of the learning organization (Kalkan, 2017). The study by Örtenblad and Koris (2014) revises 73 prior publications focused on the relevance of the concept of the learning organization in higher education institutions. The number of papers included in this review may be considered as another confirmation of identifying the education sector as one of the leading contexts of research on learning organizations. Similar evidence is provided in the case of the health care industry (Akhnif, Macq, Idrissi Fakhreddine, & Meessen, 2017; Sheaff & Pilgrim, 2006). In the literature reviews under the study, some other research contexts omitted in the bibliometric analysis are found, e.g. law enforcement organizations represented by police agencies (Filstad & Gottschalk, 2010) or the ecology industry (Chen, Wang, Lin, & Chang, 2018).

In spite of numerous aforementioned similarities, analysis of literature reviews indicates some topics, which have not received so much attention in bibliometric studies, e.g. sustainability and social responsibility issues. Relationships between the concepts of the learning organization, and sustainability and corporate social responsibility are the topics of literature reviews by Jamali (2006) and Velazquez and associates (2011) and the review completed by the case study of Marks and Spencer (Wilson & Beard, 2014).

Generally, the comparative analysis of the findings from bibliometric studies and literature reviews confirms the presence of the leading topics

(e.g., the gist and characteristics of the learning organization concept, its relationships with organizational learning, and the role of human-related aspects for its development) and research contexts (e.g. education and health care industries) in both categories. Certainly, some leading or emerging topics identified in bibliometric studies (e.g., organizational change or information management) are not so visible as others in literature reviews.

Comparing and contrasting findings from bibliometric studies and literature reviews, there is a need to stress that bibliometric studies, based on the quantitative analysis of large amounts of publication data, offer a higher level of objectivity but lower thoroughness. Moreover, the advantage of bibliometric methods is the visualization of relationships among the items in the research field and strength of these relationships.

7. Conclusions

Summing up, the study has: (1) identified the trends in productivity of research publications focused on the concept of the learning organization, (2) identified the leading topics of inquiry in the field (3) identified emerging topics in the field (4) discussed the research status within the identified leading topics of inquiry. Mapping of leading and emerging research topics contributes to a better understanding of the concept of the learning organization and amassing scientific output in the field. The originality and innovativeness of the paper results from using bibliometric methodology to map the research field. Neither Scopus nor Web of Science databases have included similar studies, so far. From the perspective of research professionals practicing in the field, such knowledge may be of unprecedented importance while planning further study projects. Due to its conceptual character, the paper's implications for the theory of the research field are more visible than those for business practice.

Nevertheless, some added value created by the paper for business practitioners should be mentioned, too. Identifying leading and emerging topics of research contributes to raising awareness of areas important for building and developing learning organizations. Such awareness may become a trigger to compare and contrast research findings with the reality of organizational life and submit the proposals of unresolved business problems for further scientific inquiry that, in consequence, leads to closing the cooperation loop between business practice and academia.

Summing up, the limitations of the study and directions for further research should be discussed. Firstly, although the combination of methods was applied in the research process, the quantitative approach employing keywords co-occurrence analysis was dominant. In consequence, a wide but sometimes not sufficiently thorough discussion of particular research trends

is achieved. Therefore, supplementing this paper with ‘deep dive’ systematic literature reviews focused on selected thematic clusters or emerging topics seems to be a logical solution. Secondly, the study is based on data from only one database, which creates room for further replications with the use of other sources of bibliometric data. What is more, the Scopus database is very much biased to English language publications. Therefore, mapping subject literature produced in languages other than English could be an interesting and valuable contribution to bibliometric inquiries. Thirdly, discussion of core references points out publications expressing open criticism and questioning the assumptions of the learning organization concept. As constructive criticism is a force supporting scientific discussion, a systematic literature survey of such works could bring inspiration for the further development of the research field. Finally, exploring the identified emerging research topics with both conceptual and empirical studies seems to be worth considering.

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Identification of customer values in the business models of hotel enterprises

Małgorzata Sztorc¹

Abstract

The article discusses the importance of a business model oriented on building a competitive advantage by creating value for hotel guests. Strengthening the competitive position and upholding the market determines the need for enterprises to monitor the expectations of buyers in order to undertake adaptation activities within the benefits offered to them. For this reason, the process of managing a modern hotel should be focused on creating value for the client. The aim of this article is to identify elements that create value for the client in the form of business model components from the perspective of hotel enterprises. The survey was conducted using a questionnaire method with CAWI (Computer Assisted Web Interview) technique with the use of a self-developed questionnaire. The survey was conducted among 543 respondents from three-, four- and five-star hotels with Polish and foreign capital. In the next stage of the study, Pearson's linear correlation coefficient was calculated using the STATISTICA program. Research results can be an inspiration to improve competence in creating value for the client among hotel management companies. The issue presented in the article is an attempt to fill the research gap indicating that creating value for the client should be implemented by taking into account determinants that stimulate the dynamics of business models of hotel enterprises. Nowadays, the modern method of enterprise management, referred to as the pattern of decision-making activities, which favors building a competitive advantage and achieving market success by creating value for the client is a business model.

Keywords: *business model, value for the client, competitive advantage, value chain, hotel industry.*

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1. Introduction

Nowadays, in a competitive market, enterprises perceive the sources of competitive advantage in various spheres of functioning. These include innovation of the offer, image, brand, modern distribution channels, and price competitiveness. Nevertheless, the most important element of advantage is the way of planning and conducting activities so that they are oriented to create value for the client. This type of activity has been gaining recognition in the last years as the concept of a business model that presents and identifies the mechanism of the company's operation. The business model is treated in the subject literature and practice as one of the key sources of competitive advantage. It should be noted that individual concepts of managing entities focus on the process of a continuous striving for value growth. In turn, all enterprises operate in the market according to the appropriate model, which determines the rationality of running a business. The rationality of this kind results from the combination of values created for the client and the values taken over by hotel enterprises. In contrast, emerging business opportunities are a component of client value. Thus, effective business models functioning in the modern economic system are a priority element on which the ability to create value for the client and the enterprise is based. Currently, every organizational design process is initiated by actions involving the creation of business models. It consists of the original types of relations occurring between the diverse resources and activities in a hotel enterprise, in which the rational creation of revenues depends on providing the appropriate value proposition for the client.

Identification of value for the client is (apart from generating profits) the basic attribute of an effective business model that creates the possibility of gaining a competitive advantage. Contemporary literature on the subject does not indicate one type of business model with the same structure. On the other hand, the previous studies of the analyzed concept integrate the value proposition for the client from the perspective of a key component. The applied composition of financial and non-financial determinants enables one to build a competitive advantage conducive to creating value. The condition for its achievement is to have the ability to generate and provide clients with services perceived as a source of fundamental value. Therefore, the process of its creation by means of a business model is perceived by theoreticians and management practitioners as a source of competitive advantage.

Nowadays, hotels operating in the market should implement innovative solutions to offer services from the perspective of achieving the greatest potential for accumulating value and gaining client experience. Thus, the presentation of analyzed issues in the form of the ability to create new values

for clients in accordance with the adopted business model reflects the essence of the studied issue.

The article attempts to identify components that create value for the client, which occur in business models of hotel enterprises and are a source of their competitive advantage. In this respect, a survey was conducted using a questionnaire method with CAWI (Computer Assisted Web Interview) technique with the use of a self-developed questionnaire. The source material was data obtained during the empirical study carried out between October 2018 and January 2019 among respondents from 543 hotel enterprises operating in the Polish market. Then, the statistical analysis method was used, which was applied to the numerical assessment of the correlation force using Pearson's linear correlation coefficient. It was subjected to a test, which was aimed at assessing the statistical significance of the obtained data. The analyses were carried out using the STATISTICA statistical package.

The issues addressed in this article have not yet been the subject of research conducted for the hotel market. Therefore, its aim is to fill the gap in the research on creating value for the client in business models adopted by hotels.

2. Literature background

Turbulent changes occurring in the modern environment of enterprises require finding appropriate methods and ways of hotel management. A significant role in their creation has been the concepts of creating competitive advantages resulting from the use of appropriate business models. In the subject literature, the term business model has been used since the middle of the 20th century. It was first used in 1957 during the presentation of a model for mathematical simulation of income sources, showing the enterprise functioning in a business game (Bellman, Clark, Malcolm, Craft, & Ricciardi, 1957). In turn, the precursor, who for the first time used this term in the title of the article, was G.M. Jones (1960). In the following years, this concept was usually used in works on information technology, e-business, and business process modeling. Then, in 1975, the business model was used as a business management tool (Konczal, 1975). A significant increase in interest in this type of subject has been observed since the second half of the 90s of the 20th century.

Currently, there are many definitions that divergently define the business model (Osterwalder, Pigneur, & Tucci, 2005) and characterize its elements in a narrower or broader range (Zott, Amit, & Massa, 2011). Usually, in the studies, the author's definitions of the business model are accepted, which best correspond to the subject of study. Nevertheless, among all authors dealing with this type of issues there is unanimity in relation to the circumstances of

having a business model by each enterprise, regardless of whether it is shaped consciously or accidentally (Teece, 2010); (Chesbrough, 2007).

From the conducted literature review of selected definitions of the business model, the authors present the following positions. According to them, the business model is a:

- composition of key strategies, strategic resources and value networks related to clients (Hamel, 2000, p. 74);
- heuristic logic that combines the technical potential of the enterprise with implementation of economic value (Chesbrough & Rosenbloom, 2002, p. 11);
- description of how resources are combined and transformed to generate value for stakeholders and how the company will be rewarded by stakeholders in exchange for the values provided to them (Magretta, 2002, p. 87);
- method of expanding, using resources, providing clients with a product/service offer, the value of which exceeds the offer of competition and which at the same time ensures the company's profitability (Afuah & Tucci, 2003, p. 20);
- coordinated action plan aimed to create a strategy that meets client expectations through the optimal use of resources and business relationships (Linder & Cantrell, 2004, p. 7-9);
- set of activities that the company carries out, the methods and time of conducting them, using the resources creating the highest value for clients and enabling the interception of values (Afuah, 2004, pp. 9-10);
- pattern according to which organizations transform the given strategic choices (concerning markets, clients) into value and with the help of which they can create and appropriate value by using the organizational architecture (Smith, Binns & Tushman, 2010, p. 450);
- essence of managing transactions in such a way as to create value through the use of business opportunities (Amit & Zott, 2010, p. 217);
- logic of creating and delivering value to clients through business (Teece, 2010, p. 173);
- indication of how the company identifies and creates value for clients and captures part of this value in the form of income (Casadesus-Masanell & Ricart, 2010, p. 196);
- premises behind the way in which the organization creates value, as well as provides and derives profits from this generated value (Osterwalder & Pigneur, 2012, p. 14);
- the organization's ability to capture value that contributes to a competitive advantage (Casadesus-Masanell & Heilbron, 2015, p. 17);
- structured image of the anticipated mechanisms and values, indicating the way in which a business should succeed on the competitive arena and lead to improvement of the strategy at the business level (Wunder, 2016, p. 222).

Generally, the concept of a business model presents a diagram of an idea for business by comparing the relations between its individual components. Their co-existence and co-operation enables the creation and provision of value for the client and then also for the enterprise. Thus, it takes the form of a relatively static model of the event, in contrast to strategy that indicates a way the company operates and reacts to the changing conditions of the external environment and internal organization. Basically, the business model is a priority concept for interpretation of how entities operate and for creating value.

From the analysis of the above definitions, it can be concluded that value creation is the basic element that defines the essence of a business model. Therefore, it is presented using a specific set of modules that collectively form a typical business plan. The subject literature proposes various types of components that make up the business model. A typical statement was constructed as a result of the analysis of twelve definitions, on the basis of which forty-two different elements were identified. According to the frequency of their occurrence (minimum two times), the authors then formulated four key components of the business model which they scored (see Figure 1.6) (Shafer, Smith, & Linderb, 2005):

- strategic choices (proposition of the company's value, abilities and competences as well as the offer of products and services) that combine with the basic specificity of a business and determine the basic logic of the company's operation;
- network of values (relations with suppliers, clients, distribution of information, and flows of raw materials and products), which present causal-related network relations taking into account the network potential;
- creation of value (creation through resources and processes), which occurs as a result of the factual management of resources and business processes;
- capture of value (cost and profit function), which is generated by achieving economic efficiency as a result of potential engagement.

The individual components of the model are mainly used to create value for the company's success. The business model presented by the authors is a source of strategic decisions related to the configuration of only those resources and skills that are necessary for effective implementation of the processes of creating, supplying and capturing values. Thus, the business model is to some extent an outline of the strategy that should be implemented in the company's structures, procedures, and systems. In addition, it reflects strategic choices related to business conduct, which should be consistent, causal, guaranteeing financial stability of the entity and ensuring appropriate relations with the environment and partners enabling access to external resources (Shafer, Smith, & Linderb, 2005).

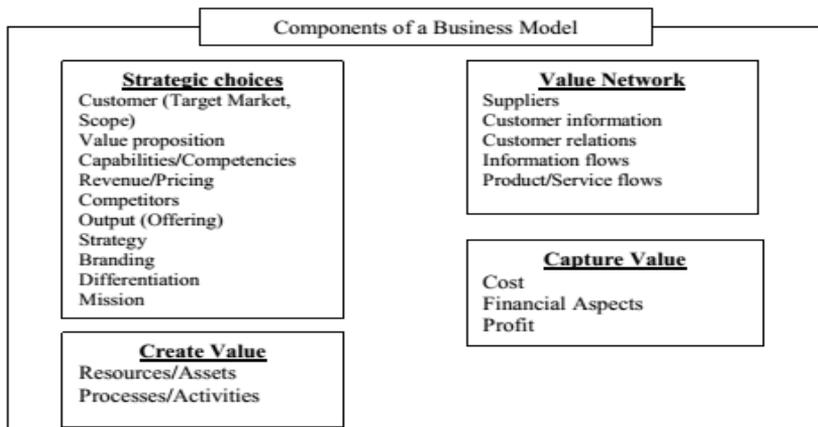


Figure 1.6. Elements of the business model

Source: Shafer et al., 2005 (p. 202).

On the basis of separated components, the business model was defined as a representation of the basic business logic and strategic choices in the creation of values within the network of its creation (Shafer, Smith, & Linderb, 2005, p. 204). The authors of the presented concept capture the business model from the perspective of a key strategic management tool, which is also necessary for the operational functioning of the company.

Another proposition also includes four basic components of the business model. The first is defined value for the client, i.e. the way in which the value is provided to the buyer, resulting from solving the problem defined by him. The next element is the profit formula that answers the question of how the company should create its own value by creating and providing value to the client. The third category is based on the key resources: human, technological and product, equipment, brand, or elements necessary in the process of providing the offer to a selected market segment. The last component of this type of business model is key processes, which include training, development, production/services, planning, sales, budgeting, and customer service. Through them, the company can systematically provide value to its clients by increasing sales volumes (Johnson, 2018, pp. 11-16).

The next concept of business model fragmentation also classifies four essential components that answer the following questions: 1) Who is the client, the recipient of the offer? 2) What constitutes an offer addressed to a given market segment and what the buyer considers valuable in it? 3) How is it created? and is value provided for the client? 4) Value, i.e. how the value stream

is generated, what value is offered and how the profit is maximized (Gassmann, Frankenberger, & Csik, 2014, p. 91). All the components of the business model proposed by the authors can be attributed to the adequate position appearing in the value chain, which was proposed in 1985 by Porter (1985, p. 37).

For the purposes of this study, it has been assumed that the business model is a list of appropriate (usually four) components that determine the components related to creating value for the client and the enterprise. The result is determined by strategic choices that affect the future tactics of the organization. Considerations of value creation for the client should begin with an analysis of the Porter value creation chain, which is a proposal of the enterprise model, as a system presenting its complete value. The key components that form the basis of this concept are categories of value and added value. According to M.E. Porter, the value chain is a set of organizational activities carried out in order to design, produce, provide to the market, and sell final goods and support activities (Kumar & Rajeev, 2016, p. 74). All activities carried out through it include various activities in terms of nature and technology used, by means of which the company generates good value for its clients (Porter, 2006, p. 66). Thus, every action taken successively (in a chain) adds some value to the product intended for the client. The complete value chain consists of nine groups of valuable activities, five of which are basic activities and four are supportive. M.E. Porter distinguished two groups of activities: 1. main – basic (internal logistics, production, external logistics, marketing and sales, service), 2. supporting – auxiliary (supply, research and development, human resources management, company infrastructure) (Porter, 1985, pp. 57-59).

In the subject literature, the value chain is variously defined, but the key element appearing in all formulations is the indication of creating added value (for the client), which is a consequence of the logically planned processes implementation. While analyzing the concept of the value chain, it should be stated that it enables the systematic observation of sources of value generated for the buyer (enabling demand for higher prices) and to determine why a specific product/service may be displaced from the market by another (Porter, 2006, p. 22).

In conclusion, it should be stated that such a concept is a cycle of processes and relations (internal and external) of the company that creates the value expected by the client. In turn, the value creation system should be understood as a set of activities contributing to generate value for the client (Parolini, 1999, p. 31).

The key element of the value chain and business model, or creating value for the client, was first used in the field of economic sciences in 1954 by Drucker. According to the author, this type of value is created by product attributes and enterprise characteristics. Among the elements shaping the value, he distinguished: price, durability, cleanliness, reliability, punctuality,

and reputation (Drucker, 1994). The value is also a measure of the buyer's satisfaction with the quality, reliability, and price of the product/service (Crum, 1973, p. 33). For this reason, it should be analyzed as a sum accepted for payment by the buyer in return for a satisfactory product or service received from the supplier (Kafel & Lisiński, 1995, p. 17). In addition, it is a measure of client satisfaction with the quality, reliability, and price of the product/service offered by the hotel (Choi, 2001, p. 10).

Nowadays, this term is formulated in various ways. Nevertheless, there are two main approaches to perceive value for the client. The first considers the value from an economic perspective as a comparison between the product quality and the price, the benefits received and the price level or the client's acceptance of the lowest price (Anderson, Kumar, & Narus, 2010, pp. 36-39) (Smith, 2002, p. 36). Among definitions representing this type of group, the interpretations regarding the benefits that buyers receive in relation to the products use should also be mentioned (Woodall, 2003, p. 10). In turn, the second set of definitions determines the value in terms of the criterion measuring the level of client satisfaction from the purchase of a product or the level of savings that occurred by selecting a given offer (Nagle & Holden, 2013, p. 114). The proper creation of values is determined by the type of needs that the buyer intends to satisfy, mainly in economic, emotional, technical and socio-ethical terms (see Table 1.14).

Table 1.14. Parameters that distinguish the value for the client

Value type for the client	Distinguishing features
Emotional values	Beauty, pleasure, desire, love
Technical values	Durability, efficiency, usefulness, easiness
Economic values	Attractive price, availability, convenience of payment terms, delivery time
Socio-ethical values	Impact on the environment, quality of life, company responsibility for the product, marketing manipulation of clients

Source: Falencikowski, 2013, p. 60).

In the subject literature, for the purposes of value analysis, the authors mainly use Porter's value chain. However, it is also possible to notice value creation models referred to as a value network and a value store. These types of methods define activities that supply processes into products/services (value chain) by solving client problems (store values) or connecting clients (value network) (see Table 1.15).

Table 1.15. Attributes of customer value creation models

Parameter	Value chain	Store values	Value network
Logic of creating value	Transforming raw materials into tangible products	Solving client problems	Connecting clients
The basic system of creating value	Linear	Intense	Mediatory
Basic categories of activities	Logistics of inputs, operations, exit logistics, marketing, services	Identification and adaptation of the client's problem, generation of problem solutions, choice of solution, execution, control, and evaluation	Network promotion and contract management, provision of services, network infrastructure operations
Relationship logic	Sequential	Cyclic	Simultaneous, parallel
The basic interdependence of activity	Collective, sequential	Collective, sequential, mutual	Collective, mutual
Main cost factors	The scale of production, the use of production capacity	–	The scale of production, the use of production capacity
Main factors of value	–	Reputation	The scale of production, the use of production capacity
Structure of the business value system	Related to each other in a chain	Specified in the store	Layered and connected in a network

Source: Stabell & Fjeldstad (1998, p. 415).

Customer value is relative, as the selection of a specific assortment is usually preceded by the recognition of competing offers (Anderson et al., 2010, p. 131). Among the valuable activities undertaken by enterprises, it is necessary to differentiate in terms of the scope of tasks and technologies. Elements of this type are the basic determinants by which the company produces valuable products/services for its clients (Porter, 2006, p. 66).

Analysis of the literature indicates that creating value for the client is one of the most important elements of the business model that determines the market existence of the company.

3. Research approach and methods

The subject of the conducted research was to recognize the components of value creation for the client, which appear in business models and constitute the main source of creating a competitive advantage of hotel enterprises

operating in the Polish market. In view of the objective set, a study was carried out which concerned:

- verification of the representatives' position in hotel companies operating in the Polish market: 1. in terms of perceiving value for the client, 2. designating sources of value for clients;
- determination of the potential value of service as a properly constructed bundle of values for the client;
- recognition of mechanisms to identify the client values from the perspective of hotel enterprises.

The survey was conducted using a questionnaire method with the use of the author's questionnaire. The data was collected using the CAWI (Computer Assisted Web Interview) technique of the online tool monitored by the LimeSurvey system, which is based on the server-respondent system. The electronic version of this questionnaire was distributed among addressed hotel enterprises from the level of online platform. The feedback of responses took the form of a matrix of data created in real-time by the respondents. The use of this kind of research method was acceptable because all hotels in the higher (five and four-star) and medium (three-star) segment of the market have access to the Internet. The initial stage of research consisted of sending out invitations to participate in the survey by electronic means to 543 owners, directors or managers (respondents) of hotel companies operating in the Polish market. The invitation included: a cover letter, basic information on the study, and a link to the CAWI questionnaire with instructions for filling in the questionnaire. For this purpose, e-mail addresses available in the Register of Hotel Facilities operated by voivodships' marshals appropriate for the location of hotels were used. Messages were sent to hotels from the three, four and five-star segments. Four e-mails were sent in the same several-day intervals. Only one respondent from a given hotel company could participate in the study. Then, after filling in the questionnaire, the answers were imported to the results database. A total of 376 filled in forms were received (feedback rate 69%). The next stage of research was verification of the correctness, in relation to which 63 questionnaires were eliminated from further research. Finally, 313 (39%) of correctly filled in questionnaires were obtained, which were qualified for the final analysis. After the respondent had filled in the questionnaire, a message of acknowledgment was sent to the e-mail address. The choice of this type of method was made due to the short-term duration of research and their relatively low cost.

The research tool was the author's questionnaire, which consisted of 21 questions and was divided into three thematic parts: 1) interpretation (understanding) of the value of services, 2) determinants of the sources of value for the client, 3) activities related to the creation of a value chain (e.g.

hotel guest service forms) in the business model. In the survey, single- and multiple-choice answers were used.

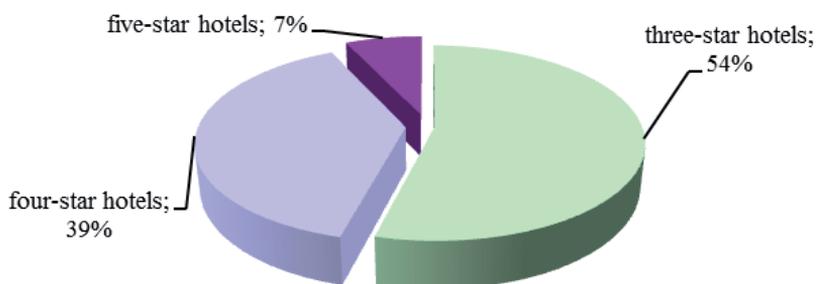


Figure 1.7. Structure of the surveyed enterprises according to the standard (%)

Both closed and open questions were applied. The final part of the form was supplemented with questions from the questionnaire, which concerned the occupied position of the respondent, possessed capital, legal form, number of employees, year of establishment. All respondents subjectively assessed the individual criteria. Then, the evaluations obtained on the basis of their responses were subjected to aggregation, structuring, absolute and indicative valuation.

Respondents referred to statements contained in selected questions using the five-point Likert scale. Individual statements were attributed to indexes expressed in value from 1 to 5. In the survey, point 5 received answers – I definitely agree, 4 – I rather agree, 3 – I do not have an opinion, 2 – I do not agree, 1 – I definitely do not agree. As a result of indexing the obtained answers, descriptive statistics (weighted average) were used to determine the general parameter of a given opinion. Individual rankings enabled precise classification of statements for individual questions (from the highest to the lowest). Obtained declarations of respondents were used to determine the assessment level of the impact of particular components of value for the client.

Research was carried out from October 2018 to January 2019 among 168 three-star, 124 four-star and 21 five-star facilities. Their percentage share is shown in Figure 1.7. The majority of respondents were enterprises with Polish capital – 175 hotels (56%). In turn, 78% of the surveyed entities have been operating in the market for over 15 years. A significant time of hotel operation helps to acquire knowledge from the perspective of understanding the organization's environment and changes taking place in it. On the other hand, considering the synthetic nature and the nationwide nature of research, their cognitive potential can be indicated.

In order to verify the hypotheses and objectively identify the value for the client, the sets of indicators available in the subject literature were used. The value for the client in hotel services was determined by the following equation (Brilman, 2002, p. 95):

$$\text{value for the client} = \text{quality indicator} * \text{weight of the quality indicator} + \text{price index} * \text{weight of the price index} + \text{relation ratio} * \text{weight of the ratio-cost ratio}$$

where: the quality ratio indicates the level of quality treated as the value of satisfaction index, which takes into account all other characteristics than the price. Thus, it includes both the service provided and multi-level customer service – relations and communication during three stages of sales: before, during and after the stay in a hotel (Żabińska, 2004).

In turn, in the analysis of the importance of features/value elements for the client, the following indicator was used:

$$W_w = \frac{M}{m} \quad (1)$$

where: W_w – value ratio for the client, M – average value of features/elements of the offer, m – maximum value of the adopted Likert scale (the best possible rating).

The average value of features/elements was calculated on the basis of the average assessment of the importance of features/elements of the offer for clients in individual areas and is made using the Likert scale. The average value is calculated by adding the assessment value of individual components from a given area and dividing the sum obtained by the number of components. The ratio can take values from 0 to 1, the higher the ratio's value, i.e. $W_w = 1$, the more important the features/elements of the offer in the selection made by clients are (Konieczna, 2017, p. 72).

In turn, the following formula was used to identify the mechanisms of hotel service value:

$$W_t = \frac{M}{n} \quad (2)$$

where: W_t – hotel service value index, M – average number of indications, n – number of entities participating in the survey. The average number of indications is measured by means of indicators that make up the material elements and intangible services. In order to calculate the average, the number of indications of particular components of a given factor was added, and then the sum obtained was divided by the number of entities that made the same indications. The W_t index may take values from 0 to 1, the

higher the index, i.e. $W_t = 1$, the more actions are taken within a given factor (Konicieczna, 2017, p. 74).

The Pearson's linear correlation coefficient was also used to analyze the obtained data and its significance was verified in accordance with the following formula:

$$r_x = \frac{C(X,Y)}{\sqrt{S_X^2 \cdot S_Y^2}} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \cdot \sum_{i=1}^n (y_i - \bar{y})^2}} = \frac{C(X,Y)}{S_X \cdot S_Y} \quad (3)$$

$C(X, Y)$ – covariance between characteristics X and Y, variance of characteristics X, variance of characteristics Y, standard deviation of characteristics X, standard deviation of characteristics Y.

It is used when both variables are measurable and have a similar distribution to normal, and the relation is linear. It is assumed that if the absolute value of the correlation coefficient is closer to unity, the correlation relation between the variables is stronger. Obtained answers to the questionnaire were used to calculate indicated factors. Their values are shown in the figure and tables.

4. Discussion and results

The business model of a hotel enterprise is a complex conceptual pattern, which the key intention is to specify the real elements of value creation. As a consequence, the process of creating a business model should refer to the answer to the question: what kind of values does a hotel guest expect? This type of position enables one to adjust the hotel's service offer to the buyer's expectations. Thus, it enables a temporary competitive advantage to be obtained.

Focusing attention on the client's capital, as a determinant of the entity's value growth, affects the modification of the management approach and the ability to assess the effectiveness of hotel operations. Among the comprehensive methods of its valuation, in accordance with the customer value management approach, financial and exploratory indicators are used. The modern solution is to analyze the elements of the business model that contribute to the creation of value. This type of paradigm takes into account the description of value offered by the hotel to the buyers of services. For this reason, during the research, client value was recognized, which is considered by hotel companies as the main motive for building a competitive advantage in the adopted business models. The individual stages of research, including analysis and reasoning, are presented in Figure 1.8.

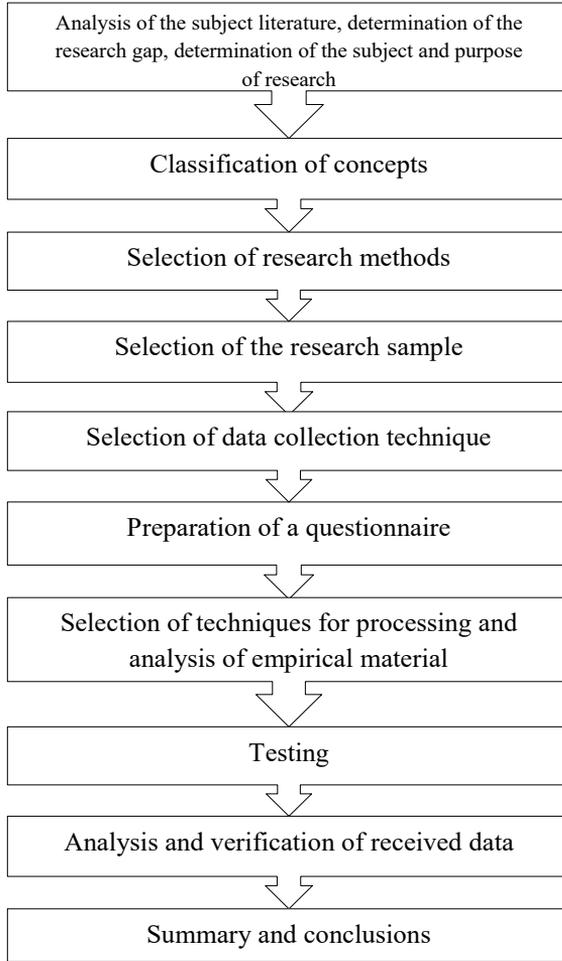


Figure 1.8. Stages of research proceedings

The first stage of research shows that all respondents (56% of enterprises with Polish capital, 44% of hotels with foreign capital) have made various attempts to implement the concept of creating value for a client in hotel services. However, respondents defined the concept of value offered to buyers differently (see Table 1.16).

Table 1.16. Interpretation of values for the client

Definition	Hotel with Polish capital (N = 175)	Hotel with foreign capital (N = 138)
The value for the client is ...		
1. satisfaction of hotel guests, satisfaction resulting not only from the service price but also service, the quality of products sold and the standard;	21	13
2. difference between benefits that the client has received and the financial and non-financial costs of access to the offer;	15	18
3. usability, or how the service meets the expectations of the buyer;	14	12
4. type and degree of client satisfaction, obtained from the product function by the person making the selection, using the services;	11	7
5. preferences, evaluation of product attributes and assessment of consequences resulting from its use, which help the buyer reaching the objectives set;	10	9
6. assessment of the hotel's potential in order to know the requirements for the service;	9	14
7. credibility and reliability of the hotel;	7	3
8. well-known brand of hotel;	5	11
9. cleanliness, order, good gastronomic services;	4	6
10. quality of services offered;	4	7

Among the respondents, there were difficulties in defining the concept of value. The majority of respondents from hotels with Polish capital (12%) indicated that the term concerns the satisfaction of hotel guests, i.e. their satisfaction with offered services, which is the result of proper service, quality, standard, and not just an affordable price. In turn, 13% of the hotels surveyed with foreign capital recognized that the value for the client means the difference between the benefits that the buyer received and the financial and non-financial costs of access to the offer. Observations regarding the category of values for the client summarized in Table 1.16 can be classified according to four key options: usability – satisfaction with services, quality of offer in relation to price, offer level and service of hotel guests (reputation, professionalism).

Based on the data from Table 1.16, the value of linear correlation coefficient was calculated indicating the strength and direction of dependencies between individual features according to the following hypotheses (see Table 1.17).

H0: the null hypothesis indicates that the linear correlation coefficient between the values given by respondents for hotels with Polish capital and foreign capital is statistically insignificant (equal to the statistical zero)

H1: an alternative hypothesis indicates that the linear correlation coefficient between the values given by respondents for hotels with Polish capital and foreign capital is statistically significant (different from zero).

Table 1.17. Pearson's linear correlation coefficient – interpretation of values for the client

	Hotel with Polish capital (N = 175)	Hotel with foreign capital (N = 138)
Hotel with Polish capital (N = 175)	1	0.602119
Hotel with foreign capital (N = 138)	0.602119	1

Note: $\alpha = 0.05$ assumed significance level, $t = 2.160$; t-Student statistic for $10-2 = 8$ degrees of freedom; significance level 0.05 read from tables.

In turn, the critical value of the correlation coefficient is:

$$r^* = \sqrt{\frac{(t^*)^2}{n-2+(t^*)^2}} = 0,539 \quad (4)$$

The research shows that $|r| = 0.602 > r_{\text{critical}} (0.539)$, and therefore the null hypothesis should be rejected and the correlation coefficient is statistically significant. Values provided by respondents for hotels with Polish capital and foreign capital are significantly correlated. It can be assumed that in the case of both types of hotels respondents provided similar answers.

During the next stage of research, respondents were asked to indicate determinants that determine the sources of value for clients of hotel enterprises (see Table 1.18). According to the respondents, the basic generator of service value is quality.

The value of hotel services, according to respondents, results mainly from the quality of their provision. According to 97% of respondents from hotels with Polish capital and 98% representatives of facilities with foreign capital, the service is a valuable offer for hotel guests. Another important determinant that determines the value of services offered is professional service (86% Polish capital, 89% foreign capital).

Table 1.18. Value components for hotel clients

The potential of valuable hotel service is due to the high value of components contained in:	Hotel with Polish capital (N = 175)	Hotel with foreign capital (N = 138)
High-quality	169	136
Professional guest service	155	123
A well-known image of the hotel and its market reputation	97	130
The culture and kindness of the staff	96	103
Taking care of the client's stay	90	118
Implementation of services within a set scope and time	88	134
Room furnishings and appearance	113	99
Hotel location	87	122
Anticipation of guests' needs	81	104
Availability of services	95	116
Distinguished additional services	84	121
Quality of service adequacy to price	73	102
Special offers	68	117
Low service prices	52	40
Distinguished hotel surroundings	5	72
Staff involvement	85	114
High prices	69	42
Effective promotion	45	68
Efficient booking system	77	106

Among the next significant determinants, creating value for the client, the following were distinguished: image, reputation, staff culture, comfort of stay, time and scope of service provision, location of the facility and its equipment. Individual sources determining the value for clients can be combined into a model, the criterion of which consists of the following dimensions: 1) Material attributes (including location, equipment, additional services, booking system), 2) Reliability of services (including quality, provision of services within a specified time and scope), 3) Sensitivity to the needs of guests (including taking care of the comfort of stay), 4) Confidence of services (including culture and staff courtesy), 5) Marketing communication (including prices, promotion, special offers). Thus, according to the position of respondents, the key values for the client include: quality of product/service, professional service of hotel guests, well-known image (brand) and reputation of the hotel business, provision of services in a specific scope

and time, equipment, availability, location of the facility, comfort of stay, distinguished additional services, culture, service commitment, anticipation and implementation of special needs of guests. On the other hand, among the less-favorable factors creating value for the client, the following was indicated: efficient booking system, adequate quality/price ratio, effective promotional activities and price of services (high/low), distinguished hotel surrounding – as the least important tool.

The analysis of the impact of individual factors on the value of offered services, according to the classification of the origin of hotel's capital, shows only one fundamental disproportion from the statistical perspective, which is the hotel's distinctive surroundings. Research on this factor shows that in hotel companies with Polish capital, 3% of respondents point to a small value for the client – in contrast to 52% of responses from hotels with foreign capital. The other factors listed in Table 1.18 do not show fundamental disproportions in value. Therefore, it should be concluded that there are no major differences in the perception of value for the client by hotels with Polish and foreign capital.

In order to determine the relation between individual components of the client's value, the linear correlation coefficients were calculated, for which the following hypotheses were made (see Table 1.19):

H0: The null hypothesis indicates that the linear correlation coefficient between components of values for hotel clients reported for hotels with Polish capital and foreign capital is statistically insignificant (equal to the statistical zero).

H1: The null hypothesis indicates that the linear correlation coefficient between components of values for hotel clients reported for hotels with Polish capital and foreign capital is statistically significant (different from zero).

Table 1.19. Pearson's linear correlation coefficient – value components for clients

	Hotel with Polish capital (N = 175)	Hotel with foreign capital (N = 138)
Hotel with Polish capital (N = 175)	1	0.623612
Hotel with foreign capital (N = 138)	0.623612	1

Note: $\alpha = 0.05$ assumed significance level; $t = 2.11$ Student's t statistic for $19-2 = 17$ degrees of freedom; significance level 0,05 read from tables.

In turn, the critical value of the correlation coefficient was:

$$r^* = \sqrt{\frac{(t^*)^2}{n-2+(t^*)^2}} = 0,505 \quad (5)$$

The analysis indicates that $|r| = 0.6236 > r_{critical} (0.505)$, and therefore the null hypothesis should be rejected and state that the correlation coefficient is statistically significant. Values for hotel clients reported for hotels with Polish and foreign capital are significantly correlated. Therefore, it can be concluded that in the case of both types of hotel respondents provided similar answers.

The value chain is an important model for creating value for the client in the hotel services sector. Proceedings related to its creation in the business model of hotel enterprises constituted the third stage of the conducted research. Respondents, among the elements constituting the sequence of activities undertaken by hotel guests regarding the service offer, listed: 1) the hotel image, 2) acquiring hotel information, 3) choosing the hotel, 4.) booking accommodation, 5) starting the stay – check-in, 6) first impression, 7) choosing a catering service, 8) selection of additional services, 10) experience, 9) ending the stay – check-out, 9) farewell, 10) memories after the end of stay, 11. contact after the stay. A value chain model can be formulated based on the value sources and components that make up the guest's behavior in hotel services (see Figure 1.9). The mentioned modules constitute an identification process for the value of hotel services to the client, which is considered as a kind of reference to the traditional value chain. The individual elements presented in Figure 1.9 form the overall components of most hotel services. The client independently, or with the help of intermediaries, completes the services by matching the individual components.

Analyzing the above scheme, it should be noted that the mechanism to identify value in a hotel enterprise should be precisely integrated with the creation and provision of value for the client as a real result, the aim of which is to solve the problem of a hotel guest (including the perception of needs and meeting them). Therefore, the concept and management of the client value chain according to a specific business model indicates which hotel components de facto create value and which segments use a particular value.

5. Conclusions

The contemporary perspective of relations between a hotel enterprise and a client indicates the development of a management concept and functioning in the market through the prism of a business model according to which the market potential of an entity depends on the ability to make strategic choices, create values and establish partnership relations with market participants. As a result of this process, hotel companies increasingly identify components that create value for the client.

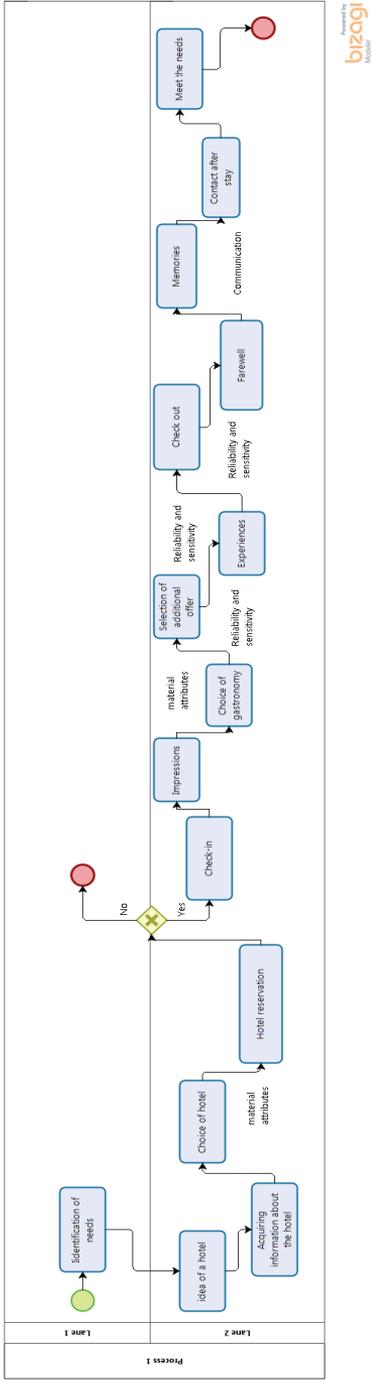


Figure 1.9. Identification process of service value for a hotel client

Source: own elaboration based on Bizagi.

This research shows that hotel companies recognize and, as a consequence, create their own map of values for the client, which is based on the set and order of priorities during the process of providing services. The value and sources of value for the client perceived from the perspective of hotel enterprises mainly concern elements related to the quality, satisfaction, scope of services offered and the service level. Therefore, entities should create different sets of values in order to meet the needs of clients and thus distinguish themselves in the market from the competition. The knowledge that is the basis of value creation for clients is acquired and developed on the basis of bilateral, dynamic relations between the hotel and its clients. For this reason, attention should also be paid to the need to shape partnerships (creating and maintaining relations) with hotel guests in order to present an offer adapted to their requirements. The conducted research also indicates that the value for the client is perceived by the respondents from the surveyed companies as a good reputation of the hotel.

Indicated elements determine the potential of valuable service as a kind of value bundle for the client. As a result, the business model contains components that differentiate the offer of enterprises. Thus, it should be recognized that the dominant strategy of the surveyed organizations is diversification of services resulting from taking rational actions in the image area.

Research results on the identification of client value mechanisms presented in the article should be considered from the perspective of positions and general beliefs on the desired ways to create value for the client in adopted business models, rather than as de facto implemented strategies. Elements of client values identified by the respondents constitute a set of most services offered by hotels. This allows the client to select the appropriate components, which can be made either by the client or through intermediaries.

In addition, studies have shown that such issues are an important area of hotel operations. Nevertheless, the values created are largely intuitive rather than planned, and operational rather than strategic. On the other hand, rational, process and resource-based value management for the client enable achievement of more beneficial results in the process of shaping the business model. Moreover, the continuous creation of the highest value is a key determinant in achieving a competitive advantage and enables an increase in sales of offered services and market share, which, as a result, affect the created value of the hotel. However, in order to achieve this objective, it seems that not only does the initial identification of value elements for the client appear to be a necessary process, but also their continuous monitoring in order to adapt the components of the business model to unstable client needs.

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Biographical note

Małgorzata Sztorc earned a Ph.D. in Management from the Cracow University of Economics. Assistant Professor at the Department of Management and Marketing in Kielce University of Technology. Leads research in the field of strategic management. Experienced hotel management practices. Her main interest and research areas include strategic management issues, contemporary concepts and management methods, global business strategies, tourism, hotel management, and business models.

Chapter 2.

Modern tools for organizations management

The issues of research contained in the second chapter of the monograph refer to the tools used in organization management. The presented case studies and examples of the use of various tools create a broad perspective of actions taken to improve the organization or their relationship with the environment. The tools presented in this part of the monograph are characterized by universality concerning commercial and non-profit organizations.

A feature of universality is undoubtedly the work–life balance approach, whose application in the service of the Navy has been studied by Joanna Kowalik from the University of Szczecin. The author referred to the specifics of the organization under study and the relationships in it, as well as the possibility of creating a work–life balance in practice. Research conducted among professional soldiers gave rise to a formulation of conclusions regarding the functioning of the military unit. The research may be a significant contribution to the analysis of mechanisms supporting the maintenance of military personnel in this and other similar military units.

Research carried out by Dawid Szutowski from the Poznań University of Economics aimed at developing a conceptual model, presenting the subsequent stages and decision points in the process of product innovation development, which allows for a schematic analysis of this complex problem. The model proposed in the result, the author himself considers, does require further verification to become a management tool. The literature research carried out by the author dates back to the mid-twentieth century, so the model's proposal may be a significant corollary or continuation of research in the field of developing innovation in the organization.

The universality of management tools in the field of marketing communication has also been undertaken by Katarzyna Śmiałowicz, a researcher at the Poznań University of Economics. The author's focus is on national art museums in Poland. It was assumed that the surveyed

organizations could benefit from improving their marketing communication in order to adopt brand orientation. The study also refers to the barriers and potential of art museums. In the author's assumption, the research results should be of interest primarily to museum boards as well as state and local government authorities.

The last presentation of research results in this part of the monograph is aimed at indicating the possibilities and benefits of using gamification in shaping the attitudes of individual energy consumers. The author reviewed research and development projects implemented under the Horizon 2020 program, in particular, the Energa Living Lab project implemented in Gdynia. An analysis of research results and implementation work are the basis for taking a position in the field of electricity management. The leading perspective of the analyzed options has become the need to protect resources and protect the climate. At the same time, economic aspects of the energy market have been identified.

The work–life balance of navy service members – conceptual considerations

Joanna Kowalik¹

Abstract

The purpose of this article is to describe the work–life balance of Polish Navy personnel. The essence and significance of a balance between work and life are presented in order to draw a distinction between the two concepts. The methods, tools, and techniques for maintaining a work–life balance are shown. The study is based on a review of the literature and survey results. The research aim of the article was to evaluate the balance between work and non-work life on the example of service in the Navy based on the answers obtained from professional soldiers and their own experience. The nature of the survey, which was carried out by the author, contributed to the formulation of the research problem, which is: Is it possible to maintain the balance between professional and non-professional life among professional Navy soldiers on duty in Świnoujście? Referring to the presented research problem, the author adopted the following hypothesis: Work–life balance is not maintained among professional soldiers serving in the Navy in Świnoujście. The results of the survey allow the author to verify the research hypothesis. The subjective scope of the assessment includes professional soldiers serving in Świnoujście. The subject matter of the assessment concerns the balance between professional and personal life. The spatial scope of the study refers to Poland, specifically to the Land of 44 Islands - the city of Świnoujście. A questionnaire, consisting of 27 single-choice and multiple-choice questions and conducted on a target group of 30 professional soldiers of the Polish Navy in Świnoujście, was used to obtain empirical data, which allowed the author to confirm the correctness of the research hypothesis of whether the work–life balance is maintained. The results of this study show that the work–life balance of Navy soldiers, both men and women, is not maintained. The choice of a given topic stems from the fact that nowadays the issues related to the maintenance of a balance between family and work are broadly discussed and are increasingly significant.

Keywords: labor market, navy service, work–life balance.

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1. Introduction

Each stage in a person's development has a substantial influence on their future life, as it brings new values for which their life is worth living and which help them derive personal fulfillment. Most significant values may include having a home, a family and friends, and being happy. Another important value is a job, as it has a large impact on broadly-defined personal development. Being employed also contributes to creating a space for cooperation and interpersonal relations, and for belonging to social groups, which consequently translates into the entirety of the person's social life. Therefore, the role of a job in a person's life is particularly important. On the one hand, it is universally perceived as a source of income, which is a vital tool for providing for one's family. On the other hand, it offers the possibility of ensuring personal development and shaping the future. It has an enormous impact on a person's life even before starting a proper professional career. It must be noted that as early as in one's childhood it is an object of dreams, soon to become an object of intentional and planned actions. In the modern world, a young person making plans for their future takes two elements into consideration: work – as the most important tool for providing for their family, and family life – offering fulfillment in various social roles, such as being a parent. The moment a person becomes employed, it is their work that begins to determine their place in society, at the same time playing the role of a factor responsible for their social position and financial wellness, which in turn affects the level of their personal life, satisfaction, and success in other areas of life. One's work is a point of reference for their values, as it contributes to how one perceives the social environment.

2. Literature background

The term 'work-life balance', or 'WLB' for short, first emerged in the 1970s in the United States. Initially, it applied to initiatives that favored the family, especially in crisis-related contexts with women massively entering the labor market in a world with the established male breadwinner model. Since the early 1990s, work-life balance has evolved to provide support to all working people regardless of their family status. Literature sources concerned with this subject give different definitions of work-life balance. Clutterbuck (2005) believes that work-life balance is a state where the individual is able to cope with the discrepancy between different life-work demands in such a way that their desire for fulfillment and prosperity is fully satisfied. One will be able to attain a work-life balance if they:

- first of all, make their choices in a deliberate and informed way;

- are aware of the various requirements concerning the investment of time and energy;
- are capable of making choices regarding the investment of time and energy;
- make a thorough selection of the values on which to base such choices.

Borkowska (2011) claims that a work–life balance is attainable and takes place wherever work does not consume the person’s non-professional life entirely, and vice versa, where work life does not happen at the expense of one’s personal life. She presents the essence of WLB, seen in the context of the individual, as an ability to combine one’s work with other life priorities, which first of all include home, family, health, interests and social activity. Greenhaus, Collins and Show (2003) suggest that WLB refers to the degree in which a given person is engaged in the roles of a worker and a family member. It is also linked to whether their involvement is uniformly distributed between their roles, and to the level of satisfaction such roles bring. Work–life balance encompasses three parallel components:

- involvement balance – equal involvement in family obligations and work;
- satisfaction balance – equal enthusiasm for one’s roles both at work and in the family;
- time balance – equal time devoted to work and family.

However, the concept of work–life balance based on equal involvement within the aforementioned areas does raise certain doubts. WLB should be treated as a way of or a method for combining these components into one coherent whole. The proportions of the commitment to any one of these areas may be subject to change, for instance in connection with the person’s current lifecycle stage. It is worth noting here that the balance between the commitment to work and non-work obligations differs significantly among individuals, clearly depending on their age, sex, educational background, and occupation, as well as their position in the family, where duties are not always evenly distributed (Zientara, 2012). Therefore, it can be concluded that there is no single universal image of work–life balance.

Nevertheless, as Machol-Zajda (2008, p. 29) rightly puts it, *when we talk of work–life balance, we imply a state where the individual has a certain impact (use of autonomy) on where and how much of their time should be devoted to pursuing tasks within work and non-work areas of their life*. A satisfying balance is one where, at a given point in time, the relationship between work and non-work areas is appropriate from the point of view of the individual person. It must be highlighted here that the work–life balance concept is first of all based on the need to find an appropriate balance

between professional and private lives, which means that it is not limited to maintaining the traditional model where both these areas used to be treated separately (Sadowska-Snarska, 2014). The idea behind work–life balance is to help the individual gain fulfillment in every stage of development in both these areas, first of all, bringing satisfaction, but also providing an opportunity to increase their own potential. WLB can also be defined as an opportunity to try and achieve objectives in all the various domains of life. However, working people are forced to look for the so-called ‘golden mean’ to help them reconcile the work-related requirements imposed on them by their family life, the life-long need for education and development of their vocational skills, their social obligations and, finally, their desire for leisure or active recreation (Buchowska & Zimmer-Drabczyk, 2014). Reconciliation between professional requirements and private life obligations is made possible with the help from family members, friends, or colleagues and by applying proper working time management techniques.

When analyzing the WLB concept, which refers to the close links between professional and non-professional life, it can be seen that there might occur time conflict and, at the same time, the need to harmonize work time with personal and family life. However, a very important and noticeable element is the positive impact of mutual interaction. Authors such as Greenhaus and Powell (2006) developed a concept of work/family enrichment, justifying that enrichment is ‘the degree to which experiences in one role improve the quality of life in another’.

It is also worth noting that the WLB concept has quite a broad definition, as it pertains to the balance between work and the various fields of a non-professional life. The worker has time at his or her disposal, which contributes to satisfaction as long as it is devoted to (Clutterbuck, 2005):

- their family, friends and other people with whom they have strong emotional ties;
- themselves (‘the time for myself’) to pursue the fulfillment of their own physical or emotional needs;
- their work, which is indeed necessary in order to acquire the funds to satisfy various needs; work can also be the means of self-fulfillment.

As can be seen, a person’s non-work area of life includes duties related to both the family and leisure time, whereas the latter can be taken advantage of in very different ways by different individuals. Leisure time can be used, for instance, for the purposes of recuperating physical and mental powers, improving health, or reinforcing physical and spiritual development. Therefore, it should be assumed that activities aiming at reconciling work with family life or, in other words, mitigating the conflict observed between work and family

obligations, can be treated as part – very often fundamental – of the work–life balance programs broadly discussed in the literature.

3. Research approach

People shape their personalities all their lives, across different stages of development of their consciousness. An adult person can distinguish at least six basic spheres of continuous consciousness. They mostly operate at the higher levels of Maslow’s hierarchy of needs, and they are (Clutterbuck, 2005):

- work – classified as the way of earning income to support a normal and decent life;
- career – described as the way in which the person develops professionally, and as their plans related to choosing the future path to success, experience, and self-development;
- family and friends who can determine the way in which the individual can establish relationships with colleagues and maintain their relationships with friends and family outside the work context;
- health – defined as the way in which the person takes responsibility for maintaining their physical and mental fitness;
- self-fulfillment – defined as what the individual is able to do outside their work and career contexts that affect their intellectual development;
- society and sense of belonging – defined as the way in which the individual acts for the benefit of the society they belong to, outside of work and career contexts.

Obviously, for every person, the choice of the above-mentioned streams will be a very individual one, often determined by their experience or worldview. It is worth mentioning that while concentrating their entire life energy on career and work, people are more exposed to the risk of burnout. Also, a society composed of such individuals is less resilient to failures due to the fact that their self-esteem is set very high (Nieżurawska, Dziadkiewicz, & Kowalewska, 2017). It can actually be concluded that they only focus on achieving their own professional values, and not on what kind of persons they are. People who are fulfilled in all aspects and areas of their lives are usually better at coping with disputes, criticism, and failures, as the problems they encounter at work are compensated for with the satisfaction derived from personal fulfillment. This is why, in order to attain the optimal level of integration between various streams of life, workers are given the option the use a set of methods and tools focusing on (Csikszentmihalai, 2005):

- a clear, matter-of-fact and transparent determination of the priorities that will allow for the attainment of the objectives;

- understanding and getting to know the different requirements that consume both their energy and time;
- finding the time for reflection, which will allow for finding more effective ways to work and relax;
- managing the expectations that are imposed on workers by their employers, and accepting the effects that may arise from unconstrained choices;
- strengthening resilience and the ability to stick to personal choices.

The most significant and, at the same time, the least realized cause of disorders to the work–life balance lies in the individual’s inability to manage their time. The availability of life energy and time is usually quite limited and, therefore, the individual needs to be able to determine exactly how much of these they have at their disposal. Many of us encounter the problem of coping with an excessive burden of obligations, which is often caused by our inability to spread them over time. Loss of control over our own life energy and time is most frequently caused by Buchelt and Jupowicz (2008):

- an increased number of emails received (as reported by the literature, over 50% of managers are burdened with messages that they are supposed to pass on to others via email);
- the necessity to finish pending matters or tasks prior to a planned holiday, or to catch up soon after the holiday;
- an increased financial pressure, closely related to the fact of having children or stemming directly from the will to expand the family;
- continuously growing expectations towards others and oneself with regard to a current or future career;
- the employee processing, gathering, collecting and gaining experience, and the employer gaining perception that the given employee is irreplaceable in their capacity;
- fear of losing a job or being perceived by colleagues as failing to commit to the job or to meet the requirements.

Spending a dozen or so hours a day at work makes people discouraged from spending any time left with their family and friends or engaging in any activity. This, in turn, leads to stress and frustration and makes people avoid others. Learning to manage time requires to first determine the priorities as an appropriate distribution of time between all of the individual’s duties and pleasures will have a positive effect on their mood and well-being, and contribute to the improvement of their spiritual and overall health.

WLB training courses (accessed on November 29, 2018) can be classified as cooperation-building technique courses. They are mainly designed for the regional cooperation sector, particularly graduates of higher education institutions. These people are about to undertake active roles in the labor market. What is important in this context is that the graduates should have

sufficient knowledge with regard to the flexibility of forms of employment, employee rights, and the tools that can help them balance their work and private lives. These courses, run at various workplaces, are also meant for the employees of medium-sized and large enterprises, labor market institutions and regional non-governmental organizations.

4. Discussion and results

The purpose of the study was to assess the work–life balance of Navy soldiers (both men and women) based on their responses to a survey. Spatially, the study was limited to ‘*the Land of 44 islands*’, namely the town of Świnoujście in Poland. The period of the study encompassed the preparation of the survey, its distribution and lastly the collection of responses from the Navy personnel, which spanned from 1 April to 1 August 2018.

The survey included 27 single and multiple-choice questions, and one open question. The target group included 30 Navy service men and women, who are characterized in Table 2.1. The respondents provided answers to all the survey questions.

Table 2.1. Study group structure

Sex - No.	Educational background - No.	Rank – No.
Woman - 4	elementary -	seaman recruit - 10
Man - 26	vocational - 2	able seaman - 20
	secondary - 20	officer -
	undergraduate - 5	
	graduate - 3	
Age - No.	Family status - No.	No. of children
18-20 -	married - 12	one - 3
21-25 - 6	informal relationship - 9	two - 9
26-30 - 11	single - 9	three -
31-35 - 11		more than three -
36-40 - 2		no children - 18
Over 40 -		

The study group included 26 men and 4 women. The prevalence of men over women in the study reflected the prevalence of male service members in the Polish Navy. Most of the respondents fell within the 26-30 (11 persons) and 31-35 (11 persons) age bands. As the study suggested, the majority of the respondents had a secondary educational background. Their family status was as follows: 12 were married, 9 were in informal relationships and just as many were single. Out of the group of 30 service men and women, 18 had no children, 9 had two children each, and 3 persons had one child each. 20

of them were able seamen and 10 were seaman recruits. According to their responses, the largest number – as many as 13 – spent 51 to 55h/a week at work. 6 persons worked for 46 to 50h/a week, with 1 person working for more than 60h/a week. Only 5 of them responded that their working week was up to 40 hours. The rest claimed that they spent 41 to 45 hours a week at work. 21 of the respondents admitted that they occasionally felt tired due to a large amount of work imposed on them. 25 of them claimed that they worked weekends because military service was perceived as a duty.

The first point raised in the survey dealt with the most important values in life. The respondents were asked to rank such values as friends, entertainment, family, health, work, salary, high financial status, leisure time, educational background and religion by assigning them with points on a scale from 1 to 10, where 1 means the most important, and 10 marks the least important value. Figure 2.1 shows the values already ranked according to their importance as reported by the respondents, from the most to the least important ones. Based on the particular positions on the scale, each column was summed up independently and the conclusions were drawn. The Y-axis shows the values ranked by the respondents in order of importance, whilst the X-axis shows the number of responses.

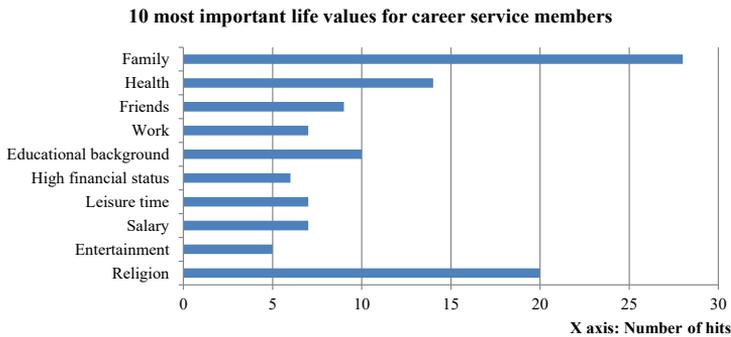


Figure 2.1. Life values as seen by Navy servicemen and women

Figure 2.1 indicates as many as 28 out of 30 respondents ranked the family as the most important value. Health was the second most important, work seen as a tool for supporting the family was the fourth, and leisure time defined as the time after completing daily professional duties was ranked as low as seventh, which meant that it was not one of the most important values to the military professionals.

According to the responses, only 4 of the respondents have lived in Świnoujście their entire lives, whilst the other members of the study group (26 people, that is 87 %) come from different parts of Poland to serve in Świnoujście.

Due to their place of residence, respondents are somewhat limited in time as the free time they could devote to family, friends or their own pleasures has to be spent on commuting to work. For most of them, their family homes were over 200 kilometers away from their workplace. 58% of the respondents returned home once a month, with few of them being able to commute on a daily basis. There were also respondents who visited their families only once every three months. Due to the distance from home, 25 Navy soldiers rented flats in Świnoujście.

Only a handful opted for renting a single room. Only one of the respondents chose to use Military Dormitory accommodation. Here, the lack of work–life balance became visible, as for most of the respondents their workplace was situated far from their family homes, which automatically reduced the available family time. Religion turned out to be the least important value for the study group, with as many as 20 of them ranking it as the last on the scale, assigning it with a value of 10 – the lowest.

The respondents (9 persons) claimed that their career in the Navy allowed them to gain experience and was their main source of income. None of the respondents believed that their job was a patriotic duty. Also, none of them claimed that their job was unrelated to their personal interests or that it failed to bring them satisfaction. The whole study group shared the view that the Polish Navy did not offer flexible forms of employment.

On the basis of their own experience, the respondents distributed proportions between their work and private life. It turned out that 50% of them were able to reconcile their family life with their career duties. However, 47% of them claimed that they could use more time off work.

Some of the survey questions allowed the respondents to express their opinion on the work–life balance support tools available in their current workplace. On the basis of the literature (accessed on December 7, 2018), the author suggested a set of work–life balance support tools for the study group (Figure 2.2).

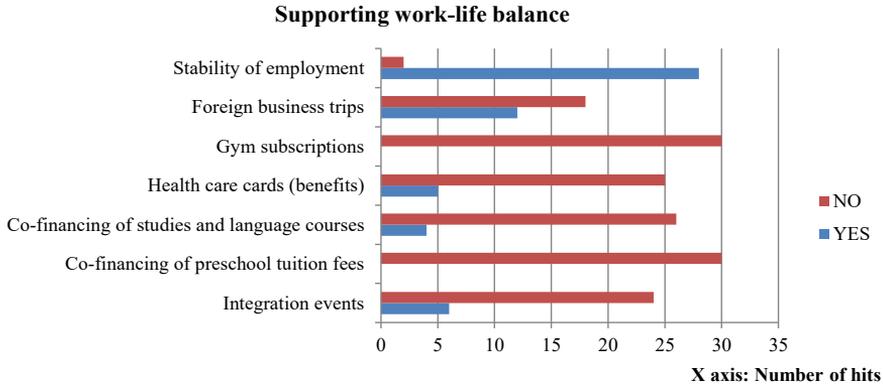


Figure 2.2. Work–life balance support tools

According to 28 out of the 30 respondents, the Navy offered stable employment and a fixed scheme of duties – referred to as standards – to be performed between 7:30 am and 3:30 pm from Monday to Friday. Sundays and religious and public holidays are time off work that the servicemen and women can use to recuperate and spend with their families. After a 24-hour duty, the serviceman or woman is entitled to one full day of leisure. Still, depending on orders from superiors, duties may also fall on public holidays (Sundays and religious holidays). In the latter case, however, the service member is entitled to a day off work, as well. According to 12 of out the 30 respondents, the Navy offered foreign business trips, which allowed them to gain valuable experience. The respondents also stated that they were provided with health care cards (5 persons) and an opportunity to apply for co-financing of their university studies or foreign language courses (4 persons). Most of the respondents (77%, 23 persons) would like to occupy a higher position than their current one, but their desire was rather linked to their pursuit of professional development. As it results from the structure of the research sample, the respondents hold a military rank of a seaman apprentice (20 people) and a seaman recruit (10 people), therefore it is important for them to develop further and gain a higher position. As a result, promotion would contribute to achieving a higher military rank. The remaining respondents (23%) say that they would not like to change anything.

23 of the respondents planned to continue their careers in the military once they obtained pension rights, although the other 7 claimed they would terminate their employment with the Navy when that moment came. 60 % of the respondents (18 persons) implied that the Navy used a system of employee

bonuses awarded once a year, while the management-level personnel extended supervision over the service members' performance. Moreover, according to 93% of the respondents, they are also subject to an annual assessment. According to the survey results, maintaining a work–life balance is very important to the Navy servicemen and women (100% of them). Additionally, 22 members of the study group claimed that when they were choosing their profession they were aware of the need to keep the balance between work and private life, and of the duties and obligations that military service entailed.

5. Conclusion

The study showed that, on the one hand, Navy members were the target of some actions allowing them to maintain their work–life balance. This balance was contributed to by the stability of their employment, even despite the fact that their employment contracts had been entered into for specific terms. On the other hand, their effort and sacrifice were not appreciated by the management-level personnel. Based on their responses to the questions concerning the co-financing of university studies or foreign language courses, a vast majority of the respondents (26 persons) admitted that they did not receive additional benefits that might have a significant impact on their personal lives and development. The Navy did not provide its members with gym subscriptions, despite the fact that they were expected to take an annual fitness exam, which forced them to take care of their health condition on their own. The employer did not even provide those members of the study group, who had families with children, with any co-financing of preschool tuition fees. It should be emphasized here that due to financial reasons most of the respondents did not visit their family homes frequently.

On the basis of her analysis of the study group, the author finds that the work–life balance is not maintained among career military personnel. The first conclusive argument in favor of this thesis is the number of work hours per month. The Labor Code states that the average number of work hours per week should be 40. This study indicates that as many as 68% of the respondents did not enjoy a standardized working time limit. This resulted from the necessity to be on duty on Sundays and religious holidays, and to appear at work as ordered by superiors (according to the National Defense Minister's regulation of August 29, 2006) (accessed on December 1, 2018). Another conclusive argument is the fact that most of the respondents had a secondary educational background and that they wished to be promoted to a higher position. The Navy, however, does not offer co-financing of higher education tuition fees, which would otherwise significantly increase the opportunity to achieve a degree, and thus to be promoted to a higher rank. Another important argument in

favor of the aforementioned thesis is related to accommodation as 70% of the respondents rent flats in Świnoujście. The Navy does have a residential building at its disposal, with double rooms designated for Navy personnel, but the monthly costs of such accommodation are much higher than the costs of a room or flat rental (assuming that the flat is shared by two or more persons). It should be added that by choosing dormitory accommodation the soldiers lose their accommodation allowance that is otherwise added to their basic salary. The prospect of sharing a room with another service member, and the respective compromised comfort of the mind, does not guarantee any sort of inner harmony and mental balance. The Navy should run 'WLB training courses' at least once a year (accessed on December 8, 2018) aimed at raising their awareness of the techniques for maintaining the balance between work obligations and private life. There, they could learn how to distribute their time between the work and home environments. The heads of the military units and ships should pay more attention to taking care of their crews and creating opportunities for self-development which will help crew members win promotion. Moreover, in order for its service members to be physically fit, mentally resilient and healthy, the Navy should invest more in providing every one of them with such benefits as gym subscriptions or health care cards.

The results of this paper may serve as an incentive for further research into the work–life balance among the Navy servicemen and women. This study has certain limitations, which are mainly related to the small size of the study group (30 persons), but it does provide valuable feedback on various aspects connected with working conditions in the Navy.

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The importance of decision-making quality throughout the product innovation development process

Dawid Szutowski¹

Abstract

Making high-quality decisions throughout the product innovation development process is a challenging task due to high uncertainty levels. The purpose of the present study was to develop a conceptual model presenting consecutive stages and decision points within the product innovation development process, which allows one to schematize this complex issue. The main part of the study relied on a systematic literature review using the SALSA (Search, Appraisal, Synthesis, Analysis) method, preceded by a preliminary literature study. At the synthesis and analysis steps the meta-ethnography method was employed, as it allowed for translating the numerous innovation models identified into one another and draw consistent conclusions. The complementary study consisted of 14 interviews performed in the first quarter of 2019, in 10 Polish and German industrial companies with a well-determined product innovation development process in place. The analysis performed resulted in the creation of a conceptual model presenting the product innovation development process from the decision-making viewpoint. Its consecutive stages included: idea generation, idea selection, research, development, testing, market introduction, and monitoring and learning, all of which were separated by decision points. It was suggested that at each decision point, decision-making effectiveness improves the overall efficiency of the product innovation development process better than decision-making efficiency. The study proposed a model indicating key decision points in the product innovation development process. After further empirical verification, the model may ultimately become a managerial tool. The study constitutes an original attempt to model the innovation process from the decision-making viewpoint, based on a systematic approach to literature analysis.

Keywords: *innovation, product innovation, process management, decision-making, development.*

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1. Introduction

Managing the innovation process is a complex task, as decisions need to be made under a high level of uncertainty (Hammedi, Van Riel, & Sasovova, 2013) senior managers from various disciplines need to collaborate to evaluate innovation project proposals and decide about the allocation of scarce resources to selected projects. Screening decisions are complex and made under high levels of uncertainty, and are considered to be one of senior management's most challenging tasks. In the present field study, screening decision making is investigated from the perspective of a Transactive Memory System (TMS). At the same time, the decisions made throughout the process are important, as they lead the deployment of key competencies and resources (Barney, 1991) and determine a company's future development. Interdepartmental coordination, functional heterogeneity among the actors involved in the process and lack of data are just a few of the key issues for managers to deal with. In order to support management, it is important to provide the discipline required to help manage uncertainty (Ylinen & Gullkvist, 2014). The need for formal management systems in uncertain settings is widely supported by the literature (Bisbe & Otley, 2004; Davila, Foster, & Li, 2009).

Successful management boils down to making quality decisions. As decision-making in the product innovation development process is challenging, there is a vital need for theoretical advancements, presenting the complexity of the product innovation development process in a schematized way and indicating when and what decisions need to be made for the process to advance smoothly. Based on the above, the research question is as follows: what are the key decision points within the product innovation development process and what is their relative importance? Thus, the purpose of the present study was to develop a conceptual model presenting consecutive stages and decision points within the product innovation development process.

The main part of the study relied on a systematic literature review performed using the SALSA (Search, Appraisal, Synthesis, Analysis) method (Booth, Papaioannou, & Sutton, 2012). In the synthesis and analysis steps, the meta-ethnography method was selected, as it draws together data from multiple studies and enriches the understanding of the findings presented in each (Siau & Long, 2005). The complementary study consisted of 14 interviews performed among scholars (n=3) and practitioners (n=11) in Germany and Poland. It was conducted in 10 companies, all of which had a well-defined product innovation development process in place. It attempted to answer the question about how important decision-making quality at each decision point really is for increasing the overall efficiency of the innovation process.

Based on the study, a conceptual model presenting the product innovation development process from the decision-making perspective was created. It comprises seven main stages (idea generation, idea selection, research, development, testing, market introduction, monitoring, and learning) separated by main decision points. In addition to the main stages, five supplementary stages (environment analysis, company strategy, business planning, protection, production adjustment) and eight supplementary decision points were identified.

The paper is structured as follows. First, decision-making theory and the evolution of innovation process models are briefly presented. Second, a description of research methods, including a systematic literature review and qualitative research, is provided. Finally, the “Results and discussion” section presents the developed product innovation development process model. The paper terminates in conclusions.

2. Literature review

2.1. Decision-making

The concept of decision-making draws from different disciplines, such as economics, management, psychology, and mathematical modeling. It boils down to evaluating different alternatives and choosing the best one from the decision-maker’s viewpoint. Theory provides three approaches to decision-making: rational–analytical, intuitive–emotional and political–behavioral (Ilori & Irefin, 1997). The first approach supports the rationality of the actors involved and indicates that decisions are based on facts. In the second approach decision-makers are presumed to be emotional. They are guided by their instincts, hunches, habits and past experiences. The third approach sets decision-makers in a specific context, acknowledging that they are often subject to pressure from other participants of the game.

Based on the above, the scientific quest for rationality started. It provided an abundance of tools and methods supporting rational decision-making (Kihlander & Ritzén, 2012). Seeing different functions inside companies as processes within which a number of decisions need to be made, models were developed, such as SGS, which divides the process into distinguishable stages separated by decision points (Cooper, 2008). It seems to be widely acknowledged that decisions should not be perceived as simple occurrences, but rather as a result of an internally complex process (Bragd, 2002). Moreover, at the level of a single decision, having options to choose from, emerged as a critical factor (Tatum, Eberlin, Kottraba, & Bradberry, 2003).

One of the principal issues in decision theory and practice is making decisions based on insufficient information. This usually is the case of innovation projects which are characterized by long feedback loops and uncertainty (Matheson & Matheson, 1998). The stack of knowledge gradually increases as the project proceeds, but at the initial stages, decision-makers only rely on qualitative information and incomplete evaluations (Chin & Wong, 1999). Moreover, decision-makers are rarely entirely rational, their preferences fluctuate over time and comprehensive information searches are rare (Kihlander & Ritzén, 2012). They are also subject to such psychological biases as anchoring and fixation (Keeney, 2004). At a team level, further decision-making issues appear. The product innovation development process involves numerous actors from different departments across the company. Their coordination and exploitation of their fragmented knowledge constitutes a significant challenge (Cuijpers, Guenter, & Hussinger, 2011). Moreover, decision-making in the innovation processes entails politics, conflicts, confusion and other noise (Spanjol, Tam, Qualls, & Bohlmann, 2011).

To sum up, decisions in innovation processes are highly complex and made under significant uncertainty, which makes them especially challenging for managers (Hammedi, Van Riel, & Sasovova, 2013). The precise knowledge on how the product innovation development process is organized and where the key decision points are is crucial from the decision-making point of view.

2.2. Product innovation development process

Throughout history, scientists provided numerous product innovation development process models. The approach to innovation process modeling changed over time, each decade being dominated by a different dominant logic (Hobday, 2005; Kotsemir & Meissner, 2013). The most distinguishable periods are summarised in Table 2.2.

As knowledge grew gradually, key considerations concerning innovation processes were summarised within the last two generations of innovation models, especially seeing that the definitive conclusions of the seventh generation are yet to be developed. Nevertheless, all the above considerations are applicable to the process of product innovation development. By now, it has been widely accepted that purposive inflows and outflows of knowledge accelerate internal innovation and expand markets for external use of innovation, respectively (Chesbrough, 2003). Another valuable component is collaboration within the process with universities and research institutes, not only as the providers of future research and development staff, but also as entities offering advanced research services (Gokhberg, Kuznetsova, & Roud, 2012).

Table 2.2. Generations of innovation models

Gen.	Period	Principal sources	Innovation model	Essence of the model
1	1950s – late 1960s		Technology push	Simple linear sequential process. Emphasis on R&D push. The market ‘receives’ the results of R&D.
2	Late 1960s – first half of 1970s	Myers & Marquis (1969)	Market pull	Emphasis is on marketing. The market is the source of ideas and provides direction to R&D. R&D has a reactive role.
3	Second half of 1970s – end of 1980s	Mowery & Rosenberg (1979)	Coupling model	Sequential model, but with feedback loops from later to earlier stages. Involves push or pull-push combinations. R&D and marketing more in balance.
		Rothwell & Zegeld (1985)	Interactive model	Interaction with research institutions and markets.
4	End of 1980s – early 1990s	Kline & Rosenberg (1986)	Integrated model	Parallel development with integrated development teams. Strong upstream supplier links and partnerships. Close coupling with leading-edge customers. Emphasis on integration between R&D and manufacturing.
5	1990s – 2000s	Rothwell (1992)	Networking model	Fully integrated parallel development. Use of expert systems and simulation modeling in R&D. Strong links with leading-edge customers. Strategic integration with primary suppliers. Horizontal links.
6	2000s – 2010s	Chesbrough (2003)	Open innovation	Innovation collaboration and multiple exploitation paths.
7 ¹	2010s - ...		Open innovator	Focus on the individual and framework conditions under which one becomes innovative.

Source: Hobday (2005), Kotsemir & Meissner (2013)¹ – emerging, not formed yet

Novel innovation process models need to allow the management of highly qualitative processes that are both flexible and customer-specific in their design and enable companies to proactively manage customer needs and trends (Luw, Schutte, Seidel, & Imser, 2018)\ncontinuous, and goal-oriented management of innovation processes. The\nliterature research demonstrates that an integrated innovation\nmethodology requires highly qualitative processes that are both flexible\nand customer-specific in their design. This work focuses on the FuGle\n(R. Moreover, such models pay careful attention not to omit the final stage of the process: performance outcome. Thus a comprehensive, long-term perspective is required, allowing for an analysis of the chain of events in an organizational innovation process, from the introduction of the proposed innovation to the outcome (Ram, Corkindale, & Tagg, 2016).

3. Research methods

3.1. Literature review

A systematic literature review was performed to develop a conceptual representation of the product innovation development process from the decision-making viewpoint. Its main part relied on the SALSA (Search, Appraisal, Synthesis, Analysis) method. In order to tailor the research scope, it was preceded by a scoping study, the purpose of which was to determine the general view on the subject, the most influential works, previous literature reviews, and any grey literature (not formally published) on the subject (Booth, Papaioannou, & Sutton, 2012).

The search procedure relied on the Scopus bibliographic database due to its large coverage of academic journals, including nearly 22,000 titles. The search terms included two substantial fields: innovation (innovation, invention, improvement, and modernization) and decision-making (decision-making, decision). Each search was performed as a combination of two search terms representing both fields, which amounted to eight separate queries. The terms were searched for in publication titles. In order to assure the timeliness of the research, the time frame was set to 2000–present. The search included books, papers, and conference proceedings. Both American and English spellings were covered. The procedure yielded 744 publications, which were later evaluated during the appraisal stage.

The appraisal procedure was divided into two independent sub-stages: exclusion and inclusion. The first one allowed for eliminating papers in languages other than English ($n=73$) and non-scientific publications ($n=70$). Furthermore, it allowed for restricting the set of papers to ones that focused on the subject of analysis. Title sifting allowed for eliminating 478 papers. The remaining 114 articles were evaluated based on their abstracts, which led to the elimination of a further 88 publications, leaving 26 for full-text sifting. The last step in the exclusion sub-stage identified 12 papers. The inclusion sub-stage relied on a reference check performed using the one step forward and backward snowballing methods (Jalali & Wohin, 2012). It led to the identification of three additional books and one article. Finally, 16 papers were selected for synthesis and analysis (Figure 2.3).

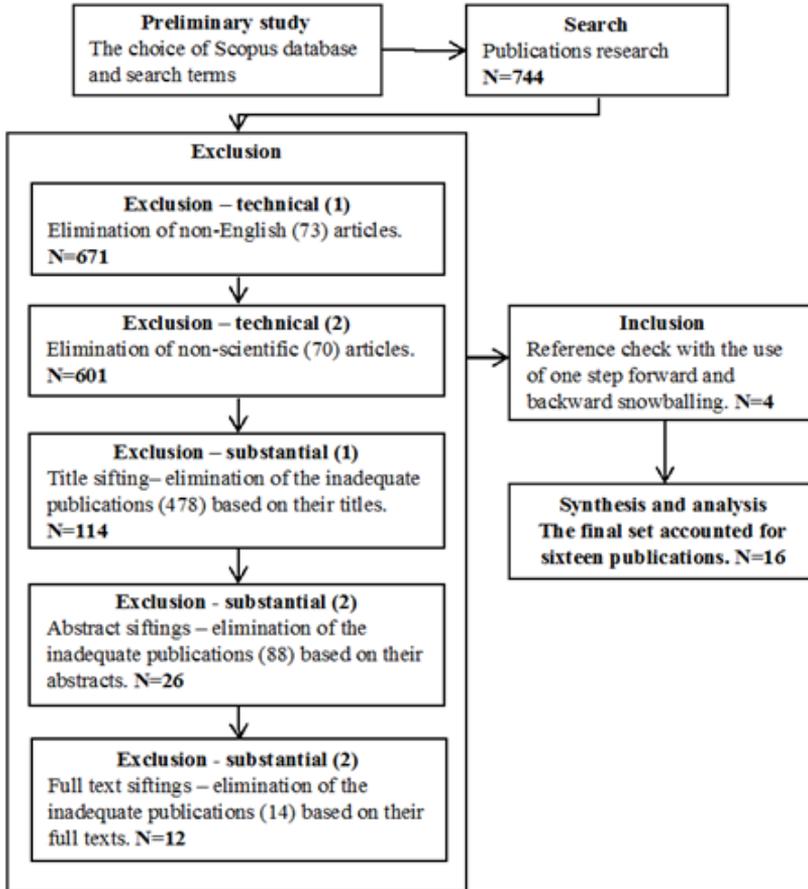


Figure 2.3. The strategy of the systematic literature review

As explained above, the synthesis and analysis procedures included 16 scientific publications. It is important to note that there were also three publications identified as grey literature found in the scoping study. They are added here for comparison purposes. The papers are synthesized in tabular form (Table 2.3).

Table 2.3. Papers selected for synthesis and analysis

No.	Author(s)	Keywords	Focus	Model type
1	(Andrew & Sirkin, 2008)	-	“Successfully managing innovation so that it delivers the required return on the company’s investment of money, time and people” (p. 1)	Descriptive
2	(Bernstein & Singh, 2006)	innovation process model, biotechnology, organizational constructs, technology push, market pull	Producing a model integrating different approaches to managing the innovation process (see p. 561)	Descriptive
3	(Bowers & Khorakian, 2014)	management, innovation, risk, integration, project	Indicating what project risk management should be applied and where in the innovation project (see p. 25)	Graphical, descriptive
4	(Cooper, 2008)	-	Updating the stage-gate system to correspond to the current management needs (see p. 213)	Graphical, descriptive
5	(Cormican & O’Sullivan, 2004)	product innovation management, best practice mode, self-assessment scorecard, case study analysis	Identifying the critical success factors for effective product innovation management (see p. 819)	Graphical, descriptive, functional
6	(Guan & Chen, 2010)	innovation production process, efficiency measurement, China’s high-tech innovations, network data, envelopment analysis	Constructing a measurement framework for the typical innovation production process from the system perspective associated with a relational network data envelopment analysis (see p. 348)	Graphical, descriptive
7	(Hallstedt, Thompson, & Lindahl, 2013)	strategic, sustainability, implementation, product development, innovation, process	Presenting identified key elements for successful implementation of a strategic sustainability perspective in the early phases of the product innovation process (see p. 277)	Graphical, descriptive
8	(Hansen & Birkinshaw, 2007)	-	Offering a framework for evaluating innovation performance: the <i>innovation value chain</i> .	Descriptive
9	(Havlíček, Thalassinou, & Berezkinova, 2012)	operational innovation, product innovation, strategic innovation, M-C model, controlling	Describing innovation management in terms of process management based on management plans and targets and their controlling (see p. 57)	Graphical, descriptive
10	(Kamps, 2013)	-	Determining “what does a process look like and what kind of tools and/or methods should be used to be successful” (p. 2)	Graphical
11	(Louw, Schutte, Seidel, & Imsier, 2018)	-	Developing a FluGe model allowing for rigorous, continuous, and goal-oriented management of innovation processes (see p. 155)	Graphical, descriptive
12	(Penidea, Gourc, Pingauda, & Peillonb, 2013)	innovation; best practices; BPM; modeling; alignment	Describing innovation best practices as compulsory steps in the innovation process (see p. 183)	Graphical, descriptive

No.	Author(s)	Keywords	Focus	Model type
13	(Szutowski, Szulczerwka-Remi, & Ratajczak, 2019)	innovation process, innovation management, technological innovation	Confirming the representation of an innovation process including interactions and the relation between the design of innovation processes and company innovation performance (see p. 282)	Graphical, descriptive
14	(Lakshmanan, Ramachandran, & Ram, 2016)	-	Developing processes that are efficient and minimize environmental damage (see p. 1)	Graphical, descriptive
15	(Vitezić & Vitezić, 2015)	innovation management process, controlling, strategic management, sustainability, measurement system	Investigate the role of controlling in the innovation management process respecting sustainability (see p. 175)	Graphical
16	(Zizlavsky, 2013)	innovation process, controlling, management	Clarifying methodological bases of an innovation process and innovation performance measurement (see p. 675)	Graphical, descriptive
Grey literature				
17	(CGMA, 2013)	-	Exploring how successful organizations promote innovation, while also maintaining a balanced approach to risk and how management accountants can help promote a culture of creativity and renewal (see p. 2)	Graphical, descriptive
18	(Nesse, 2015)	-	Finding a recipe for sustainable innovation programs rather than mere spurts of innovation	Descriptive
19	(Samuel, Ohler, & McMurray, 2015)	-	Presenting two life cycles of innovation that must be managed	Graphical, descriptive

There are numerous approaches to analyzing a set of scientific papers: meta-analysis, meta-synthesis, narrative synthesis, mapping, and meta-ethnography, just to name a few (Okoli, 2015). Here, meta-ethnography was selected as it draws together data from multiple studies and enriches the understanding of the findings presented in each. It is the most commonly used qualitative synthesis approach. More precisely, the analysis relied on steps 4 and 5 of the seven-step meta-ethnography approach by Siau and Long (2005), which include: “determining how the studies are related” and “translating the studies into one another.” Thus, conclusions drawn in one paper were explained by those presented in other publications. In order to do so, several steps were undertaken. First, innovation process models were extracted from the papers analyzed. Second, all the models were presented jointly next to one another. This enabled a very clear comparison. In Table 2.3, all the models are presented one-by-one, which supports the identification of their general focus, their complementary character in relation to one another, the overlapping and disjunctive stages of the models, and the idea behind each stage. Third, based on the translation of each model into the others, a unified, consistent construct emerged. The procedure resulted in the creation of a model representing the process of innovation from the decision-making viewpoint. All stages

included in particular models are presented in Table 2.4 (grey boxes), and the conclusions drawn are presented in the next chapter.

3.2. Preliminary investigation

The purpose of the preliminary empirical study was to suggest just how important decision-making quality really is in increasing the overall efficiency of the product innovation development process. The preliminary study protocol consisted of 5 questions. Respondents were asked to evaluate the importance of each aspect of decision quality at each stage of the product innovation development process from the point of view of innovation process efficiency. The answers were provided on a scale of 1 to 7, where 1 indicated “very unimportant” and 7 indicated “very important”. Both decision-making efficiency and decision-making effectiveness were evaluated based on the adaptation of the already established research protocol (Hammedi, Van Riel, & Sasovova, 2013) senior managers from various disciplines need to collaborate to evaluate innovation project proposals and decide about the allocation of scarce resources to selected projects. Screening decisions are complex and made under high levels of uncertainty, and are considered to be one of senior management’s most challenging tasks. In the present field study, screening decision making is investigated from the perspective of a Transactive Memory System (TMS). The questions concerned the importance of:

- making optimal use of all available information and knowledge;
- making decisions rapidly;
- decisions being consistent with the company’s strategy;
- decisions making sense in light of the available financial resources;
- decisions contributing to overall company performance at each stage of the product innovation development process.

The data was gathered from 14 respondents – 3 scholars and 11 practitioners. The scholars were selected based on their research focus: innovation management (n=2), and economics and finance (n=1). Practitioners represented diverse industries, such as: food production (n=3), biotechnology (n=1), medicine (n=1), energy provision (n=1), mechanical engineering (n=4) and IT (n=1). They were employed as: directors (n=1), managers (n=6), R&D specialists (n=1) and project leaders (n=3). The respondents came from 10 different companies (two interviews were performed in one of the food production companies), all of which had a well-determined product innovation development process in place. Eight of the companies operated internationally, one operated solely in Germany and another solely in Poland. The interviews were performed in the first quarter of 2019, in Poland and Germany.

Table 2.4. Summary of innovation models

Stages	Introduction	Idea generation	Idea selection	Portfolio	Research	Development	Testing	Production	Market introduction	Monitoring and learning
Papers selected for synthesis and analysis										
(Andrew & Sirkin, 2008)										
(Bernstein & Singh, 2006)										
(Bowers & Khorakian, 2014)										
(Cooper, 2008)										
(Cornican & O'Sullivan, 2004)										
(Guan & Chen, 2010)										
(Hallstedt, Thompson, & Lindahl, 2013)										
(Hansen & Birkinshaw, 2007)										
(Havlíček, Thalassinou, & Berezkinova, 2012)										
(Kamps, 2013)										
(Louw, Schutte, Seidel, & Inser, 2018)										
(Pendea, Gourc, Pingauda, & Peillonb, 2013)										
(Szutowski, Szulcowska-Remi, & Ratajczak, 2019)										
(Lakshmanan, Ramachandran, & Ram, 2016)										
(Vitezic & Vitezic, 2015)										
(Zizlavsky, 2013)										
Grey literature										
(CGMA, 2013)										
(Nesse, 2015)										
(Samuel, Ohler, & McMurray, 2015)										

<p>Translation of the models into one another</p>	<p>Analyzing company interior and surroundings to identify strategic goals.</p> <p>Exploiting all the available internal and external sources of innovation (e.g., inventors, start-ups, small entrepreneurs, partners).</p> <p>Idea selection including technical feasibility, consumers' needs, analysis of long-term costs and benefits, and consistency with company strategy and goals. Coming up with the project definition.</p> <p>Managing the portfolio by allocating resources, assigning responsibility, monitoring potential projects.</p> <p>Conducting both: basic research (focused on the acquisition of new knowledge) and applied research (focused on specific and predetermined targets of use).</p> <p>Development uses existing knowledge gained from research and practical experience to produce a testable version of the product, a crude model or a rapid prototype.</p> <p>Testing innovation formally, including e.g. phases I, II and III in clinical trial and submission of regulatory authorization. Further testing on usability, design and price performed internally and with consumers.</p> <p>Production of innovation and alteration of current production process. Building semi-operational units simulating future production if needed. Monitoring output quality; compliance with the declared properties and the overall cost and ultimate efficiency.</p> <p>Market introduction of innovation. Marketing takes the leading role. Marketing research, customer testimonials used in setting price, distribution and communication strategies.</p> <p>Monitoring and learning. Formal methods of capturing experiences, systematically recording qualitative and quantitative data, and precise documentation are introduced.</p>
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4. Results and discussion

4.1. Model description

Translation of the analyzed models into one another resulted in the creation of a conceptual model representing the product innovation development process. It represents the process at the organizational level, and thus encompasses numerous single projects. The model presents in graphical form the synthesis and analysis delivered in Table 2.4. It comprises seven main stages (grey boxes) and five complimentary ones (white boxes). All the stages are mutually linked, allowing for the continuation of the process from earlier to later stages and for the feedback loops drawing the process back from later stages to prior ones (two-sided arrows). The numbers 1–6 in white boxes (solid line) represent consecutive key decision points, which separate the main stages. The numbers 1S–8S in white boxes (dotted line) present supplementary decision points (see Figure 2.4).

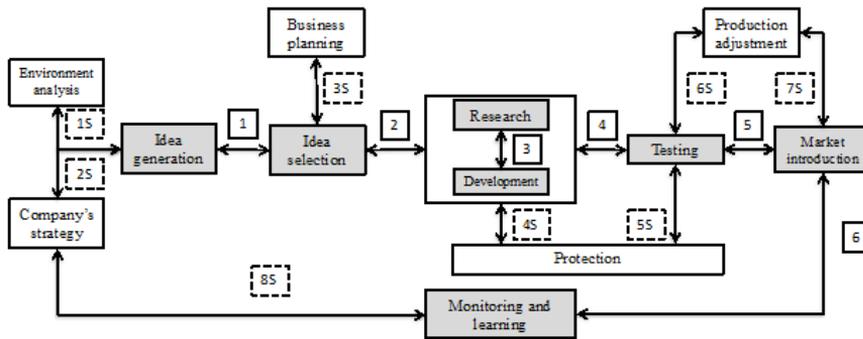


Figure 2.4. Model of the product innovation development process

The model explains the product innovation development process based on the stage-gate-stage logic originating from the work of Robert Cooper (e.g., Cooper, 2008) and widely present in the analyzed set of papers. It constitutes a conceptual and operational map for moving the process from idea generation to monitoring and learning in such a way that no steps or activities are missed, no time-lines are exceeded, and that organizational design, leadership and quality execution are adequate. Each stage is followed by a decision point where go/prioritize/return/hold/kill decisions are made.

As the model is set at the organizational level, activities within stages are undertaken simultaneously by representatives of different functional areas of the company. Thus, the process should not be perceived as sequential, but

rather as combining different functional areas performing at the same time (idea generation happens year-round and R&D is performed year-round, etc.). Also, the model guarantees flexibility at single project level, as not all projects need to pass through all the stages, stages may overlap, activities may be moved from one stage to the other, etc. Moreover, no department is strictly attributed to any particular stage as instead they all contribute at each stage.

The shape of the model is further supported by the control theory. Successful management of the process requires well-organized planning, data gathering, data analysis, and decision-making. As such, the model indicates where the actions accumulate to the point requiring a decision to be made, and where the support is most needed. Besides, it shows the path that the process follows, and where the combined decisions should ultimately lead. The model explains decision-making based on the decision theory so that at the decision points, deliverables (the results of activities undertaken at a stage) are judged against predetermined criteria, which results in the making of a decision. At this point, both efficiency and effectiveness of the decisions taken contribute to the overall decision quality (Hammedi, Van Riel, & Sasovova, 2013) senior managers from various disciplines need to collaborate to evaluate innovation project proposals and decide about the allocation of scarce resources to selected projects. Screening decisions are complex and made under high levels of uncertainty, and are considered to be one of senior management's most challenging tasks. In the present field study, screening decision making is investigated from the perspective of a Transactive Memory System (TMS). High decision effectiveness achieved at the decision point means that the result meets the criteria established by management. It minimizes potential errors such as spending resources on failures and ignoring potentially successful ideas. High decision efficiency minimises the resources spent on reaching the consensus, such as time, effort, staff, etc. It produces timely recommendations without wasting time and resources on the decision-making process.

The model is highly contextual and may not be detached from the environment. First of all, at each stage of the process, external cooperation, including an open approach to innovation is allowed (Chesbrough, 2003), and in practical applications – much wanted. Second of all, at each stage, the process may be influenced by a firm's internal factors (creativity, corporate strategy, risk-taking policy, technological capability, organisational climate, organisational structure) and the national innovation environment (financial system, infrastructure, regulations, demand conditions, knowledge and human resources, critical mass and physical resources) (Galanakis, 2006).

Control theory may be further employed to explain the existence of feedback loops between the stages of the process. Innovation controlling aims at ensuring that innovation activities are continuously measured and

valuated (Havlíček, Thalassinou, & Berezkinova, 2012). Observation and data analysis performed at each stage result in organizational improvement. Both new knowledge and good organisational practices are presumed to penetrate smoothly upstream and downstream in the process.

4.2. Importance of decision-making

As the study focuses on the decision-making perspective (decision points), it was crucial to answering the question about the actual importance of decision-making at the determined decision points. In line with the theoretical considerations, the respondents were asked to evaluate the importance of both decision-making efficiency and decision-making effectiveness within the process. The protocol consisted of 5 questions, two of which concerned the importance of efficiency, whereas three concerned the importance of effectiveness. The results obtained in this complementary study gave rise to two main conclusions. Firstly, what drove the successful management of the product innovation development process in the studied companies was the effectiveness of the decisions made. Meeting the established criteria was seen as more important than reaching the consensus rapidly and with fewer resources wasted. Thus, it was suggested that decision-makers in Polish and German industrial companies should dedicate a fair amount of resources to firmly support any go/prioritize/return/hold/kill decision. An independent-samples t-test was performed to compare the overall importance of decision-making efficiency and effectiveness throughout the whole process in the studied companies. The test confirmed that there was a significant difference between efficiency ($M=58.8\%$, $SD=5.1\%$) and effectiveness ($M=75.9\%$, $SD=5.9\%$); $t(7)=5.8$, $p < 0.01$. Secondly, the relative importance of the decisions made in the studied companies at each decision point increased as the process continued. These preliminary findings may be explained by the observation that each consecutive stage of the process usually tends to be more expensive than the previous one (Cooper, 2008). See Figure 2.5.

The model developed presents the product innovation development process from the decision-making perspective including key stages and decision points. The preliminary investigation suggested that decision quality is important for the smooth continuation of the process in Polish and German industrial companies. While both decision-making efficiency and decision-making effectiveness should be considered by the decision-makers, special attention should be paid to the latter.

The study suggested that it was crucial for the decisions made throughout the process to be consistent with the company strategy and to be made with respect to available financial resources.

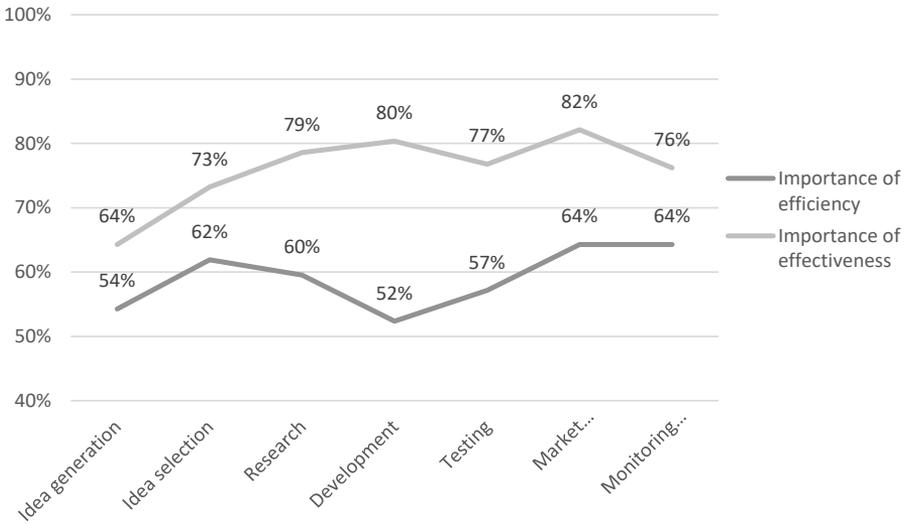


Figure 2.5. Importance of decision-making efficiency and effectiveness at the consecutive stages of product innovation development process

5. Conclusions

The purpose of the present study was to develop a conceptual model presenting consecutive stages and decision points within the product innovation development process. The study relied on a systematic literature review performed with the use of SALSA (Search, Appraisal, Synthesis, Analysis) and meta-ethnography methods. The complementary study included 14 interviews conducted in 10 Polish and German industrial companies with a well-determined product innovation development process in place. Based on the study, a conceptual model of the product innovation development process was created. It consists of the following stages: idea generation, idea selection, research, development, testing, market introduction and monitoring and learning, all of which are separated by decision points. The study suggested that in the Polish and German industrial companies at each decision point, decision-making effectiveness improves the overall efficiency of the innovation process to a larger extent than does decision-making efficiency. From the point of view of business practice, the study suggests a model of the product innovation development process and prompts managers to pay attention to decision-making quality. However, it is only after the verification of the model and further qualitative and quantitative studies that the model may become an actual managerial tool. It seems that promising directions for

further research would include: (1) confirming the conceptual model (stages and decision points) in a large-scale, international study, (2) measuring the impact of decision-making quality at the decision points on the efficiency of the process, (3) identifying the determinants of decision-making quality, and (4) determining how to support decision-making quality at each decision point. Moreover, a separate line of research could focus on the impact of partnerships on the course of the product innovation development process. The original questions were answered. However, the study was not free of limitations. First of all, despite English being the most popular language in scientific publications, papers published in national languages often produce important scientific contributions. Further research could encompass literature published in different languages. Second of all, while the systematic literature study performed allowed tailoring the research scope, the risk of omitting influential publications based on them not containing the search terms remained. Third of all, the preliminary empirical investigation was performed on a relatively small sample including only 14 respondents. A large-scale study in this area would be of value.

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Marketing communications of national art museums in Poland – barriers and opportunities for adopting a brand identity

Katarzyna Śmiałowicz¹

Abstract

Although there is quite a substantial body of literature which contains conceptualizations and models for introducing marketing communications in museums, there is still a lack of research that would answer the question why comprehensibility and effectiveness of brand image activities by Polish national museums, classified as artistic, is relatively low in comparison to the museum activities of other European cities. This research aims to find out; what inhibits the national art museums in Poland from improving their marketing communications for adopting a brand orientation and what opportunities museums have in this field. The method of data collection was qualitative in-depth interviews (IDI) with professionals responsible for marketing communication in national art museums in Poland. The issue of marketing communications and creating a museum brand image is a complicated subject due to the character of this type of institution. This research explores some barriers and potential to introduce modern marketing communications and brand orientation in national museums, classified as artistic, in Poland from the qualitative research lens. The article also presents recommendations for national art museums (and their authorities - state and local government units) striving to build a positive image of their brand and thus greater effectiveness in disseminating participation in high culture.

Keywords: *branding, museums, qualitative research, marketing communication, non-profit sector.*

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1. Introduction

The aim of the article is to present the results of a qualitative survey of marketing managers in Polish national art museums on the potential and possible barriers for these institutions to create the brand identity. According to the statutory definition, museums are „non-profit organizations”; however, nowadays they are faced with similar market rules as companies. Their aim is, amongst other things, to attract as many customers as possible. Although the Polish analysis, concerning marketing applications in museums, takes into account the status or type of museum depending on the organizer: national, state, regional and local, social and private museums (Stasiak, 2007; Nowacki, 2009; Rohrscheidt, 2011), so far the most important and most visited museums in the country, i.e. national art museums, have not been examined. The rank of ‘national museum’ has been given to only seven institutions selected from among Polish art museums, which take care of the most valuable art collections - the national cultural heritage. These museums have thus become institutions organized or co-organized by the Ministry of Culture and National Heritage, and they receive the highest, (among similar institutions), grants from the public budget. Therefore, they should serve as a model for other museums, and the fact that they reach a wider audience is becoming a mission to promote participation in high culture. According to the latest research, although the marketing communications of Polish museums are constantly developing, the potential of communication tools is used in a narrow scope, in a less integrated way and with no strategic perspective (Sobocińska, 2015; Macalik, 2018). Taking into account the fact that conceptualizations and models of introducing marketing communication in museums have been described by various authors (e.g. Griffin, 2008, Kotler, Kotler & Kotler, 2008, Baumgarth, 2009, Vassiliadis & Belenioti, 2015), it can be assumed that there are unrecognized barriers preventing national museums from taking full advantage of the possibilities of modern marketing communications and building a coherent brand image of museums. So far, the focus on the Polish ground has been mainly on research:

- perspectives for the development of marketing orientation in cultural institutions (Sobocińska, 2015);
- barriers to visiting museums as tourist attractions (Nowacki, 2015);
- barriers to managing museums as service organizations (Misiak, 2017);
- marketing communication tools used by museums in Poland (Macalik, 2018).

However, the potential and possible barriers to the creation of brand identity by national museums classified as artistic (GUS, 2018) in Poland were not identified. In order to fill this research gap, the potential of marketing

communication of national art museums in Poland was investigated using the Kapferer's brand identity model. Due to the exploratory nature of the analysis, a qualitative research method was chosen. The Grounded Theory has been used as the research basis, while the research technique is the in-depth individual interview (IDI). The interviews (IDI) were conducted with professionals responsible for marketing communication in each of the seven national art museums in Poland. The results of the conducted research may be a contribution to making hypotheses and conducting further research to verify them.

2. Literature background

Modern museums need audiences to justify their existence and ensure their survival (Cerquetti, 2016). The 21st century brings new challenges for museums (Burton & Scott, 2003; Kelly, 2004). Their mission to promote cultural participation is becoming increasingly difficult. Commercial corporations with strong brands create museums of their activities to improve their brand image (Shih, 2015). Brands' museums, multimedia museums, chocolate museums, and other similar institutions attract people who want to spend their free time pleasantly and effectively, by the principle of edutainment, which is based on combining entertainment with education (Addis, 2005). Thus, museums, which own the most important art collections of national heritage, face unprecedented competition, not only because of the availability of a wide variety of leisure activities (Nechita, 2014) but also from modern museums whose collections are perhaps less historically significant, but the entertainment aspect of their offer often turns out to be more attractive to the audience.

The issues mentioned above, described in more detail in the cited scientific literature, make marketing communication tools the key instruments for reaching the audience and building sustainable relations with recipients by museums (Kotler et al., 2008; Wallace, 2006; Hede, 2007). However, before a museum (or any other organization) decides which communication and promotional tools to use, it should have a clear idea of what brand it intends to create, what kind of identity it intends to give it and what image it intends to present to the public. Answering the above questions allows organizations to create their brand, to attract attention, but also to build trust among the audience. While the functional elements of a brand (e.g., name, graphic sign) are easy to copy, its symbolic and emotional dimension, i.e. the associations with the brand, beliefs, attitudes, psychological and social values it carries, are difficult to replicate (Kotler, Kotler, & Kotler, 2008). A museum with a strong brand can attract visitors with a positive image in their minds. Building a strong brand and maintaining its positive image in the consciousness of its

recipients have become a necessity for museums (Rentschler, 2006; Griffin, 2008; Baumgarth, 2009; Vassiliadis & Belenioti, 2015).

The marketing communication of museums is also considered in the context of the development of cultural tourism and, more specifically, museum tourism (Stasiak, 2007; Rohrscheidt, 2011). Rohrscheidt perceives the following conditions for a properly implemented promotion of the museum's offer: proper definition of the recipients (tour operators, guides, audiences), channels and leading motifs of information. In the opinion of the above-mentioned authors, a museum should be distinguished by visual identification (for both a graphic sign and a friendly information system including the exhibition), customized arrangement of exhibitions and museum information, the use of newsletters, running own Internet information portals (regularly updated) with booking services, as well as establishing and supporting associations of "friends of museums" and cooperation with institutions and organizations operating in other sectors of leisure time services (2011). The requirements for museums to develop cultural tourism correspond to the concepts of integrated marketing communication and branding. Therefore, it can be concluded that museum branding is also a requirement of contemporary tourism. The research described in this article aimed to examine the potential of marketing communication of national art museums in Poland for building brand awareness.

It seems surprising that although the promotion and marketing communication of a museum is considered important by the researchers as well as by the organizers, directors, and employees of museums, the opportunities for modern marketing communication in most museums are used in a narrow range (Macalik, 2018). Considering the fact that over the years there have been many, both Polish and foreign scientific studies on the implementation of marketing communication in museums and building the brand identity of the museum (Griffin, 2008; Kotler, Kotler, & Kotler, 2008; Baumgarth, 2009; Vassiliadis & Belenioti, 2015; Cerquetti et al., 2016), it seems even more surprising that the level of application of the proposed solutions in Poland is low. The described position indicates the existence of barriers that prevent Polish museums from introducing integrated marketing communication and creating their brand identity. It would be a mistake to assume that there are no institutions among Polish national art museums where marketing communication is at a high level and brand identity is created consciously. Thus, the survey also provides information on good practices and opportunities, as well as recommendations for other institutions.

The study aimed to identify the potential and barriers to coherent marketing communication of national art museums in Poland. Kapferer's prism was used as a tool for analyzing the possibilities and barriers of building brand identity by these museums. His concept of brand identity

consists of six elements: Physique (a brand's physical specificities and qualities), Personality, Culture, Relationship, Reflection, and Self-image (Kapferer, 2008). For each of these elements, the marketing communication of the museum, i.e. how the museum communicates with both the external and internal environment, plays a significant role. This analysis included the determinants of marketing communication of national art museums in Poland based on qualitative interviews conducted with professionals responsible for marketing communication in all national art museums in Poland.

3. Research approach and methods

Grounded theory assumes that social processes and the complexity of social life are best understood by the people involved. Thus, it was decided to conduct in-depth individual interviews (IDI) with people responsible for marketing communications in all national art museums in Poland. The research aimed to identify all the conditions and determinants of marketing communication of these institutions, as well as the mission and goals of those, who are responsible for it. An important aim of the study was to identify factors that are important for the conduct of marketing communication in the studied institutions and the potential (barriers and opportunities) of Polish national art museums in terms of building brand identity. To analyze the potential of branding by the surveyed institutions, Kapferer's brand identity prism was used. Due to the exploratory and inductive nature of the research, research hypotheses were abandoned, as this could limit the search field only to the threads known by the researcher, and thus contribute to omitting a spectrum of issues that the researcher may not be aware of (Sławecki, 2012). Qualitative research, by definition, is not repeatable, nor does it constitute a basis for generalization (in the understanding of statistical generalization), as it serves the purpose of a deeper analysis of the existing reality (Czernek, 2017). The transferability of qualitative research results means that "research results obtained in one context may be useful for understanding a given phenomenon in other conditions" (Muszyński, 2018, p. 192).

Data collection took place by in-depth interviews, which was chosen for a research technique. This technique does not require a detailed formulation of questions, as openness is the main advantage of qualitative interviews (Kvale, 2004). However, the issue of questions posed should be clearly defined (Kaczmarek, Olejnik, & Springer, 2013). The research areas are shown in Table 2.5.

Table 2.5. Research areas that have been included in the empirical recognition

Research area	Aims of the questions	The range of questions
The potential of marketing communication of national art museums in Poland for building brand identity.	Identification of the potential for brand image creation by national art museums in Poland and possible barriers to its development based on Kapferer’s brand identity prism	1. Physique: Visual Identity System The image on the Internet 2. Personality: Content of the messages How does a museum want to be perceived 3. Culture: Values Organizational culture of the museum 4. Relationship Relations between the museum and the public 5. Reflection: Museum’s approach to the viewer, museum workers’ knowledge about the viewers 6. Self-Image: How the museum’s recipients perceive themselves as using the museum’s offer

Source: own construction based on Kapferer’s identity prism Kapferer (2008).

Purposeful sampling is a technique used in qualitative research that involves selecting individuals that are especially knowledgeable about or experienced with a phenomenon of interest. The rank of national museums has been given to only seven institutions selected from among Polish art museums, which take care of the most valuable art collections. These museums have thus become institutions organized or co-organized by the Ministry of Culture and National Heritage, and they receive the highest (among similar institutions) grants from the public budget. The subjects of the study were the people responsible for marketing communication in all national art museums in Poland, i.e. the National Museum in Gdańsk, the National Museum in Kielce, the National Museum in Kraków, the National Museum in Poznań, the National Museum in Szczecin, the National Museum in Warsaw and the National Museum in Wrocław. One respondent represented each institution. Depending on the organizational structure of museums, they were employees of the Marketing Department, Promotion Department or Communication and Public Programs Department.

The survey covered seven Polish cities with national art museums: Gdańsk, Kielce, Kraków, Poznań, Szczecin, Warsaw, Wrocław. The interviews were conducted in places indicated by the respondents and followed the guidelines on the art of conducting qualitative interviews, in an attempt to provide the respondents with maximum comfort and freedom.

The survey was conducted in the first quarter of 2019.

The subject matter of the survey covered the identification of barriers and the potential for building a museum brand identity, based on Kapferer’s brand identity prism. All elements of the brand identity indicated in the model were analyzed: Physique, Personality, Culture, Relationship, Reflection, and Self-Image. The greatest emphasis placed on the elements of brand identity most strongly connected with the marketing communication of the museum were: Physique, Personality, Culture, and Relationship.

To ensure comfort and freedom of expression, respondents were made anonymous, which means not mentioning their name in publications, not providing full transcripts of interviews, and deleting from quotations and analyses those parts of their statements which may point to a particular institution or person. The results are presented in the next part of the article. Recommendations that constitute the application value of the article are formulated on their basis.

4. Discussion and results

The analysis of qualitative empirical data included the selection and organization of data and the creation of a set of analytical categories for interpreting data and presenting conclusions. Kapferer’s brand identity model, also known as the identity prism, was used to analyze the potential of branding in national art museums in Poland. Kapferer created the so-called hexagon of identity, in which he characterized the main elements of brand identity (Figure 2.6).

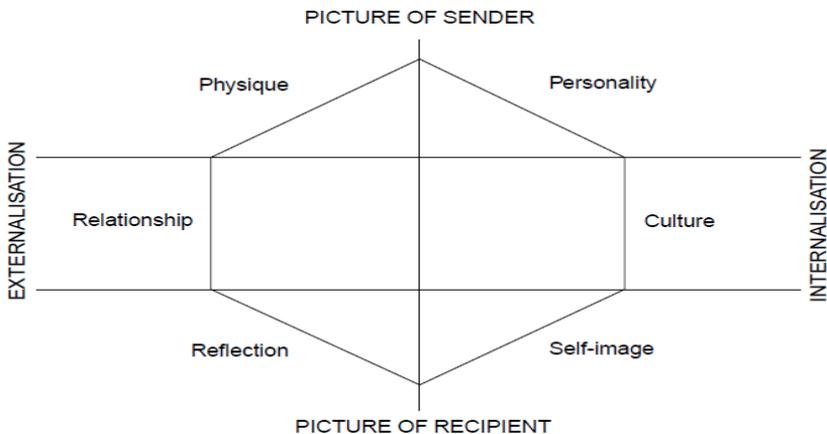


Figure 2.6. Kapferer’s brand identity prism

Source: Kapferer (2008).

1) Physique

The first element of brand identity distinguished by Kapferer is its Physique, which consists of all the elements of visual communication that the transmitter (museum) sends to the recipient. Visual communication includes the logo, logotype, but also all forms of visual advertising addressed to the audience, in the form of leaflets, catalogues, spots, etc., as well as elements of architecture and interior design of the museum and the appearance of any messages located within and outside the buildings (e.g. information boards, maps).

a) Visual Identity System (VIS)

In the aim of building a strong brand identity, museums should take care of the coherence of the elements that constitute the appearance of their brand, especially since each of the national museums surveyed is a multi-departmental institution. The appearance of each department and the messages sent from it should be consistent in such a way that the recipients perceive the activities of particular departments as the whole activity of the institution they are a part of. To maintain the coherence of the elements that compose the appearance of the national museum, it is necessary to create a professional Visual Identity System for this institution, and then rigorously follow its principles entered in the Visual Identity Book. A serious approach to visual identification is also evidenced by the setting up of the function of a “VIS guard”, i.e. a person whose task is to check if every message from the museum to the audience is compatible with the VIS. Four of the seven institutions examined have a Visual Identity System described in the Visual Identity Book, which is also a manual for using this system. Two museums respect the VIS rules so that their visual communication is coherent.

However, in all surveyed institutions VIS need to be completed. For example, they do not always contain information systems covering movement around museum exhibitions. The rules of the VIS are not always followed in the exhibition’s information: “Most of them were prepared before this identification was created, so now we would have to change everything. [...] In my eyes it is a success that we have managed to unify all the forms, we have managed to introduce the formats of these forms, and they all look as they should. [...] In our museum it has long been so that the VIS was one thing and using it was another problem. At the moment, all prints (or almost all of it) go through the Promotion Department. I don’t have to design it, but I have to accept it. When we are co-organizers of exhibitions, we also insist that external prints are checked by us. That doesn’t mean there are no accidents”.

Respondents admit that visitors to particular departments of national museums have no idea that they are visiting places belonging to the same institution. Moreover, some national museum departments have their visual identification, which is inconsistent with the identification of the whole institution.

Also, the artworks, which could be the museum's flagship or the basis of their brand, are promoted separately from the institution (some of them also have their own VIS and separate sponsors, allocating funds exclusively for the conservation, exhibition, and promotion of the selected artifact). Some respondents do not see any sense in covering all of the departments with a single VIS, emphasizing the individual character of particular departments: "We have a VIS and we're writing a request for a new one. [...] Harmonizing exposure signposting is complicated for us. Our departments are completely different. That is the abyss. The signposting is adapted to the character of the object, we cannot unify it, we can give the logo on the front of the building and we do it. [...] What's more, people don't care if this is a department of the national museum. We try to make these objects visited, and it is not important, whether we have a consistent identification of these departments. There's no need for that. We try to build the brand of the national museum as the most important cultural institution in the city, but it is not important for us whether a tourist visiting our department knows that this is our department. For us, it's important that he comes there and buys a ticket, and then he sees that there's a department nearby and another one [there are specific examples here], so there are leaflets from other departments in every department. However, it is not a priority for us, so that the department would be identified immediately, as [the full name of the institution is mentioned here]". A surprising contradiction can be seen in this statement. On the one hand, the respondents want their institution to be perceived as the most important cultural institution in the city and want people to visit the main building and the other departments, on the other hand, they do not see the need to promote all departments of the museum under one strong brand.

Nevertheless, coherent brand identity and its reflection in the perception of the recipient (brand image) is a promise of a good experience. People do not want to spend their time analyzing and comparing offers of places where they could spend their free time. They need a "shortcut" and the brand is that "shortcut" for them (Kotler, Kotler, & Kotler, 2008). A museum with a strong brand can attract visitors with a positive image in their minds. Some of the surveyed museums, however, do not have the VIS. There is no identification consistency between the different departments of the museum. Catalogs and leaflets are diverse, and there is no single template. There is only a logo that is used in all materials. The logo is accompanied by a graphics standard, but it

is not a logo manual. People from the Marketing Department try to make sure that the logo is used correctly, but sometimes the materials are printed without their knowledge: “I hope that this will change because if we want to maintain consistency in communication, we should influence what is printed. Lack of VIS is also a problem because I remember the moment when the museum in Warsaw started using VIS and it was clear, that it works. There is no such thing in our museum. [...] It’s scattered around, every department for themselves. [...] There is only a logo that is used in all materials, we try to make sure that it is used correctly”. Using the museum logo in all materials and departments of the museum is not practiced in three institutions (although some of them make an effort to introduce such a practice): “There is a system that we follow, we try to make it a kind of continuity, but we do not have something that is developed, described in the book. The leaflets we print are always in the same form. [-For all the departments the same?] - No”. Some departments of the surveyed museums have a separate logo, a separate website and a separate profile on social media. One of the departments has a VIS, whereas the main institution to which it belongs does not have it. The respondent explains this by the fact that it is the newest, recently built department of the museum: “When this department was built, it was not entirely clear, whether it would belong to the national museum or not. Finally, it happened that it belonged to us, but because it wasn’t our initiative, this department functions a little separately”. The department of another national museum has a separate logo and a separate page due to the requirements of the EU subsidy it received for renovation: “They had to create the site, it has to be running for five years, then we are going to take it off.”

In institutions that have VIS, respondents are satisfied with it. Their opinion had been taken into account when making decisions about its form, so they identify themselves with that. However, they see a need for rebranding or updating the VIS in some cases. In institutions which do not have the VIS, people responsible for promotion and image of the museum do not identify themselves with the graphic symbol they have to use: “I am not enthusiastic about the museum’s logo, I think it is archaic, but I don’t know if there are any changes planned”. Most respondents are willing to implement a coherent VIS: “The VIS would make things much easier for us and it would be the next step in modernizing these things, and of course, we think about it.”; “VIS, new: a new logo, all the markings, including the orientation identification in buildings and the standardization of external identification - this is necessary, but nobody here understands it, and therefore I simply do not have the money for it. I have a preliminary draft with a price estimate, and the price is quite reasonable for this type of work. At the moment, I do not think it will succeed”.

b) The image on the Internet

According to Kotler, Kartajaya, and Setiawan (2017), modern marketing should combine traditional and digital approaches. Thus, an extremely important element of museum branding is the image of the museum on the Internet. The role of the Internet in museums is increasingly important and will have an even greater impact in the future, due to new interactive communication perspectives and mobile technologies (Tallon & Walker, 2008). All the surveyed national museums have their websites, which are regularly updated, however, the respondents asked about the websites of their institutions declared their willingness to change: “This is not the final website, this is a temporary website that we did in five days, about two years ago, when we had to take off the previous page for technical reasons”. Some respondents have reported that they are in the process of making changes to existing websites or building completely new websites: “Now we’re changing it to a new one. The website is already very old, [...] but so far, due to a lack of funds, we could not do anything with it, although we were aware, at least in the Marketing Department, that the website is already quite seriously outdated”.

In recent years, more attention has been paid to the role of social media and their application in the museum sector, which is associated with the museum’s shift from one-way communication to dialogue with audiences (Marakos, 2014). All respondents agreed on the important role of social media in communication with visitors. Each of the surveyed institutions has a profile on Facebook and YouTube. Most (except for two) have a profile on Instagram. Twitter is less popular. Museums do not have profiles on portals more often used by young people such as Snapchat. Respondents justify this choice by the ephemerality of the content appearing on this portal. They also predict the end of Snapchat is near.

Not all the opportunities of the YouTube channel are used by national museums. Two of the surveyed museums recorded professional films promoting permanent exhibitions, which are very popular. One museum decided to cooperate with an influencer. Other institutions have films promoting exhibitions or particular departments (all national museums are multi-departmental institutions), but respondents admit that they lack the time and financial resources to record more interesting content on YouTube.

Not all of the studied institutions use free online tools to provide information and attract tourists, such as Google profile or Tripadvisor. Some respondents admit that they do not have time or are not able to use these tools. The Google profile of one of the museums has been taken over by someone from outside, so false information appears there.

Most Internet portals, search engines, and social networking sites offer the possibility of paid advertising. Two of the surveyed institutions use this option, while respondents from other institutions admit, that due to financial reasons, they can rarely afford to buy online advertisements.

2) *Personality*

Brand Personality is an important element of identity because it brings it closer to the consumer by giving it human characteristics (Taranko, 2011). How it speaks “shows what kind of person it would be if it were human” (Kapferer, 2008, p.108).

a) Content of the messages

A company or institution may express its personality through the way it communicates with its recipients and, above all, through the content of the messages broadcast, e.g. content posted in Internet media. Some respondents point to limitations connected with the need to maintain the authority of an “esteemed institution” and problems with adapting the content of messages created by the curators of the exhibitions to the needs of its recipients: “I get texts that are painful, so uninteresting, they tell me about the exhibition in a school way. [...] I never have a starting point in the text. I don’t know what the exhibition is about when I read it”. Respondents from several institutions are posing this problem: “The simple thing - the text. There are, of course, curators who can write a pleasant, light text, but most of them are very difficult texts written in the jargon of art historians, where the language is sometimes so hermetic that it’s impossible for the audience to get through. The problem is to convince curators to write texts more accessible or to trust us that if someone from us modifies the text, the text is not worse”. The cited excerpts show that there is no consensus among the employees of the institutions represented by the cited respondents as to the content of the messages sent out to the audience. It is difficult to consciously create a museum personality in such circumstances.

b) How does a museum want to be perceived

Some institutions, on the other hand, try to consciously create the personality of the museum brand as an educated expert in the field of art: “We try to create the brand of the museum as an expert institution. We show that we not only make exhibitions but also have experts on a national, and even a European scale, in the field of conservation, storage of collections and art history. In

the media, it is strongly established, e.g. that our director is a very wise man and can tell us not only about the exhibition in the museum but also about some discovery in the history of art, about a painting that was sold at auction at high prices, etc.” Respondents identified the museum with a high level: “People are looking for easier things, but we are trying to keep a high level. We will not do something that will not have an audience, but also we will not do something just because it will be popular and people will come to it”. The conflict between the egalitarian mission of promoting participation in high culture required today and the traditional elitism of museums makes it difficult for museum staff to clearly define the personality of their institutions. Some respondents allow the possibility that the personification of a museum is a person with a sense of humor, but jokes must also be “high quality.” One of the museums has successfully introduced a new way of communicating through Instagram, using situational humor and linking current events with the artworks in its collection. They created “heheshkas”, widely observed, also by respondents who, although admitting that they follow the profile of this museum themselves, would not decide to promote their museum in this way. However, in this manner, the museum gains a more attractive personality, closer to the younger audience.

3) Culture

a) Values

Brand culture is the basic values of a brand, its source of inspiration and (although not always) its relationship with the culture of the country of origin. The cultural values represented by the national museums in Poland are obvious. Each of the surveyed institutions presents itself as one of the oldest and most important museums in Poland, possessing extremely valuable collections of national identity. These aspects of the culture of national museums in Poland will not be questioned in this article. On the other hand, the brand culture consists also of its organizational culture and the activities of its employees (Teślowski, 2018).

b) Organizational culture of the museum

The survey analyzed the impact of the organizational culture of national museums on their marketing communication and brand image. National museums in Poland differ significantly in terms of their organization. In some institutions, marketing communications are handled by the Communication Department in cooperation with the Marketing Department, which employ

a team of specialists, whereas in other institutions: “there is no clear definition of who is responsible for what because marketing issues are scattered across many departments. We have been collecting them for many years to control them, but they are in the Publishing Department and a little in the Education Department and the Press Officer and they are in the different sections... We tear things out of the spaces where they have been developed, things that we believe should be in our hands to be able to act effectively. There is no clear division of roles. Theoretically, it is written down, but in practice, it doesn’t work”. It is also a problem to convince other museum employees to perform certain tasks: “When we created the website, we tried to introduce such an idea that there would be a person in each section, who would submit information about this section, [...] but apart from us, only two people were doing it. Another issue is the role of the exhibition curators in communication with the audience. Should these people be the authors of all texts concerning exhibitions and artifacts, or only scientific studies? Another question is whether the professionals responsible for promotion can transform the texts of curators into advertising content.

The lack of a clear division of tasks and rules of cooperation may cause operational problems: “The curators write about promotional tools in their projects without asking me for my opinion, and then it is my responsibility. If someone writes nonsense in a ministerial application and then it has to be done – it’s a big trouble.”, and also to personal conflicts: “The director does not say clearly who is responsible for what and who should accept what when organizing an exhibition [...] I once [...] wrote a very good text and [the exhibition curator] protested against the fact that a technical worker writes the texts and my director told me that I had to publish her text on the website. [...] Custodians think that they are responsible for everything related to the exhibition, and yet this should not be like this. The exhibition consists of many elements and these elements should be performed by specialists in the following fields”. The language of the museum’s communication is the subject of misunderstandings between marketing specialists and exhibition curators. Marketing communication specialists often think that the custodians’ texts are too hermetic. In national museums, personal aspects determine the quality of cooperation between the staff: “Some curators are easier to work with and some things can be done immediately, and some are not. These are also issues of relationships, different personalities”, which does not mean that cooperation is always difficult: “When we have to prepare an exhibition promotion, we sit down with the curators and think about what could appear on the poster, what would be the first step to the visual key.”

It seems much easier to cooperate in organizations where certain solutions are implemented top-down and systemically, through the rules of cooperation

with the Promotion/Marketing Department approved by the director or through the use of a computerized internal communication system, which forces the use of certain procedures, and it is transparent, because everyone can always check who started a given procedure and when (e.g. Adonis): “we’ve got this well-organized”. An important aspect is also the location of the individual departments, if they are located close to each other, it facilitates harmonious cooperation and the creation of a common vision of the identity of the museum: “We are close to each other, we do a lot of things together [...] All the departments are concentrated in one place”. If the departments responsible for marketing communication are located in different buildings (for example a Marketing Department in one building and a Press Officer in another building) creating a coherent brand image of a museum is more difficult.

4) Relationship

The brand Relationship is its relations with the social environment and stakeholders, but also with the direct recipients. For museums, which are service organizations, the most important are the relations with the direct recipients. They can take place both on the Internet (which was described earlier) and directly in the museum: “we build these relations mainly on the Internet, through Facebook, we answer very different questions, [...] but sometimes it happens that we work hard on promoting an event, and when someone comes and clashes with someone unpleasant to them, all our work is in vain, because of what happens in a museum, people do not come back to us”. The problem of the approach of museum staff to their institutions as service organizations was described by Misiak (2017). As the author points out, museum staff does not want to see the museum as an institution serving people. Some respondents from the surveyed national museums notice this problem in their institution: “I have such an impression sometimes that this is an idea of a museum as a place that preserves and protects its collections and, in fact, years ago, the audience was never important. In recent years that has changed, it’s beginning to matter that people should also participate in it. That’s why they make museums that are interactive and in my opinion, this is a difficult moment. [...] I am talking about people who work in this museum, who sometimes find it hard to understand that the approach to museums is changing in the world. I think it will take some time for them to change their thinking. I remember those times myself that when I went to the museum I didn’t feel welcome. Today it’s different. I am in favor of museums being places where people feel good, can ask, find out and touch. These are museums that I think are right, but on the other hand, I am aware that such

things do not change in ten years”. The structure of employment in national museums reflects the disrespect of the audience. The “first contact” persons are the personnel at the lowest level, uneducated, lowest paid. Specialists, custodians, and curators rarely meet visitors to the museum. Special events are an exception: vernissages, lectures, guided tours. The growing interest shown by museums in their recipients can be proved by a significant number of events, indicated by respondents from each of the surveyed institutions: “This weekend, for example, we are organizing 22 events”. However, even in museums that understand their role as a public institution serving the people, the audience is rarely seen as equal partners. The most common belief is that the viewer should be taught. This approach is represented by institutions surveyed. However, respondents were aware of the need for change.

5) Reflection

This is a brand identity element strongly linked to the previous one, which means that the brand should reflect the image of its consumer. It requires in-depth knowledge about the audience, which is why museums should research the public. Some of the institutions surveyed attach great importance to audience research and regularly conduct such research, including qualitative research. In these institutions, the recipients are more often treated as partners, included in projects as co-creators of exhibitions or events. These are the institutions with the strongest brand among the surveyed and the highest attendance. Other museums rely on statistics available free of charge or carry out small-scale research on their own, and there are institutions where research is not conducted at all: “We don’t research anything at all. We do not evaluate projects at all, including the promotion projects”. As a result, visitors are perceived more often as passive recipients who should accept what is offered to them than people with specific expectations (Misiak, 2017).

6) Self-image

The last element of the brand identity, distinguished by Kapferer, is its Self-image, i.e. how the brand’s recipients perceive themselves as using the brand’s offer (Taranko, 2011).

As before, in this aspect of branding, we can also feel the tension between the vision of the museum as a public institution - accessible to all, egalitarian, and the vision of the museum as an elite institution. Respondents perceive the recipient of the museum’s offer as a member of the elite. Each of the respondents emphasized that the museum has “its own group of recipients,”

which should not be forgotten, for example by introducing innovations to the museum's offer. On the other hand, the mission of the museum is to promote participation in higher culture; thus, the recipient of the museum should be everyone. Thus a narrative appears: "At a certain age or a certain level of education it is not appropriate to never see [the name of the exhibition of the examined museum was given here]". The pressure for museums to expand their audience does not necessarily mean lowering the level, although it is often perceived this way by museum workers: "in the campaign [the name of the campaign] we used a joke to show the museum in a different way of seeing the museum and it was catchy, [...] but it was criticized by museum workers who claimed that it shouldn't be like this, that the museum is a temple of elite art. But the truth is, they weren't the recipients we wanted to target. [...] It was supposed to reach those who had never entered the museum, had never been there, didn't know what was there and didn't know that there was such a museum at all. Their reactions, when they wrote that they had to come and see it, were important to us". Regardless of the chosen vision of the museum (elite or egalitarian), the recipient of the museum's offer may feel like "someone better". In the first case, someone who has just joined the elite, while in the second case, someone who learned something, broadened their horizons, and effectively spent their time.

6. Conclusions

As the survey showed, people responsible for marketing communication of national museums in Poland, who want to build their brand, face barriers related mainly to the management and organization of the surveyed institutions. Another problem is the lack of awareness of the need to build a museum brand and the unwillingness of museum workers (curators, custodians, museum directors) to introduce marketing orientation in these institutions and the unwillingness to promote participation in high culture by using marketing communication tools to expand the audience. In institutions where the awareness of the need to build a brand of a museum as a place worth visiting (not only for selected ones) is high, marketing communication is at a high level and the team responsible for it consists of specialists in their fields. Procedures for cooperation with other departments, e.g. in the organization of exhibitions, have been developed and sanctioned there. These museums conduct regular audience research, both quantitative and qualitative, to get to know their audience, to properly create elements of brand identity, such as Personality, Reflection, and Self-image. These are institutions that treat the recipients as equals and invite them to co-create their offer. The appearance and language of the messages addressed to the audience are adapted to their

needs and tastes, and the experience of being in the museum is designed to make the recipient feel good. Only in one of the museums surveyed do the authorities and staff consciously attempt to build a brand identity based on the practices described above, although there is potential and good practices in the other institutions, which may result in a strong brand in the future. To overcome internal barriers, the following recommendations for cultural institutions that want to use marketing communication professionally and build their brand identity were distinguished:

- 1) Employ specialists responsible for various aspects of marketing communication (PR specialist, marketing specialist, new media specialist, press officer, exhibition arranger, etc.) and create project teams to work on exhibition promotion or events.
- 2) Build relations with the audience by using a long-term marketing communication strategy.
- 3) A clear division of responsibilities should be provided in the internal rules.
- 4) The Visual Identity System should be used and a “VIS guardian” should be appointed.
- 5) Using an internal communication system, e.g. Adonis is a good practice.
- 6) It’s worth investing in “first contact persons” training.
- 7) It is necessary to adapt the language of the texts to the needs of the audience (e.g. using the ‘Clear text’ tool) and to adapt the form and language of the content to the specific media (short and dynamic YouTube videos, humorous social media posts, etc.).

The solutions recommended above are a collection of practices applied by the surveyed museums that have proved their worth in the course of their activities. The analysis was interpretative, which is associated with certain limitations. The survey cannot be considered representative and should, therefore, contribute to further research. Especially interesting seems to be the study on the perception of the brand image of national art museums by the audience.

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The use of gamification in creating customer attitudes in the energy market

Katarzyna Wasiluk-Maksymiuk¹

Abstract

The main purpose of the paper is to present the potentiality of using gamification in creating customer attitudes in the energy market by identifying examples of R&D projects in which gamification in the field of energy management was used. In order to fulfill the research goal, R&D projects in the field of research and innovation, implemented under the Horizon 2020 Framework Programme, were reviewed. Additionally, an in-depth analysis of one of the reviewed project was carried out (i.e. Energa Living Lab realized in Gdynia). The conducted research provided the following conclusions: firstly, there is the possibility of practical use of gamification to create consumer attitudes in the energy market, as demonstrated by the review of R&D projects. Secondly, based on the analysis of results from the Energa Living Lab project, it can be concluded that gamification in the power industry can not only improve energy efficiency indicators but above all, be an effective method of attracting the attention of energy users and engaging them in direct interaction. Energy management, that includes planning and operation of energy production and energy consumption, should embrace and create positive trends in resource conservation, climate protection, and cost savings. Scientific considerations including contemporary energy management's challenges. The work demonstrates the knowledge and specific data which can constitute the base for the inspiration of further economic research in the energy market.

Keywords: *gamification, energy management, smart grid, IT systems, energy efficiency.*

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1. Introduction

In the contemporary world, the dilemma between living in the reality of continuous growth, increasing consumption of raw materials, as well as increasing waste production and the protection of natural environment, and related to it some apparent inconveniences resulting from transferring from a linear economy to a circular economy, is an issue raised by researchers of various scientific disciplines, such as sociology, psychology, law, economics or environmental sciences. This interdisciplinary approach aimed at defining and describing modern economic development has led to the redefinition of the concept of Economic Man (lat. *Homo oeconomicus*). And so, in terms of heterodox economics, one can talk about the concept of a Globally Aware Man striving to achieve maximum value with the maximum use of all raw materials, products, and waste. The goal of this Globally Aware Man's actions is to preserve the trends of economic growth while developing the trend of energy-saving and minimizing greenhouse gas emissions.

The research process commenced by searching for answers to the following questions: is the occurrence of the phenomenon of economic growth possible while minimizing energy consumed in the economy? What measures are taken to minimize energy consumption in the economy? Can an energy distribution system be managed by controlling consumer behavior? The abovementioned questions were used to present the idea of transferring the methodology from cybernetics to economics and allowed the contemporary version of Economic Man to be compared to a player in a particular system that needs to be designed - both from the player's perspective and the perspective of the system itself. In this way, the question asked at the beginning of the research process contributed to the characterization of the phenomenon of gamification, that is defined as the use of computer game elements and design techniques in a non-game context (Werbach & Hunter, 2012), as well as to determine the role of this phenomenon in modern energy management systems.

An undoubted limitation of this study is the fact that the phenomenon of gamification is relatively young. Gamification was used for the first time in 2008 in the context of computer software (Walz & Deterding, 2015), however, as Google Trends statistics currently show, until 2010 this term had not gained popularity. In terms of research on gamification (2011) can be mentioned as to when the first studies on the phenomenon, treated in various contexts but mainly in the learning process or education, appeared in the Web of Science collections. Besides, the fact that the idea of using gamification in energy management is still experimental makes this study a descriptive attempt to systematize the current research achievements in this area.

2. Literature review

For almost five decades, the literature on the subject in the field of earth sciences, biological and social sciences points to the problem of disturbing the social and biological structure of human existence in the environment consisting in excessive exploitation of the natural environment. Carson (1963) pointed out for the first time that the level of technical development threatens not only animals and plants but also people. Other American authors followed Carson, i.e. Ehrlich (1968), Commonor (1971), Hinrichs (1971), Meadows (1972), pointing out that the essence of this problem lies in the inability to reconcile the pace of civilization development with rational resource management (Skowroński, 2006). Many studies treat the fact that the greatest and most current political and economic challenge of the modern world is to direct the economy on the tracks of sustainable development, by applying or even forcing the use of environmentally and human-friendly techniques and resource management technologies (Chyłek, 2016). What is more, in the literature, it is indicated that urban agglomerations should be the subject of strategic actions aimed at mitigating climate change (Carter et al., 2015; Broto, 2017). And although the debate on the very concept of sustainable development is very long, it is still not possible to precisely determine what the consistency of economic activity and the natural environment should be or how to achieve it. In general, for economic activity to be known as sustainable, the following assumptions must be met: being based on the use of renewable natural resources for durability, taking into account the protection of ecosystem properties and functions, striving to preserve biodiversity, and avoiding irreversible damage to the environment and nature (Mulder & van der Bergh 2001, as cited in Jeżowski, 2012).

Faced with recently observed climate change, namely global warming as a result of an uncontrolled increase in greenhouse gases emissions, it is particularly important to discuss at an international level the issue of keeping emissions below the critical threshold in the context of sustainable development. One such international initiative is the United Nations Conference on Environment and Development (UNCED), convened in 1992 in Rio de Janeiro, also known as the Rio de Janeiro Earth Summit, the Rio Summit, the Rio Conference or the Earth Summit. As a result of this conference, the United Nations Framework Convention on Climate Change was signed. Thanks to this, the goals and assumptions of international cooperation regarding the stabilization of greenhouse gases concentrations in the atmosphere responsible for the global warming phenomenon (Journal of Laws 1996 No. 53, item 238) were defined. The most important, legally binding instrument of the Convention is the Kyoto Protocol, signed on December 11, 1997. The Protocol specifies

the classification of greenhouse gases and sets quantitative targets which are binding for the issuing States Parties, including those regarding the increase in energy efficiency (Journal of Laws 2005 No. 203 item 1684). The protocol came into force in February 2005. Initially, the Protocol covered the period 2008-2012, but during the climate summit in Doha (Qatar) in 2012, it was decided to extend it for the next period, i.e. for the years 2013-2020 (Journal of Laws 2018 item 669). Another important step was to draw up the Paris Agreement for the United Nations Framework Convention in 2015 at the Paris (France) Climate Summit, which established the principles of climate protection after 2020. This agreement is significant because it is the first, official international document legally binding provisions of this case. The agreement departs from the previously adopted calculation system for carbon dioxide emissions in favor of the main, long-term goal of limiting the increase in average temperature, which may contribute to lowering the risk and mitigating the consequences of climate change (Ciechanowicz-McLean, 2017).

The European Union, which has been promoting the concept of a circular economy since 2014 (Korhonen, Honkasalo, & Seppala 2018), emphasizes the issue of greenhouse gases emission in the context of energy efficiency, as well. The concept of a European circular economy is based on: the idea of developing a low-carbon economy that effectively uses resources as well as decoupling economic growth from the use of resources and energy, reducing carbon emissions, increasing competitiveness and ensuring energy security (Burchart-Korol, 2016).

As a result of the literature review, it was possible to diagnose the main research trend in economic sciences in the field of ecological economics in the aspect of resource management. The main direction can be indicated by attempts to analyze the possibilities of minimizing the impact of human activities on the natural environment while maintaining economic growth based on a circular model. Unfortunately, it is increasingly emphasized that actions taken to slow down negative climate change do not bring the intended result, and the circular economy is impossible to implement on a large scale (Millar, McLaughlin, & Borger, 2018, Kirchherr et al., 2018, Garcia-Barragan, Eyckmans, & Rousseau 2019). This is evidenced by *The Global Carbon Budget 2017*, a report prepared by 76 scientists from 57 institutions. According to the report, despite various measures taken to reduce emissions of carbon dioxide and other greenhouse gases and many attempts at increasing the efficiency of using raw materials so as to get closer to a model of the circular economy, not only is a slowdown in greenhouse gas emissions not being observed, but the growing scale of the problem, up about 2-3% each year, is being recorded. In the face of this ineffective struggle to maintain the pace of economic growth, while mitigating the consequences of human

intervention in the natural environment, new experimental methods using the increasing significance of consumers in balancing the energy demand are sought (Olkuski, Ciesielka, & Szurlej 2015).

3. Research approach and methods

Based on the reviewed literature, the research problem has been diagnosed. It can be described as searching for new methods of energy management in the face of the lack of possibility to slow down the negative impact of continuous economic development on the natural environment. In order to examine the problem mentioned above, an analysis of source materials was used, i.e. the literature on recognized methods for managing energy demand, and reports on research and development in the field of developing new methods of managing energy demand.

Generally, there are several basic models of demand management for electricity. The most common model is price regulation. The idea of this model consists in observing trends in the distribution network and determining the power profiles and balancing directions. On the basis of these observations, a division of the day is carried out for periods in which increased demand for power is observed, as well as those in which there is an oversupply in the network. For periods of increased demand for power, more expensive tariffs are set, and for periods of oversupply of power in the network, tariffs are cheaper. This procedure is to induce electricity consumers to the maximum reduction of power consumption from the network in diagnosed periods of increased demand for power and to increase power consumption from the grid during periods of oversupply. In recent years, interest in a model based on the use of energy storage has been increasing. The idea of this model is based on the desire to minimize energy losses during periods of oversupply. If there is an oversupply of energy in the network, its excess is directed to the energy storage. When the increased demand for power is recorded - energy from the storage is released into the network. This model is used not only in distribution networks but above all in microgrids equipped with their own devices producing electricity.

A new phenomenon in electricity demand management, which was already mentioned during the literature review, is the experimental use of the growing importance of consumers in balancing the demand for energy (Olkuski, Ciesielka, & Szurlej, 2015). These modern models include dynamic management of energy demand, based mainly on smart grid solutions. The intelligent network is based on innovative hardware solutions that allow the network status at its individual nodes to be monitored in real-time, e.g. through remote meters or other devices supporting the monitoring of network behaviors. In addition, intelligent networks are supported by IT solutions

implementing self-learning algorithms that allow partial or total automatic control of the network. However, the intelligent control of the network is not enough, because very often the consumer of electricity is unaware and does not have sufficient knowledge of activities to increase energy efficiency. Thus, demand-response solutions help to activate energy consumers in order to better manage energy demand in the conditions of unstable and changeable energy demand while simultaneously changing the energy generation characteristics. In light of the growing importance of consumer activation of electricity, a practical solution that continuously increases its popularity is the use of gamification methods in modern energy demand management models.

It is noted that gamification is understood as the use of computer game mechanics in non-game contexts which bring tangible results in marketing (Tkaczyk, 2012). Therefore, attempts are made to transfer these well-functioning mechanisms from the enterprise level, i.e. from the microeconomic level to the regional level, i.e. the meso-economic level or the general economic level, i.e. the macroeconomic level. However, to make a correct mapping of these mechanisms on the meso- or macroeconomic scale, one should build a certain simplified model of economic reality. For the purposes of creating this economic model for the analyzed research problem, it was decided to borrow methods used in cybernetics and digital technology. Therefore, the use of gamification as a method of supporting energy management in a regional or general economic context has been considered in the category of a controlled system.

When transferring the gamification model from digital technology to the macroeconomic level, it should be pointed out that it consists of two perspectives - the player's perspective, i.e. the Economic Man perspective, and the system perspective, i.e. the economy. The player's perspective describes the player's position, i.e. his demographic, sociological, psychological and economic situation. The perspective of the economy describes the search for methods of achieving planned strategic and tactical goals without losing focus on the player's values. In the player's perspective, the most important part is collecting valuable items (skills). In the economic perspective, the most important parts are the decisions creating values for the player (Hunicke, LeBlanc, & Zubek 2004). In the described case, it is necessary to the concept already known in economics, i.e. *economic planning* has been replaced by a concept taken from cybernetics, i.e. *control*.

According to the dictionary definition, control is the management of the operation of a certain device by means of other appropriate devices, i.e. controllers (PWN Dictionary, 2018). According to the technical definition, control is a dynamic system in which specific process waveforms can be enforced by means of control interactions on an object that is called a control object; it is possible to describe this object by states, parameters, and structure

of connections between elements (Kaczorek, 2018). Nine elements must be distinguished in this economical, dynamic system:

- a **player**, that is understood as a modern Economic Man;
- **revenues**, understood as economic or psychological profits;
- **costs**, understood as expenses incurred;
- **behaviors**, describing the necessary actions of the players, aimed at achieving benefits;
- **aesthetics**, describing the moods that accompany players;
- **dynamics**, describing the mechanisms acting on the player;
- **components**, describing elements characterizing system operation or giving feedback to players;
- **mechanics**, describing the rules in force in the system and elements of dynamics;
- and **platforms** describing the space in which the system was implemented.

The same elements compose the basic model of gamification - the process of using computer game mechanisms to motivate and engage entities in a certain environment (system) that is not a game reality context, to maximize the effectiveness of expected activities (Hunicke, LeBlanc, & Zubek, 2004 as cited in Arenas, 2013). And that means that the basic model of gamification is also applicable in economic sciences.

4. Results

The idea of using gamification in economic sciences and management sciences is not purely theoretical. Because the mechanisms of gamification have already found their practical application in energy management - they have been applied in research and development projects addressing the problem of effective energy management, including in:

- 1) Charged – a project carried out under Horizon 2020, the European Union Framework Program. It aims to achieve greater energy efficiency and to reduce energy losses in public buildings. As part of the project, an application implementing gamification mechanisms was created. The application is designed to inform building users about their energy wastage and provide personalized recommendations in real-time. The solution, in the form of pilot installations, was introduced in three European cities, and the game covered 150 players (Charged, 2016).
- 2) OrbEEt – a project carried out under Horizon 2020, the European Union Framework Program. Its goal is to improve organizational behavior aimed at improving the energy efficiency of public administration offices. The project developed responsive systems based on teleinformatic solutions that measure electricity consumption

- and provide feedback encouraging energy saving for building users (Benefice, 2019).
- 3) PEAKapp – a project carried out under Horizon 2020, the European Union Framework Program. Its purpose is to motivate users to a more energy-efficient way of behavior by offering individualized savings opportunities when using electricity. The IT solution, which is a mobile application, will dynamically offer discounts during peaks of electricity production from renewable energy sources to enable users in households to actively lower their own carbon footprints (Energie Institute, 2018).
 - 4) EnerGAware - a project carried out under Horizon 2020, the European Union Framework Program. The main objective of the project is to reduce energy consumption and thus also greenhouse gases emissions. As part of the project, a game for energy consumers will be developed. The goal of the game will be to provide players with knowledge about good energy habits. The game will be linked to the actual energy consumption in these consumers' households, and the data will come from a smart meter. To strengthen the mechanisms of gamification, the game will be embedded in social media and other network tools. The pilot program will cover 100 households (EnerGAware Consortium, 2015).
 - 5) Energa Living Lab – project co-financed by the European Union and the National Fund for Environmental Protection and Water Management under the LIFE + Instrument. The main goal of the Energa Living Lab project was to reduce greenhouse gases emissions as a result of optimizing energy management in project participants' homes. The project was divided into two phases. In the first phase, project participants tested pilot pricing and infrastructure solutions for managing energy consumption. This management consisted of informing participants about currently applicable tariffs, changing depending on the time of day. In the second phase, gamification solutions were activated, actively encouraging participants to reduce energy consumption. In the second phase, the research panel comprised 43 households from Gdynia equipped with intelligent electricity meters (Enspirion, 2018).

As the project carried out in Poland, i.e. Living Lab, is already completed, the further part of the consideration is focused on this project. First of all, the system designed (Table 2.6) as part of the Living Lab project and the basic 9 elements of the gamification model has to be presented (Table 2.7).

In the first phase of the project, in which the elements of gamification were not applied, the participants showed a tendency to refrain from increasing electricity consumption during the increased demand for power in

the electricity grid in comparison to the amount of energy consumed in this time before the project started.

Table 2.6. Perspective of the system designed as a part of the Living Lab project

Perspective name	Description
Perspective of a system	striving for sustainable optimization of electricity management in households reduction of energy consumption striving to reduce CO2 emissions striving to improve the quality of the environment in which players live influencing the reduction of fees for energy consumption borne by players increasing the players' awareness of the energy flow in the natural environment
Perspective of a player	inhabitants of Gdynia having access to the power grid with elements of the intelligent network, i.e. remote power meters living in potentially good conditions for home solutions in the field of renewable energy sources better educated and wealthier than the entire population of Gdynia motivated to participate in the project eager to learn about energy consumption interested in reducing electricity bills in their households positively oriented to technological novelties

Source: Energa Living Lab (2018).

What is more, they also showed a tendency to increase the consumption of this energy at the time when the cheaper tariff was in force, i.e. during reduced power demand in the electricity grid compared to the amount of energy consumed at that time before the project started. Nevertheless, in the early phase of the first part of the project, participants began to change their habits of using electricity, e.g. by switching off the devices working in sleep mode, exchanging light bulbs for energy-saving or investing in new energy-saving devices, which managed to increase energy efficiency. However, only after the launch of the second phase of the project, i.e. after incorporating the gamification model into the project was it possible to achieve a reduction in energy consumption with 78% of the participants. The average farm consumed 15% less energy than in the corresponding months before the project started.

Table 2.7. Elements of the gamification model designed as a part of Living Lab

Elements name	Description
players	residents of 43 households from Gdynia
revenues	knowledge about rational energy consumption, e.g. how to match the energy consumption of receivers to the variable power demand in the power grid reduction of expenditures on electricity, i.e. optimization of household costs access to modern technologies with a narrow, limited range
costs	in the case of Living Lab simulations - no direct costs, but players are exposed to costs hidden in the system - if they do not comply with the rules, they may incur higher electricity bills due to improper management of energy consumption ultimately - the player will have to bear the costs of adjusting the ordinary power grid to the required standards of the smart grid and the costs of the platform on which the solution was implemented, i.e. a tablet
behaviors	selection of a saving goal (4%, 8%, 15%) adherence to energy tips that help you save
aesthetic	the players were optimistic about the project motivated to change their consumption habits but with reserve they referred to the application of the gamification model in the system
dynamics	dividing the game into 9 rounds division of players into teams in order to introduce competition between households and between teams determining the scoring rules determining the catalog of prizes for points earned
components	measuring device placed in the household switchgear box phototransistor placed on the measuring device UZP module tablet
mechanics	awarding points for the implementation of savings plans after the end of each round
platforms	a tablet with a mobile application that communicates with the point of connection of the household electrical network to the distribution network and at connection points of the receivers of electricity to the electricity grid of that household

Source: Energa Living Lab (2018).

5. Conclusion

The review of projects implemented under Horizon 2020, the European Union Framework Program, shows that the use of a gamification mechanism in creating consumer attitudes in the energy market is perceived as an innovative element in electricity demand management, and the intent of applying gamification is to influence the consumer's energy behavior to:

- increase awareness of the energy market;
- increase awareness of climate change;
- reduce energy losses;
- reduce the demand for electricity;
- improve the management of electricity in the distribution network;
- achieve a better energy efficiency indicator.

Based on an in-depth analysis of one selected project, i.e. Energa Living Lab, it can be stated that its results indicate that the use of a well-designed gamification model can be successful at the local level, and the proof of it is to achieve much better final results than it was assumed at the design phase of the system.

It should be emphasized that, despite the excellent results of the Energa Living Lab project, the role of gamification as a tool for shaping consumer attitudes in the energy market should be considered with some reserve. At present, many projects based on gamification in the context of energy management are still being carried out. The results and their summary should wait until the end of 2020. Only then will it be possible to reliably discuss the phenomenon of gamification in the context described in the article.

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Chapter 3.

Organizations in a market economy

The presented research on organizations from a market economy perspective relates to the financial aspects of their functioning or systemic solutions determining the behavior of individual entities. Particular attention of modern researchers focuses on the analysis of financial risk, which scrolls to a different extent in the chapter of the third part of the monograph.

The research of Michał Comporek from the University of Lodz was aimed at examining and accurately characterizing the relationships between implemented financial strategies and the scale of purposefully shaping the financial results of publicly listed companies (WSE). The time horizon of research (2002-2017), as well as the multidimensionality in relation to both the financial strategies and the scope of earnings management practices in the surveyed companies, allow the problem of manipulation of financial results of state-owned companies to be looked at for the first time in Poland.

The next chapter contains research results from the French financial market. A team of researchers from several research centers in Porto presented the results of statistical research aimed at assessing and testing long-term memory in the French stock exchanges. Estimates indicate a slightly long memory, in the form of persistence in the first analysis and in the form of anti-persistence in the second analysis. The tests suggest a stochastic short-term memory process that degenerates over longer periods. Researchers have concluded that this market is more susceptible to predictability, but also trends that, however, can be unexpectedly disturbed by discontinuities. This subsection helps to clarify the lack of consensus regarding long memory in stock returns. Detailed studies were conducted on the example of the Euronext platform, which covered a period of more than 25 years, during which 6,634 observations were provided. According to the researchers, the conclusions presented are important for regulatory and risk management authorities.

The selected aspect of a company's financial management is presented in the next chapter, in which Tomasz Pisula from Rzeszow University of Technology assessed the risk of bankruptcy for Polish and Czech logistics companies. In the applied research process, he used a comprehensive, group classification approach. To prove that group classification models offer better classification consistency compared to commonly used models with one classifier, the author used model comparative analysis using the most commonly used techniques to increase the efficiency of classification of basic models. The study used a comparative analysis of models to verify the research thesis that complex classification models offer much better classification consistency compared to commonly used models with a single classifier. In this aspect, the author verified the accuracy of classification of several variants of models of complex classifiers, using the most commonly used techniques to increase the efficiency of classification of basic models. The identified team classifier model with the best classification performance understood as the correct identification of companies threatened with bankruptcy was used to forecast the probability of bankruptcy and to conduct a comparative analysis of bankruptcy risk for Polish and Czech logistics companies in a two-year time horizon. The presented study is the first case of using team classifiers to assess the bankruptcy risk for logistics companies.

The latest research study carried out from a market economy perspective relates to the healthcare sector. The subject of interest of Agnieszka Strzelecka from Czestochowa University of Technology was health expenses analyzed in relation to the sources of their financing. The researcher focused her attention on the sources of financing healthcare from SHA2011 programs. The study was conducted on data for 2014-2017 for "new" EU countries. The study used data from the OECD database. The research undertaken is a valuable contribution to identifying changes in healthcare expenditure and managing the healthcare system. A particular challenge in healthcare management is the progressive increase in healthcare expenditure, which accounts for an ever-larger share of GDP. Therefore, the need for research supporting decision-making processes in the healthcare sector is increasing.

The relations between financial strategies and earnings management in public industrial companies listed on the Warsaw Stock Exchange

Michał Comporek¹

Abstract

The main goal of the article is to examine and closely characterize the relationships between the implemented financial strategies and the scale of intentional shaping of the financial results in industrial enterprises listed on the Warsaw Stock Exchange in the reference horizon 2002-2017. The mentioned financial strategies were examined using - inter alia - indicators referring to: sources of financing of the company's assets (variable: financial leverage), acquisition and investing in assets (variables: assets growth strategy, assets structure ratio and fixed assets renewal ratio) and redistribution of generated profits (variable: retained earnings ratio). On the other hand, the scope of earnings management practises were estimated by using: the Jones model and the Dechow et al. model. Empirical studies are based on the ordinary-least-square regression (OLS), the ANOVA tests, correlation matrix and descriptive statistics of tested variables. The main conclusion flowing from the research is the finding that relations between the analyzed variables depend to a large extent on the tested model for extracting individual sub-categories of accruals. Indicated six-dimensional analysis fits into the still insufficiently recognized theoretical and empirical issues over the determinants of deliberate manipulation of the company's financial results by its management. Research on the subject matter has not been carried out in the context of the Polish capital market so far.

Keywords: *earnings management, discretionary accruals, financial strategy, the Warsaw Stock Exchange.*

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1. Introduction

The view on the maximization of the market value of an enterprise as a superior objective of its functioning, widely accented in the economic and financial literature (Jensen, 2001; Sundaram & Inkpen, 2004; Tirole, 2006), indicates that this goal can be achieved while company management is focused on the effective and efficient acquisition, exploitation and financing of resources. Achieving the maximum market value of a business entity implies the need to recognize the financial management feature as a leading function in an organization. This function, reflected in the implemented financial strategy, defines a set of criteria and rules subordinated to the realization of the strategic goal of the enterprise, so that managers are guided in the decision-making process about raising funds for current and development activities, and determining the directions and ways of using these resources for the fulfillment of existing opportunities, threats and relationships with the environment (Kołosowska, Tokarski, Tokarski, & Chojnacka, 2012). Thus, the primary areas of financial strategy relate to investing in assets, raising capital and redistribution of generated profits.

On the other hand, the starting point in the creation (maximization) of the market value of the reporting entity is the enterprise's earning/profit/net income category. Financial results obtained in the enterprise have a direct impact on the possibilities of its development, which in turn becomes the engine of economic growth by increasing sales revenues without additional market share and contributing directly to the implementation of the overriding objective of the business unit. What is more, despite its disadvantages (omitting the volatility of the time value of money in determining the financial result; failure to include risk factors and remuneration for risk in the measurement of the financial result; lack of reflections in the financial result of the assumptions regarding the necessity to incur expenditures on investments; lack of direct reflection in the financial result for the value of the cash flow balance) (Black, Wright, Bachman, & Davies, 2000), earnings are the most important categories in the assessment of a company's performance in the financial plane (Obeidat, 2016). Earnings influence the individual behavior of capital market participants, constituting a positive or negative premise for further capital involvement in the enterprise. Moreover, informing about the rationality and efficiency of using the resources possessed, shape the directions of capital flow to and from the unit, support decision-making processes in the scope of planning and forecasting the current and future business activity of the entity, and verify the effectiveness and efficiency of the management staff (Gierusz, & Gawrońska, 2012). It is also an economic category susceptible to intentional and unintentional shaping by managers, in accordance with the assumptions

of earnings management (EM). This phenomenon is accompanied by the simultaneous temptation of excessive exposure of this information, which will show the financial situation of the entity in a better light in the eyes of its stakeholders, while at the same time limiting the disclosure of financial data with a potentially negative coloration.

The main goal of the article is to examine the relationships between accrual-based earnings management (measured by discretionary accruals – DACC) and the implemented financial strategy of industrial companies listed on the Warsaw Stock Exchange. The main prerequisite for conducting this research is the diverse and ambiguous position of the researchers regarding the effect of the financial strategy of reporting entities has on the practices of the earnings management phenomenon². The adopted research optics were directed to the use of the Jones model (Jones, 1991) and the modified Jones model (Dechow, Sloan, & Sweeney, 1995) to estimate the scale and directions of earnings management. In turn, the Uwuigbe, Uwuigbe, and Okorie model (2016) - with further modification - was used to assess the impact of the adopted financial strategy on the value of discretionary accruals. The analysis of the impact of financial strategy on the practice of earnings management involves two dimensions. The general dimension refers to the attempt to select those companies that in the given financial year reported an above-average value of discretionary accruals, which could be considered as a manifestation of earnings management. Whereas the in-depth studies include the results of research including relationships between estimated discretionary accruals and: firm size, financial leverage, corporate growth strategy, structure of current assets, retained earnings ratio and assets renewal rate.

2. Literature background

The literature on the subject presents a different approach to defining the phenomenon of earnings management: Davidson, Stickney, and Weil (1987) describe it as the process of taking deliberate steps within the constraints of generally accepted accounting principles to bring about the desired level of reported earnings. According to Schipper (1989, pp. 91-102), earnings management can be identified as “disclosure management” in the sense of a “purposeful intervention in the external financial reporting process, with the intent of obtaining some private gain as opposed to merely facilitating the neutral operation of the process.” Healy and Wahlen (1999, pp. 363-385) recognize earnings management as the manipulation of the companies’ financial statements by managers based on their “own judgment in financial reporting and in structuring transactions to alter financial reports to mislead

² This issue is discussed in greater detail in the second part of the article.

some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers". On the other hand, Cornett, Marcus, and Tehranian (2008, pp. 357-373) state that earnings management can be treated as an anticipatory step to avoid an in-default situation in a loan agreement, reduce the regulatory cost, and increase the regulatory benefit. In turn, according to Sankar and Subramanyam (2001, pp. 365-386) this phenomenon involves the use of discretion in financial reporting and (in the case of having more detailed information than other stakeholders) with the transfer of information material from the point of view of the company's value and future cash flows. Despite the viewpoint that practicing earnings management is legal and morally justified, or is it just a harmful effect of the low motivation of the management staff, the imperative of rule of a true and fair view in the financial reporting of enterprises is being undermined. As a consequence, outlined in the canons of modern accounting, the principle postulating the need to provide high-quality information about the financial position of the entity, the results of its operations and the generated cash flows are not sufficiently fulfilled.

As mentioned earlier, implemented financial strategies are considered - among others - as a significant determinant of earnings management in listed companies. Previous research on the raised issues focused to a large extent on the interrelationships between the capital structure, dividend policy and the intentional shaping of the company's financial result.

Naz, Bhatti, Ghafoor, and Khan (2011) provided that negative impact of capital structure on earnings management, from the perspective of listed companies in Pakistan, and implicates the use of debt in capital structure as a tool to encounter the problem of earnings management. Evidence gathered by Uwuigbe et al. (2016) revealed a significant positive relationship exists between firm size and discretionary, accruals and supports the argument that large firms tend to have higher motivations and more prospects to engage in the manipulation earnings and exaggerate earnings due to the intricacy of their operations, and the complexity for users to identify overstatement. However, the relationship between a company's financial leverage and earnings management of the sampled firms in Nigeria was not significant. Also, according to Jelinek (2007), there is negative relationship between leverage and opportunistic behavior, when leverage increases opportunistic behavior and earnings management that is related in this function decreases. Other prior researchers who found no statistically significant relationship between the capital structure and the phenomenon of earnings management were inter alia Nozarpour and Norouzi (2015) or Zamri, Abdul Rahman and Mohd Isa (2013). Zhe, Donghui, and Jin (2016) found robust evidence that, on average, firms engaging in higher earnings management activities have higher financial

leverage and the authors document that the positive relation between earnings management and financial leverage is much less pronounced in countries with better institutional environments. Zhang and Liu (2009) discovered the relationship between capital structure and earnings management with reference to the Chinese capital market, and established a link between capital structure and discretionary accruals by providing evidence that the equity proportion of controlling shareholders had an inverted “U shaped relationship” with earnings management, and the debt ratio had a strong positive relationship with earnings management. While Sercu, Vander Bauwhede and Willekens (2006) explained the relationship between the structure of capital and the management of earnings, by sampling 1,302 Belgian unlisted companies, and established that earnings management was positively related to leverage.

Several studies referred to the relationship between earnings management practices and the adopted policy of the dividend in the company. Farinha and Moreira (2007) found a positive impact of earnings management on the dividend yield of listed companies in the US during 1987 – 2003. Chansarn and Chansarn (2016) found that earnings management had a positive impact on the dividend payout ratio and dividend yield of listed companies in Malaysia. Similarly, Ali Shah, Yuan, and Zafar (2010) discovered a positive impact of earnings management on dividend policy in the context of Chinese and Pakistani listed companies. On the contrary, Haider, Ali, and Sadiq (2012) revealed that there is a negative relationship between earnings management and dividend payout in Pakistani enterprises.

Referring, in turn, to the third important sphere of the financial strategy, which is the strategy of investing in assets, it is worth paying attention to, among others, the research carried out by Sadeghi and Zareie (2015) who found that between current ratio and the ratio of working capital of net assets to total assets and earnings management, no significant relations were observed. Meanwhile, the mentioned researchers confirmed the hypothesis indicating there is a positive relationship between earnings management and: quick ratio, liquidity ratio, receivable turnover ratio, and working capital. On the other hand, Nguyen and Nguyen (2018) conducted research that allowed them to reject the stated hypothesis, claiming that activity ratios have a positive correlation with earnings management of listed companies in Vietnam.

From the perspective of the Polish capital market, the theoretical contribution made by Michalczyk (2013) deserves particular attention. This author conducted his research on the cost of stock removal, as an example of applying solutions in the field of accounting engineering. While scientific research conducted by Piosik (2013; 2016) was aimed at, among others, the analysis of indicators of intentional shaping of the financial result or the relationship between unexpected changes in earnings value and discretionary changes in non-cash current

assets. The presented results prove that the financial leverage and the size of the company's assets (measured by the logarithm of total assets) statistically significantly affect the value of discretionary changes in net current assets.

Concluding the above references, it is worth highlighting the complexity of the research problem with regard to the relationship between financial strategy and earnings management in public enterprises. The examples presented are only a small part of the whole academic studies on the subject matter. However, there are noticeably different findings, which should provide an incentive for further investigations of the phenomenon of earnings management.

3. Research approach and methods

Empirical research has been carried out among public industrial companies listed on the Warsaw Stock Exchange, whose shares have been traded for at least ten years within the 2003-2017 reference horizon. Additionally, a sample selection was based on the following criteria:

- the fiscal year of the firm should end up to 31 December;
- companies do not conduct business activity in the finance and insurance sectors;
- all of the required financial data must be available.

Consequently, the study was investigated with 83 listed companies. Empirical research was based on financial information taken from the Notoria Service database. The research procedure, leading to the fulfillment of a set goal of the study, was divided into three substantial steps:

- 1) In the first place, the research procedure was directed to the detection of those public companies that implemented earnings management practices during the period under consideration. In the paper, it was assumed that the practice of intentional shaping of the financial result will be proven by above-average industry values of discretionary accruals calculated for each of the tested companies. Wherein, separation of individual categories of accruals follows the steps shown below:
 - a) calculating total accruals by the equation:

$$TACC_{i,t} = NI_{i,t} - OCF_{i,t} \quad (1)$$

- b) decomposing total accruals into discretionary (DACC) and non-discretionary (NDACC) accruals by the equation:

$$TACC_{i,t} = NDACC_{i,t} + DACC_{i,t} \quad (2)$$

- c) derivation of a statistical model for the estimation of individual subcategories of accruals. For this purpose, as mentioned earlier, the Jones model and the Dechow et al. model were used. In the Jones model, which is an essential point of reference in the vast majority of research on the issues of earnings management phenomenon, the change in revenue from sales (ΔREV) is considered as a proxy for current accruals arising from changes in the economic environment of enterprise, while gross property, plant and equipment (PPE) controls any changes for non-discretionary accruals related to depreciation expense. Discretionary accruals, computed as the difference between total accruals and the non-discretionary components of accruals, are the residue of the regression model. The formula of the Jones model takes the final form as below:

$$\frac{TACC_{i,t}}{TA_{i,t-1}} = \alpha_1 \left(\frac{1}{TA_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{i,t}}{TA_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \varepsilon_{i,t} \quad (3)$$

While the use of the Dechow et al. model is explained by the fact that the mentioned authors pointed out that the original Jones model does not include potential managerial manipulation of revenues. For this reason, they have entered into the model the cash-accompanying revenue variable ($\Delta REV - \Delta REC$) instead of the sales revenue variable (ΔREV). In this way, the form of the regression model, allowing the separation of individual categories of accrual differences, took the following form:

$$\frac{TACC_{i,t}}{TA_{i,t-1}} = \alpha_1 \left(\frac{1}{TA_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{TA_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{TA_{i,t-1}} \right) + \varepsilon_{i,t} \quad (4)$$

where:

- $TACC_{i,t}$ - total accruals of company i in year t ,
- $NI_{i,t}$ - net income of company i in year t ,
- $OCF_{i,t}$ - operating cash flows of company i in year t ,
- $NDACC_{i,t}$ - non-discretionary accruals of company i in year t ,
- $DACC_{i,t}$ - discretionary accruals of company i in year t ,
- $TA_{i,t}$ - total assets of company i in year t (at the end of period),
- $\Delta REV_{i,t}$ - change in revenues of company i in year t ,
- $\Delta REC_{i,t}$ - change in short-term receivables of company i in year t ,
- $PPE_{i,t}$ - gross property, plant and equipment of company i in year t (at the end of period),,
- $\alpha_i, i = 0, 1, \dots, k$ - parameters of the regression model,
- $\varepsilon_{i,t}$ - error term.

- 2) Secondly, it was examined whether the selected measures of the company's implemented financial strategy had a significant statistical

impact on earnings management in the surveyed population. For this purpose, the Uwuigbe et al. model was used. The robust model can be written as:

$$DACC_{i,t} = \beta_1 FSIZE_{i,t} + \beta_2 LEV_{i,t} + \beta_3 STRAT_{i,t} + \beta_4 CASH_{i,t} + \varepsilon_{i,t} \quad (5)$$

Furthermore, the original version of the Uwuigbe et al. model was modified by adding additional variables, referring to: the retained earnings indicator (illustrating the scope of the dividend strategy implemented in the company) and the rate of renewal of fixed assets and intangible assets (showing the strategy of acquiring key assets generating current and future economic benefits for the organization). As a result, the following New Model was obtained, namely:

$$DACC_{i,t} = \beta_1 FSIZE_{i,t} + \beta_2 LEV_{i,t} + \beta_3 STRAT_{i,t} + \beta_4 CASH_{i,t} + \beta_5 RET_{i,t} + \beta_6 RENEW_{i,t} + \varepsilon_{i,t} \quad (6)$$

Where:

- $FSIZE_{i,t}$ - logarithm of total assets of company i in year t ,
- $LEV_{i,t}$ - financial leverage of company i in year t (calculated as total debt to total assets),
- $STRAT_{i,t}$ - assets growth strategy of company i in year t (calculated as a relative increase in assets),
- $CASH_{i,t}$ - a share of cash and cash equivalent in total asset of company i in year t ,
- $RET_{i,t}$ - retention ratio of company i in year t (calculated as retained earnings to net income),
- $RENEW_{i,t}$ - assets renewal ratio of company i in year t (calculated as purchase of property, plant, equipment and intangible assets to fixed assets),
- $\beta_i, i = 0, 1, \dots, k$ - parameters of the regression model,
- other designation - as above.

For the sake of completeness, it should be added that the executed analysis is based on the ordinary-least-square regression (OLS), the ANOVA tests, correlation matrix and descriptive statistics of tested variables.

2) Drawing from the literature, five hypotheses to be tested in this study are stated below:

H1: In the examined population there is a significant positive relationship between financial leverage and earnings management;

H2: In the tested population there are significant positive correlations between implemented growth strategy and earnings management;

H3: There is a statistically significant relationship between earnings kept back in the business (calculated by the retention ratio) and earnings management practices in industrial companies listed on the Warsaw Stock Exchange;

H4: In the examined population the strategy of current assets management (calculated by the share of cash and cash equivalent

in total assets) has a statistically significant link with earnings management;

H5: In the tested population there are negative significant correlations between the assets renewal ratio and the scope of earnings management.

4. Discussion and results

4.1. Separating of companies practicing earnings management

The results of the empirical research showed that (with reference to the Jones model) about one-third of the industrial market companies implemented practices in the field of earnings management (Table 3.1). On the other hand, using the Dechow et al. model the percentage of enterprises performing intentional shaping of their financial results drops by about five percentage points. In the paper, it was assumed that the DACC dummy variable is equal to one if a firm's discretionary accruals are above industry-year average value, and zero otherwise. Particularly noteworthy is also the fact that the share of companies implementing earnings management in individual industries is quite different depending on the regression model that was used to separate them. This note applies especially to companies conducting business activity in: the chemical industry, wood industry, electromechanical industry, light industry, fuel industry as well as the raw materials industry (however, in the case of the last of these sectors, it may be related to the relatively small number of the tested group). It unambiguously proves that the adopted reference model may have a significant impact on the results of further analysis.

4.2. Testing research hypotheses based on the Jones model

The results of the outcome of correlation analysis as presented in Table 3.2 show that, between discretionary accruals extracted by the Jones model and some variables illustrating implemented financial strategies, there exist statistically significant correlations. However, positive correlations can be reported in the case of the relationship between discretionary accruals and corporate growth strategy (correlation coefficient result as 0.122) or discretionary accruals and the share of cash and its equivalents in total assets (correlation coefficient result as 0.104). In addition, a significant positive relationship is depicted in the context of the relationships between earnings management practices and the size of the company (although this variable does not directly express the implemented financial strategy). In turn, the results shown in Table 3.2 further indicate the

fact that in the studied population there exist negative correlations between discretionary accruals and: financial leverage (correlation coefficient result as -0.099) and assets renewal rate (correlation coefficient result as -0,294).

Table 3.1. Sectoral analysis of industrial companies listed on the Warsaw Stock Exchange that practiced earnings management in the reference horizon 2003-2017

Model	Number (year-to-year observations) / percentage of companies implementing EM													TOTAL
		<i>chemical industry</i>	<i>wood industry</i>	<i>electromechanical industry</i>	<i>pharmaceutical industry</i>	<i>light industry</i>	<i>metal industry</i>	<i>building materials industry</i>	<i>automotive industry</i>	<i>fuel industry</i>	<i>food industry</i>	<i>raw materials industry</i>	<i>plastics industry</i>	
Dechow et al. model	No.	32	23	77	17	27	37	62	14	13	44	7	22	375
	%	54.24	27.38	37.20	31.48	30.00	29.13	35.03	24.56	28.89	26.83	46.67	26.83	32.30
Jones model	No.	45	15	59	17	17	24	53	11	9	39	5	20	314
	%	76.27	17.86	28.50	31.48	18.89	18.90	29.94	19.30	20.00	23.78	33.33	24.39	27.05

Table 3.3 presents the results of the regressions (the Anova test, as well as a model summary) which tested all five stated hypotheses. The first finding worth commenting on is the goodness-of-fit of the examined model to the empirical data. The results pointed out that about a 16% variation of the dependent variable (DACC) can be explained by the independent variables suggesting that simultaneously the explanatory variables were significantly associated with the discretionary accruals variable (non-existence of multicollinearity between the independent variables was confirmed by computing the variance inflation factors).

Table 3.2. Correlation matrix between discretionary accruals extracted by the Jones model and tested explanatory variables

Tested variables	DACC	FSIZE	LEV	STRAT	CASH	RET	RENEW
	DACC	1.000					
	FSIZE	0.275	1.000				
	LEV	-0.099	-0.036	1.000			
Pearson correlation	STRAT	0.122	0.078	-0.166	1.000		
	CASH	0.104	-0.008	-0.188	0.121	1.000	
	RET	-0.011	0.003	0.006	0.026	0.022	1.000
	RENEW	-0.294	-0.111	0.087	0.020	0.008	0.005

Note: the bold font indicates correlations that are statistically significant at the p-value = 0,05

Interestingly, empirical evidence from the study indicates that, contrary to initial expectations, the first hypothesis was rejected. Based on the obtained results this relationship is not significant as depicted in the p-value of (0.464). Hence, the null hypothesis which states that there is no significant positive relationship between the mentioned variables was accepted. What is more, the next three research hypotheses (H2, H3, and H4) were similarly rejected. Based on the results of the regressions carried out, statistically significant relationships between earnings management practices and: implemented growth strategy, retained earnings or strategy of current assets management in Polish industrial listed companies, were negated.

Finally, consistent with *a priori* expectation, findings for the fifth hypothesis (H5), which suggest a significant negative relationship between assets renewal ratio and the scope of earnings management, were confirmed (as depicted in a p-value close to 0). The asset renewal indicator presented in the research informs about the investment activity of the enterprise. The increase in the ratio means a modernization of assets, which is particularly beneficial from the perspective of achieving future economic benefits. Fixed assets and intangible assets are those resources of an enterprise that: actively participate in production processes, do not change their form during production, but circulate in the form of newly produced products, as well as wear out gradually, transferring the value of their consumption to the produced products and services provided.

Table 3.3. The results of the ANOVA test and regression analysis (dependent variable – discretionary accruals extracted by the Jones model)

ANOVA	Sum of squares	Mean square	F	Sig.
Regression	3.382	0.564	13.243	0.000
Residual	16.771	0.043		
Total	20.153			
Regression analysis	Coefficient	Std. Err.	t	Sign.
(Constant)	-0.246	0.082	-2.987	0.003
FSIZE	0.073	0.014	5.112	0.000
LEV	-0.035	0.048	-0.733	0.464
STRAT	0.088	0.045	1.961	0.051
CASH	0.309	0.160	1.931	0.054
RET	0.000	0.001	-0.308	0.758
RENEW	-0.019	0.003	-5.742	0.000
R	0.41			
R Square	0.168			
Adjusted R Square	0.155			
Std. Error of the Estimate	0.206			

4.3. Testing research hypotheses based on the Dechow et al. model

Table 3.4 shows the relationship between discretionary accruals separated by the Dechow et al. model, firm size and selected indicators of a company's financial strategy (financial leverage, growth strategy, current assets ratio, retained earnings ratio and fixed assets renewal rate), investigated by using the Pearson linear correlation coefficient. The presented research results lead to the conclusion that the only measure related to the implemented financial strategies - in a statistically significant way shaping the values of discretionary accruals in the sample of data on hand - was the debt to total assets ratio (LEV). However (the opposite as was underlined in the case in the relationship between leverage and discretionary accrual separated by the Jones model), the mentioned relationship is positive.

Further analysis of Table 3.5 indicates several other findings worthy of comment. The first stage of the in-depth research consists of the examinations of the explanatory power of tested model. Summary statistics for the regression analysis included in Table 3.5 allow for the presumption that a 15% variation of the dependent variable (DACC) can be explained by the independent variables.

Table 3.4. Correlation matrix between discretionary accruals extracted by the Dechow et al. model and tested explanatory variables

Tested variables	DACC	FSIZE	LEV	STRAT	CASH	RET	RENEW
	DACC	1.000					
	FSIZE	0.307	1.000				
	LEV	0.208	-0.079	1.000			
Pearson correlation	STRAT	0.040	0.081	-0.201	1.000		
	CASH	-0.077	-0.015	-0.194	0.130	1.000	
	RET	-0.005	0.035	0.065	0.044	0.022	1.000
	RENEW	0.088	-0.122	0.090	0.028	0.013	0.004
							1.000

Note: the bold font indicates correlations that are statistically significant at the p-value = 0.05

However, a much higher value of the standard error of the estimation (0.415) is noticeable. This is particularly important in view of the fact that the standard error of the estimate is a measure of the accuracy of predictions (the regression line is the line that minimizes the sum of squared deviations of prediction, and the standard error of the estimate is the square root of the average squared deviation).

From the perspective of the stated research hypothesis, indeed noteworthy is the fact that the first research hypothesis (H1), claiming that in the examined population there is a significant positive relationship between financial leverage and earnings management practices, was verified positively. Leverage increases don't constrain the opportunistic behavior of managers. Even while an enterprise is highly leveraged, it doesn't have to face the strict scrutiny of lenders.

Other cells in Table 3.5 indicate that the variable assets renewal rate has a consistent, positive relationship with discretionary accruals in the vast majority of tested samples. Thus, it allows for the negation of the fifth research hypothesis (H5), which affirms that in industrial companies listed on the Warsaw Stock Exchange there are negative significant correlations between renewal ratio and the scope of the earnings management phenomenon. At the same, time the three remaining research hypothesis (H2, H3, H4) have been verified negatively. Outline relations between discretionary accruals extracted by the Dechow et al. model and the corporate growth strategy indicator (STRAT), a share of cash and cash equivalent in total asset ratio (CASH) and retained earnings ratio (RET), did not prove to be statistically significant.

Table 3.5. The results of the ANOVA test and regression analysis (dependent variable – discretionary accruals extracted by the Dechow et al. model)

ANOVA	Sum of squares	Mean square	F	Sig.
Regression	10.875	1.812	10.489	0.000
Residual	54.777	0.173		
Total	65.652			
Regression analysis	Coefficient	Std. Err.	t	Sign.
(Constant)	-1.061	0.188	-5.644	0.000
FSIZE	0.208	0.032	6.416	0.000
LEV	0.452	0.104	4.332	0.000
STRAT	0.114	0.095	1.200	0.231
CASH	-0.237	0.342	-0.693	0.489
RET	-0.001	0.001	-0.670	0.503
RENEW	0.014	0.007	2.046	0.042
R	0.407			
R Square	0.166			
Adjusted R Square	0.150			
Std. Error of the Estimate	0.415			

5. Conclusions

Earnings management in public companies focuses on the possibility of applying a wide range of accounting practices that allow for distortions in the amounts of net profit (loss). These activities take into account the varied motives of these manipulations, which usually focus either on striving to provide investors with a sense of security in the capital invested in shares (stocks) of an enterprise, by showing the unit's financial standing in a better light than it actually is or are based on low incentives accounting procedures. Hence, in recent years there has been considerable interest shown by researchers in potential factors that can be considered as an important determinants of earnings management.

This study basically examined the effects of implemented financial strategies on the earning management phenomenon of industrial companies listed on the Warsaw Stock Exchange. The mentioned financial strategies were examined using indicators referring to: financing of the company's assets (variable: financial leverage – LEV), acquisition and investing in assets (variables: assets growth strategy – STRAT; assets structure ratio – CASH; fixed assets renewal ratio – RENEW) and redistribution of generated profits (variable: retained earnings ratio – RET). In addition, the firm size indicator (FSIZE) was accepted

as one of the explanatory variables, but its use was dictated by the adoption of the Uwigbe et al. model as the basis for further analysis. On the other hand, the scope and direction of earnings management practices were estimated by using: the Jones model and the Dechow et al. model.

The analysis of the conducted research can be inferred multidimensionally. Firstly, only one of the exogenous variables referring to the applied financial strategies turned out to be statistically significant (based on the ANOVA test and regression analysis) in relation to discretionary accruals distinguished by both the Jones model and the Dechow et al. model. This variable proved to be the assets renewal rate (RENEW). However, depending on the reference model used for the estimation of the dependent variable DACC, the relationship between renewal rate and earnings management practices were multi-directional (negative in the case of discretionary accruals separated by the Jones model and positive in the case of discretionary accruals extracted by the Dechow et al. model). The empirical studies pointed out that in the examined population, there is a significant positive relationship between financial leverage and the earnings management phenomenon. While this finding, concurrent with the *a priori* first hypothesis (H1) finds its reflection only if discretionary accruals are estimated by the Dechow et al. model. The research carried out did not allow us to empirically confirm the other research hypothesis which stated that in the sample data there are significant correlations between earnings management and: implemented growth strategy, earnings kept back in the business, or strategy of current assets management (even abstracting from the assumed directions of these relations). It seems, therefore, that the main conclusion flowing from the research is the finding that reported relations between the analyzed variables depend to a large extent on the tested model for extracting individual sub-categories of accruals.

It should be clearly emphasized that the presented research results do not aspire to the conclusions generalizing the influence of individual determinants on the scale and directions of earnings management in industrial joint-stock companies. First of all, they contain partial results, which in the longer term should be extended to a wider group of companies analyzed and a longer time horizon for the research being carried out. Under the second, they do not meet a sufficient condition, because the earnings management processes are difficult to make unambiguous assessments, not only of a quantitative nature.

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Estimating and testing long-term dependence on CAC 40 index returns

Lúis Gomes¹, Sílvio Gama², José Matos³, Vasco Soares⁴

Abstract

The purpose of this paper is to assess and test long-term memory in the French stock market returns. Rescaled-Range Analysis (classical and modified) and Detrended Fluctuation Analysis were used to measure the degree of dependence. Complementarily, Rescaled-Range Tests (classical and modified) and Fractional Differencing Test were used to test long-term memory. The estimates of Hurst exponents evidence a slight long memory, in the form of persistence by the first analysis and in the form of anti-persistence by the second analysis. In addition, the tests performed suggest a stochastic process of short-term memory that degenerates over long periods. This suggests that this market is more prone to predictability, but also trends that may be unexpectedly disrupted by discontinuities. Despite the reduced statistical evidence of fractal dynamics, as in most international studies, it does not refute the random walk hypothesis with i.i.d. increments, which is the basis of the efficient market hypothesis in its weak form. This paper contributes to clarifying the lack of consensus on long memory in stock returns. Specifically, it studies the highest index of the Euronext platform and covers a period longer than 25 years, during which 6,634 observations were provided. The conclusions are important for regulators and risk managers.

Keywords: long-term memory, rescaled-range analysis, detrended fluctuation analysis, fractional differencing analysis, Hurst exponent, efficient market hypothesis, CAC 40.

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1. Introduction

The prices of financial assets are usually described in terms of a geometric Brownian motion (gBm), which represents an assumption compatible with the efficient market hypothesis (EMH). In these terms, the stock returns follow an uncorrelated Gaussian process through unpredictable behavior, given the available information (Costa & Vasconcelos, 2003).

Although EMH is a fundamental benchmark of modern finance, efficiency drifts have been observed in different markets. The main cause has a particular interest because it derives from time dependence in some stock returns series (Horta, Lagoa, & Martins, 2014). This property was identified by Mandelbrot (1971) and designated as "*long memory or low frequency persistent temporal dependence*." The presence of long-term memory on asset prices has controversial implications about: (1) the theoretical and econometric modeling, (2) the statistical tests to pricing models, (3) the measurement of efficiency and rationality (Maghyereh, 2007). More specifically, fractal dynamics refutes the random walk hypothesis with i.i.d. increments, which is the basis of the EMH in its weak form. Consequently, many of the paradigms used in modern financial theory will be violated, namely the validity of the martingale methods of derivatives instruments (such as the Black & Scholes model) and the adequacy of the asset pricing models (such as the capital asset pricing model - CAPM and the arbitrage pricing theory - APT). This is the problem which justifies our research.

Given the implications for the theory and practice of financial economics, researchers continue to seek for a better understanding of the dynamic nature of financial time series, with most of the evidence suggesting an absence or weak base of any form of long memory (Lo, 1991; Jacobsen, 1996; Lipka & Los, 2002; Kristoufek, 2012; Braun, Jenkinson, & Stoff, 2017) and another part of the evidence suggesting a clear fractal structure (Fama & French, 1988; Costa & Vasconcelos, 2003; Assaf & Cavalcante, 2004; Chen & Yu, 2005; Ferreira, 2018). However, some results presented mixed findings, depending on the test method, sample period and frequencies of the series (Sadique & Silvapulle, 2001; Christodoulou-Volos & Siokis, 2006; Eitelman & Vitanza, 2008; Núñez, Martínez, & Villareal, 2017).

This paper is motivated by the lack of consensus on evidence of long-term memory in stock returns and its implications for the EMH. Intending to provide additional knowledge for discussion, the objective of this work is the investigation of empirical characteristics of the daily French stock index (CAC 40) returns, with particular emphasis on estimating and testing the degree of persistence to verify the EMH, and modeling the dynamic behavior of the time

series. The expansion and visibility of this market, after its accession to the Euronext platform in September 2000, justify this choice.

The econophysics approach applies theories and methods developed in statistical physics, in order to contribute to the resolution of problems in economics and finance. The widely accepted techniques for identifying long memory are the ones most commonly used to estimate the Hurst exponent H . Four of the most popular techniques are the rescaled-range analysis – under the classical (R/S) and modified (M-R/S) statistics –, the detrended fluctuation analysis (DFA), and the Geweke and Porter-Hudak method (GPH). The R/S analysis, first introduced by Hurst (1951), was later improved by Mandelbrot and Wallis (1969a, b) and Mandelbrot and Taqqu (1979) to detect the presence of long-term memory in a time series. The M-R/S analysis, proposed by Lo (1991), modifies the previous statistics to make it insensitive to short-term memory, heteroscedasticity, and non-normality. The DFA analysis, proposed by Peng, Buldyrev, Havlin, Simons, Stanley, and Golderberger (1994), models the series to obtain the exponent H via a single appropriate parameter, being robust to a non-stationary time series. The GPH was developed by Geweke and Poter-Hudak (1993) as a semi-parametric procedure, potentially more efficient than M-R/S, to estimate the memory parameter in a fractionally integrated process. The M-R/S test and the GPH test have the interesting property of being robust to non-normality.

The empirical study developed in this paper is based on the establishment of four research hypotheses:

- H1: the time series of CAC 40 index returns is well described by fBm;
- H2: the time series of CAC 40 index returns exhibits long-term memory;
- H3: the long-term memory exhibited by the CAC 40 index returns stems from the short-term dependency;
- H4: the time series of CAC 40 index returns refute the EMH.

The structure of this paper is organized as follows. Section 2 provides a brief review of literature related to long-term memory in the forms of persistence and anti-persistence. Section 3 presents the data series and describes the methods employed to estimate and test long-term memory. Section 4 discusses the results of the empirical analysis. Finally, section 5 summarizes the main findings.

2. Literature background

According to Fama (1970), the random walk hypothesis with independent and identically distributed (i.i.d.) increments is the basis of the EMH. This hypothesis establishes, in a simple way, that (1) the price variation is random, as a result of the activity of traders trying to make gains, and (2) the implementation of their strategies induces dynamic feedback in the market, randomizing the stock price (Matos, Gama, Ruskin, & Duarte, 2004).

The statistical analysis of a financial time series has exhibited different characteristics from the random walk, wherein stock prices exhibit unpredictable behavior, given available information (Lo, 2004; Assaf, 2006; Da Silva, Figueiredo, Gleria, & Matsushita, 2007). The presence of long memory components in stock prices has controversial implications for market efficiency and is inconsistent with continuous stochastic processes employed in the martingale methods of stock valuation (Lo, 1991; Sadique & Silvapulle, 2001; Eitelman & Vitanza, 2008). A series with long-term memory is characterized by long-term dependence and by non-periodic long cycles (Mandelbrot, 1977; Cheung & Lai, 1995), meaning that the market will get back to its long-term trend in the future. Mandelbrot (1971) was one of the first to recognize the possibility and implications of long-term persistent statistical dependence in the financial time series. The proper identification of the nature of persistence is crucial to decide on the type of modeling diffusion of these series. A succession of persistent or anti-persistent stock returns is characterized by an effect of long-term memory.

The most recent empirical evidence incites a renewed interest in fractional Brownian motion (fBm) and in fractionally integrated processes (Lento, 2013; Kim, Kim, & Min, 2014), and market efficiency is one of the most frequent topics under discussion. Cajueiro, Gogas, and Tabak (2009) and Wang, Liu, and Gu (2009) used the Hurst exponent to examine the efficiency of the Greek and the Shenzhen stock indexes in the context of market reforms. They found that the loss of market efficiency was due to the market pressure on investors, which led to herding behavior. Onali and Goddard (2011) used the Hurst exponent to study the efficiency of 6 developed European stock markets. They confirmed the existence of long-range autocorrelation in the Italian market. Eom, Choi, Gabjin, and Jung (2008) investigated the relationship between the Hurst exponent and the predictability of 60 different markets and found that the market indexes with a higher Hurst exponent tend to have a higher level of predictability.

There are three classifications of dissemination of market prices, measured by the Hurst exponent H (the degrees of long-term dependence). For $H = 0.5$, the process corresponds to the geometric Brownian motion (gBm)

with independent innovations (Beran, 1994), following a random walk that characterizes efficient markets in the strict sense of Fama (1970). For $H \neq 0.5$, the process corresponds to fBm, wherein the increments (fractional white noise) have a long-term correlation. If $0.5 < H < 1$, the increments of fBm are positively correlated and the process exhibits persistence (Embrechts & Maejima, 2002), i.e., the deviations tend to maintain the signal. If $0 < H < 0.5$, the increments are negatively correlated and the fBm exhibits anti-persistence or unpredictability (Embrechts & Maejima, 2002), i.e., the deviations of a signal are usually followed by counter-signal deviations.

In a persistent market, if a change in price was up/down in the last period, then the prospect is that it will continue to be upward/downward in the following period. In this case, markets have long periods of stability, which are interrupted by sudden and sharp discontinuities (Los & Yu, 2008). It corresponds to riskier markets and to invest in that persistence allows opportunities for abnormal gains by arbitrage. In an anti-persistent market, if a price change was upward in the last period, then the prospect is that it will be downward in the following period, and vice-versa. In this case, markets have a fast reversion to the mean and are called ultra-efficient (Kyaw, Los, & Zong, 2006).

3. Research approach and methods

3.1. Sample and data series

The Stock Exchange of France, renamed Euronext Paris, is the main French stock exchange, which was founded in 1724 and joined the pan-European Euronext platform in September 2000. The CAC 40 acronym – *Cotation Assistée en Continu* – is the main index of this equity market, which represents the capitalization-weighted measure of the 40 largest financial assets, selected from the set of listed companies. The original data refers to the price of daily closing CAC 40 series, provided by Nyse Euronext⁵, and cover a period longer than 25 years, since January 1, 1993 to June 6, 2018. The data used in the empirical study consists in the simple transformation of the stock index through the first log difference of their levels $D[\log\{P_t\}]$. In practical terms, the returns compounded continuously X_t at time t are calculated from the consecutive daily prices P_t index:

$$X_t \equiv \log P_t - \log P_{t-1} = \log \left(\frac{P_t}{P_{t-1}} \right) \quad (1)$$

⁵ The NYSE Euronext website: www.nyx.com

3.2. Methodology

In order to pursue the objective of the empirical study, we will:

- 1) examine whether the time series of index returns exhibits long-term memory;
- 2) identify whether the possible long-term memory is persistent or anti-persistent;
- 3) identify whether the possible long-term memory stems from short-term dependency;
- 4) examine whether price diffusion models empirically identified suggest inefficiency in the stock market, and thus, call into question the adequacy of pricing models;
- 5) examine whether price diffusion models empirically identified can assist financial market participants to earn abnormal returns.

3.2.1. Rescaled-range analysis

3.2.1.1. Classical rescaled-range statistics

An approach to detect long-term dependence is to use the range over standard deviation or rescaled-range (R/S) statistics. The classical R/S is given by “range of partial sums of deviations of a time series from its mean, rescaled (divided) by its standard deviation” (Lo, 1991, p. 1287). Specifically, being X_j the return of a stock in period j , for $\{X_1, X_2, \dots, X_n\}$ it may be defined as:

$$(R/S)_n = S_n^{-1} \left[\text{Max}_{1 \leq k \leq n} \sum_{j=1}^k (X_j - \bar{X}_n) - \text{Min}_{1 \leq k \leq n} \sum_{j=1}^k (X_j - \bar{X}_n) \right] \tag{2}$$

where $\bar{X}_n = (1/n) \sum_{j=1}^n X_j$ is the sample mean and $S_n = \left[(1/n) \sum_{j=1}^n (X_j - \bar{X}_n)^2 \right]^{1/2}$ is standard deviation. The time series is divided by an integer number of adjacent non-overlapping sub-intervals of equal size. The first term (in brackets) is the maximum (in k) of the partial sums of the first k deviations of X_j from the sample mean. The second term is the minimum (in k) of the same sequence of partial sums. The difference between the two parties, called range (R_n), is always non-negative and, therefore, the statistics $(R/S)_n \geq 0$, as indicated by Lo (1991).

Test procedure:

Under the null hypothesis ($V_n = 0$) that “the series of returns is i.i.d.” the R/S statistics converge asymptotically to the range of a Brownian

bridge in the unit interval V . The cumulative distribution function of the range of a Brownian bridge is explicitly given in Kennedy (1976) by $F_V(v) = 1 + 2 \sum_{k=1}^{\infty} (1 - 4k^2v^2)e^{-2(kv)^2}$, which represents the asymptotic distribution function of the normalized (i.e., divided by the square root of the sample size n) rescaled-range statistics (Lo, 1991, p. 1288):

$$V_n \leftarrow \frac{1}{\sqrt{n}} \times R/S \sim V \tag{3}$$

The moments of the range V_n are calculated from the distribution function F_V , where the mean and theoretical error variance are equal to $E(V_n) = \sqrt{(\pi/2)}$ and $E(V_n^2) = \pi^2/6$, respectively. The test for the null hypothesis of non-existence of long-term dependence can be performed (in the absence of short-term dependency) by estimating the confidence interval for a level of significance and finding whether V_n is within or outside the desired limits, where the asymptotic p-values are given in Lo (1991, p. 1288).

3.2.1.2. Modified rescaled-range statistics

The short-term dependency is incorporated into a denominator, which becomes the square root of a consistent estimator of the variance of partial sums until the lag q in expression [2], presented as (Lo, 1991, p. 1289):

$$(M - R/S)_{n,q} = S_q^{-1} \left[\text{Max}_{1 \leq k \leq n} \sum_{j=1}^k (X_j - \bar{X}_n) - \text{Min}_{1 \leq k \leq n} \sum_{j=1}^k (X_j - \bar{X}_n) \right] \tag{4}$$

where S_q^2 is a heteroscedasticity and autocorrelation consistent variance estimator (Andrews, 1991) and includes the usual sample variance S_n^2 and autocovariance $\hat{\gamma}_j$ estimators of X :

$$S_q^2 = S_n^2 + 2 \sum_{j=1}^q \omega_j(q) \hat{\gamma}_j \tag{5}$$

where the weighting function was suggested by Newey and West (1987) and given by $\omega_j(q) = 1 - j/(q + 1)$, $q < n$ with the truncation lag suggested by Andrews (1991) and given by $q = \text{Int} \left[(3n/2)^{1/3} \times (2\hat{\rho}_1 / (1 - \hat{\rho}_1^2))^{1/3} \right]$ being $\hat{\rho}_1 = \hat{\gamma}_1 / \hat{\gamma}_0$ the first-order autocorrelation, and the estimator of

autocovariance is given by $\hat{\gamma}_j = (1/n) \sum_{i=1}^{n-j} (X_i - \bar{X}_n)(X_{i+j} - \bar{X}_n)$. The M-R/S statistics requires selection of the lag order, in relation to which exhibits high sensitivity.

Test procedure:

Under the null hypothesis ($V_n(q) = 0$) of “short-term dependence with heteroscedasticity” (that is, absence of long-term memory), the normalized rescaled-range statistic ($V_n(q)$) with lag q has the limit distribution (Lo, 1991, p. 1291):

$$V_n(q) \Leftarrow \frac{1}{\sqrt{n}} \times M - R/S \sim V \tag{6}$$

The V_n and $V_n(q)$ statistics can be used to distinguish and analyze three hypotheses: random walk, short-term memory, and long-term memory (Chow, Pan, & Sakano, 1996). If both statistics are significant, the process has long-term dependence; if the statistics V_n is significant and the statistics $V_n(q)$ is insignificant, the data series exhibits short-term memory; if both statistics are insignificant, the process is independent or random walk.

3.2.1.3. Rescaled-range analysis and Hurst Exponent

If the time series exhibits positive or negative long-term dependence, the exponent H should converge in values larger (persistence) or smaller (anti-persistence) than 0.5, respectively. Such scaling reflects a trend of strengthening of deviations from the mean and it is also characteristic of the time series models known as fractional Gaussian noise (Mandelbrot & Wallis, 1969b) and as fractionally integrated ARMA (Granger, 1980). In these processes, the long-term dependence is identified in a slow (hyperbolic) decay of the autocorrelation function (ACF), based on the asymptotic scaling relationship (Lux, 1996, p. 702):

$$(R/S)_t \sim at^H \tag{7}$$

where a is a finite positive constant independent of t and H is the Hurst exponent. The linear relationship in log-log scale indicates the power scaling (Weron, 2002). To discover this scaling law and estimate the exponent H one can employ a simple linear least-squares regression (Lux, 1996, p. 702) on the

logarithms of each side of the expression [7] in a sample of increasing time horizons ($s = t_1, t_2, \dots, tn$) as $\log(R/S)_s = \log(a) + H \log(s)$.

The rescaled-range analysis (sometimes called R/S analysis) involves calculating the mean of the rescaled-range for several values up to n for a given value of s . As this mean is represented by R/S, the limit of the ratio $\log(R/S)/\log(s)$ is often referred to as exponent H . Mandelbrot and Wallis (1969a) suggested the technique of representing $\log(R/S)$ as a function of $\log(s)$ for different values of s . The slope of that representation, estimated using ordinary least-squares, reflects an estimate of the Hurst exponent H .

3.2.2. Detrended fluctuation analysis

The basis of the DFA method, proposed by Peng *et al.* (1994), is to subtract the possible deterministic trends from the original time series and then analyze the fluctuation of detrended data.

Firstly, after subtracting the mean, one integrates the original time series $\{X_j\}$ to obtain the cumulative time series $Y(t)$ as follows (Oh, Kim, & Um, 2006, p. 2):

$$Y(t) = \sum_{j=1}^t (X_j - \bar{X}) \quad ; \quad t = 1, \dots, n \tag{8}$$

This accumulation process is what transforms the original data into a self-similar process, where $\bar{X} = \frac{1}{n} \sum_{j=1}^n X_j$ represents the mean.

Secondly, the series $Y(t)$, of length n , is divided by an integer equal to n/τ non-overlapping boxes, each containing τ points. Then, the local quadratic trend $z(t) = at^2 + bt + c$ in each box is defined as the standard least-squares fit of the data points. Subtracting $z(t)$ to $Y(t)$ in each box the trend is removed. This process is applied to all the boxes, and the detrended fluctuation function F is defined by the square root of the mean deviation of $Y(t)$ from the trend function $z(t)$ (Kristoufek, 2010, p. 317):

$$F_k^2(\tau) = \frac{1}{\tau} \sum_{t=k\tau+1}^{(k+1)\tau} |Y(t) - z(t)|^2 \quad ; \quad k = 0, \dots, \frac{n}{\tau} - 1 \tag{9}$$

The calculation of the average of $F_k^2(\tau)$ over the n/τ intervals provides the definition of the fluctuation function $F(\tau)$ defined by (Matos, Gama, Ruskin, Sharkasi, & Crane, 2008):

$$F(\tau) = \sqrt{\frac{\tau}{n} \sum_{k=0}^{n/\tau-1} F_k^2(t)} \tag{10}$$

Thirdly, if the observable $X(t)$ are uncorrelated random variables, the expected behavior should be a power-law, and the previous fluctuation function has the following scaling relation (Peng *et al.*, 1994):

$$\langle F(\tau) \rangle \sim (const)\tau^H \tag{11}$$

Returning to run a linear least-squares regression over the relationship represented by log-log scale in the expression [11] produces a straight line, whose slope is the Hurst exponent H . So, from a linear (in log-log scale) regression of data corresponding to $F(\tau)$ the empirical value for exponent H can be estimated to define the degree of polynomial trend (Costa & Vasconcelos, 2003, p. 237), as occurred for the R/S analysis, as $\log(F(\tau)) = \log(const) + H \log \tau$.

3.2.3. Fractional differencing analysis

The fractional differential processes, developed by Granger and Joyeux (1980), may be used to model parametrically long memory dynamics. Under this approach, whether a series has long memory depends on a fractional differencing parameter. A general class of fractional processes $ARFIMA(p, d, q)$, which are generalizations of standard ARMA models, is described by:

$$\Phi(L)(1 - L)^d X_t = \Theta(L)\varepsilon_t \tag{12}$$

where $\{x_1, \dots, x_T\}$ is a set of time-series data, $\Phi(L) = 1 - \phi_1 L - \dots - \phi_p L^p$ and $\Theta(L) = 1 + \vartheta_1 L + \dots + \vartheta_q L^q$ are the AR and MA polynomials, respectively, in the lag operator L with all roots being stable, ε_t is a white noise disturbance term, and $(1 - L)^d = \sum_{k=0}^{\infty} \frac{\Gamma(k-d)L^k}{\Gamma(-d)\Gamma(k+1)}$ is the fractional differencing operator, where $\Gamma(\cdot)$ is the standard Gamma function.

The fractional differencing parameter (or degree of fractional integration) d assumes any real values.

3.2.3.1. Geweke and Porter-Hudak method

The spectral regression method, developed by Geweke and Porter-Hudak (1983), suggests a semi-parametric procedure to estimate the memory parameter in a fractionally integrated process. The statistical procedure involves the estimation of d in expression [12], through the slope of the spectral density function around the angular frequency $\lambda_j = 0$. This process uses a simple linear regression of the log-periodogram at low Fourier harmonic frequencies $\lambda_{jT} = 2\pi j/T$:

$$\ln[I(\lambda_{jT})] = c - \hat{d} \ln[4 \operatorname{sen}^2(\lambda_{jT}/2)] + v_j \quad ; \quad j = 1, 2, \dots, m < T \quad (13)$$

where the disturbance v_j is asymptotically normal with variance $\pi^2/6$ under normality of the innovation ϵ_t in expression [12], and m is the number of low frequency ordinates, wherein $m = T^a$ with $0 < a < 1$. The test for the null hypothesis ($d = 0$) of “short term dependence” (i.e., absence of long-term memory) can be based on the usual T-statistic.

The authors GPH show that the spectral density function of a fractional Gaussian noise with Hurst exponent is identical to that of an ARFIMA model with differencing parameter $d = H - 0.5$.

4. Discussion and results

4.1. Estimation of long-term memory

4.1.1. Classical and modified rescaled-range analysis

In an experimentation for dependency, under a fBm approach, Table 3.6 presents the estimates of Hurst exponents, via R/S and via M-R/S analysis, for CAC 40 index and the coefficients of determination (R^2):

Table 3.6. Hurst exponents H via R/S and M-R/S analysis and coefficients R^2 for daily returns series of the CAC 40 index

Procedure: linear regression of $\log(R/S)_s$ over $\log(s)$

Estimates		CAC 40
Hurst exponent (via R/S)	H	0.540
Coefficient of determination	R^2	0.999
<hr/>		
Hurst exponent (via M-R/S)	H	0.524
Coefficient of determination	R^2	0.999

Note: The complete series for log-returns has a length of 6,634 observations, but given the need of entire divisibility in R/S procedure, we considered only the first 6,630 closing prices. Specifically, the decimation for the $(R/S)_t$ ratio established the lags $s = 6, 13, 26, 51, 102, 195, 390, 663, 1326, 2210$. The $\log(R/S)_s$ was calculated as the mean of a fixed number of non-overlapping intervals.

For the whole period of analysis, the Hurst exponent is slightly above the benchmark $H = 0.5$, in both (R/S and M-R/S) techniques, indicating the existence of long memory in the form of persistence. The excellent fit of the regression $(R/S)_s$ is given by R^2 close to unity.

4.1.2. Detrended fluctuation analysis

In another experimentation for dependence, Table 3.7 presents the estimate of a Hurst exponent via DFA for the CAC 40 index and the coefficient of determination (R^2):

Table 3.7. Hurst exponent H via DFA analysis and coefficient R^2 for daily returns series of the CAC 40 index

Procedure: linear regression of $\log F(\tau)$ over $\log(\tau)$

Estimates		CAC 40
Hurst exponent (via DFA)	H	0.480
Coefficient of determination	R^2	0.996

Note: The $\log F(\tau)$ was calculated as the average of a fixed number of sliding overlapping intervals, where in the minimum lag τ is equal to 20 days (about one month of trading).

The result of the DFA technique, for the whole period of analysis, contradicts the evidence from the R/S analysis. The estimated exponent is slightly lower than 0.5, indicating the existence of long memory in the form of anti-persistence. The degree of long-term dependence indicates that the French market moves away from the independence of the innovations in the

gBm, where $H = 0.5$. Once again, the high coefficient R^2 shows the excellent fit of the regression $F(\tau)$.

4.2. Testing long-term memory

4.2.1. Classical and modified rescaled-range test

The estimates of $V_n(q)$ were calculated for the truncation parameter $q = 2, 4, 8, 16, 32$ days, in order to adjust to the possible presence of short-term autocorrelation and test the robustness of the results. Table 3.8 presents the statistics of R/S test and M-R/S test for the CAC 40 index, the autocovariance component of M-R/S statistics and the influence of R/S statistics on the presence of short-term memory:

Table 3.8. Statistics of R/S test and M-R/S test for daily returns series of the CAC 40 index, the autocovariance component of M-R/S statistics and the influence of R/S statistics on the presence of short-term memory

Index	$V_n(q)$										
	V_n	2	%infl	4	%infl	8	%infl	16	%infl	32	%infl
CAC 40	1.240	1.264	-1.9	1.303	-4.8	1.366	-9.2	1.412	-12.2	1.412	-12.2
Significance	()	()	()	()	()	()	()	()	()	()	()
Autocov. (x10 ⁷)		[-8.47]		[-2.15]		[-4.03]		[-5.24]		[-5.24]	

Note 1: the null hypothesis of an i.i.d. process, that is, non-existence of long term memory (in the absence of short-term memory) is rejected if the V_n statistic is not contained in the confidence intervals (at 90%, 95% and 99%) defined by critical regions [0.861, 1.747], [0.809, 1.862] and [0.721, 2.098], respectively (the p-values were defined in Lo (1991), Table 3.7, p. 1288). The moments of the range V_n are determined from their distribution function, with the mean $E(V_n) = \sqrt{(\pi/2)}$ and the theoretical error variance $E(V_n^2) = \pi^2/6$.

Note 2: the null hypothesis of a short-term memory process is rejected if the $V_n(q)$ statistic is not contained in the confidence intervals (at 90%, 95% and 99%) defined by the same critical regions.

Note 3: *, ** and *** indicate statistical significance (in the bilateral test) for the null hypothesis at the level of 10%, 5% and 1%, respectively.

Note 4: the %infl. is calculated using the formula $[V_n/V_n(q) - 1] \times 100$ and indicates the influence of classical rescaled-range statistics on the presence of short-term memory.

The R/S test shows that the V_n statistic does not exceed the mean critical value equal to $1.25 (\approx \sqrt{\pi/2})$ for a process without long memory and, therefore, indicates long-term negative dependence (i.e., anti-persistence with $H < 0.5$). This result diverges with estimates of Hurst exponents obtained through R/S (classical and modified) analysis and converges with estimates obtained through DFA.

This analysis evidences an absence of long memory in the French stock market, since the $Vn(q)$ statistic does not reject the hypothesis of short-term memory for any cut of lag.

As both statistics, Vn and $Vn(q)$, are insignificant, the process appears to be independent. This means that the signals for CAC 40 support the EMH.

4.2.2. Geweke and Porter-Hudak method

The GPH spectral regression procedure to estimate the parameter d and test the null hypothesis of short-term memory was subjected to different values of the root of sample size $\alpha = 0.45, 0.50, 0.55, 0.60, 0.65$, in order to test the robustness of the results. Table 3.9 presents the estimates of a fractional differencing parameter via the GPH method for the CAC 40 index, the standard errors and the T-Student statistics:

Table 3.9. Fractional differencing parameter d via the GPH method for daily returns series of the CAC 40 index, standard error deviation and T-Student statistics

Index	d				
	$m = T^{0.45}$	$m = T^{0.50}$	$m = T^{0.55}$	$m = T^{0.60}$	$m = T^{0.65}$
CAC 40	0.114	0.060	0.054	0.073	0.018
Significance	()	()	()	()	()
Standard Error <i>s.e.</i>	[0.083]	[0.074]	[0.063]	[0.050]	[0.038]
<i>t</i> -statistic <i>t</i> -sample	(1.373)	(0.811)	(0.857)	(1.460)	(0.474)

Note 1: the null hypothesis of a short-term memory process is rejected if the statistic $|t\ sample_d| > t\ critical$ where $t\ sample_d = \frac{d-0}{s.e.d}$ for a T-Student distribution with degrees of freedom. The t statistics for the estimates of parameter d are determined from the theoretical error variance ($\sigma^2/6$).

Note 2: *, ** and *** indicate statistical significance (in the bilateral test) for the null hypothesis at the level of 10%, 5% and 1%, respectively.

The estimates obtained by the GPH method are different from zero in the stationary region ($0 < d < 0.5$ or $0.5 < H < 1$), indicating long-term memory property in the form of moderate persistence ($d > 0$ or $H > 0.5$). However, robust evidence of long-term positive dependence could not be found in any low frequency ordinates. The results of the semi-parametric estimator agree with the Hurst exponents calculated by the R/S analyses. With the relation $d = H - 0.5$, the bandwidth $\{0.518, 0.614\}$ is obtained for the variation of the scaled parameter H in the CAC 40 index.

5. Conclusion

In the search for evidence of long memory property in the CAC 40 index, the daily returns series were modeled using an fBm formulation to obtain the Hurst exponents H through (classical and modified) R/S analysis and DFA with different window sizes. The regression on the total sample data estimated slightly higher H exponents in the first method, although this is not surprising since it tends to overestimate the parameter in small time series (Kristoufek, 2010). The excellent fit of the regressions $(R/S)_s$ and $F(\tau)$ is consistent with the hypothesis H1, so the time series of CAC 40 index returns seems well described by fBm. However, the methodologies provided divergent empirical results for the French market, although they do not reject the hypothesis H2. The Hurst exponent is slightly different from the benchmark $H = 0.5$, indicating the existence of long memory in the form of persistence for R/S techniques and in the form of anti-persistence for DFA.

In addition, statistical tests of long-term memory processes were performed for different levels of significance using the R/S test, the M-R/S test and the fractional differencing test GPH. The second and third tests consider different lag cuts and different values of the sample size root, respectively, in order to assess the robustness of the results. In general terms, a comparison of test procedures did not reveal clear and convincing evidence that the CAC 40 index has long-term memory, thus being inconsistent with the hypothesis H2.

The R/S tests evidence absence of long memory in the French stock market, since the $V_n(q)$ statistic does not reject the hypothesis of short-term memory for any cut of lag. This analysis suggests that there may be a stochastic process of short-term memory that degenerates over long periods, supporting hypothesis H3. The values of the $V_n(q)$ statistic are higher than those of the V_n statistic for all lags. This is not unexpected, as the series of returns proved to be negatively correlated in the short term. As both statistics V_n and $V_n(q)$, are insignificant, the process appears to be independent. This means that the signals for the CAC 40 index support the EMH, contradicting the hypothesis H4.

However, some positive results support the presence of long memory in the form of persistence in the French stock returns. This suggests that the CAC 40 index is subject to predictability, but also to trends that may be unexpectedly disrupted by discontinuities. The conclusions are important for regulators and risk managers. An important issue for them should be to know which of the market indices are persistent and thus inefficient, and which can, therefore, produce abnormal returns. Moreover, the research of persistence is important because (1) establishes the long-term benchmark models for evaluating assets and derivatives, (2) provides measures for investment selection and risk management, and (3) distinguishes the small stock markets and the global

financial markets. Further research should continue to test the degrees of persistence and the integration of Euronext stock indexes.

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Bankruptcy risk assessment for Polish and Czech logistics companies by means of the ensemble classifier approach

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Abstract

The purpose of the present study is to develop a risk assessment and forecasting tool enabling early prediction of business bankruptcy using the ensemble classifier methodology. The study uses comparative analysis of models aimed at verifying the research thesis that ensemble classifier models offer far better classification consistency compared to commonly used single classifier models. In this aspect, the author verified the classification accuracy of several variants of ensemble classifier models using the three most frequently used techniques of increasing base models' classification performance: boosting, bagging, and stacking. Classification accuracy of ensemble models was compared with four conventional models relying on single classifiers: classification trees, logistic regression, linear discriminant analysis, and support vector machines (SVM). Measures of classification accuracy, AC and AUC, were used as validation measures to determine classification consistency of investigated models. The ensemble classifier model with the best classification performance understood as the correct identification of companies threatened with bankruptcy, was used to forecast the likelihood of bankruptcy and to conduct a comparative analysis of bankruptcy risk for Polish and Czech logistics companies within a 2-year time horizon. The forecasts were based on currently available statistical data for 2017 including financial indexes of businesses investigated in the study, and statistical data were retrieved from the EMIS database. The novelty of the approach presented in the study is the fact that so far researchers have not attempted to apply ensemble classifiers in the assessment of bankruptcy risk for logistics businesses, in particular no comparative analyses have been performed to assess bankruptcy risk for Polish and Czech businesses from the sector.

Keywords: *bankruptcy risk, corporate credit risk management, ensemble classifiers, logistic sector.*

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1. Introduction

The issue of early prediction of business bankruptcy, and therefore the possibility of forecasting the risk of company bankruptcy over a long time horizon (even up to several years), is a rather significant financial and economic problem. Multiple publications discuss legal and economic aspects of business bankruptcy (e.g., Mączyńska, 2014). In its financial and economic dimension, bankruptcy (company insolvency) is defined as a situation in which a business is unable (for various reasons) to meet its liabilities towards creditors. A potential risk of bankruptcy always exists for companies operating in market economy conditions. This type of risk is most commonly defined and expressed as the probability of the business being in a situation, which prevents it from repaying its liabilities and thus causes its insolvency. The subject of modeling the risk of bankruptcy is also highly significant for institutions granting corporate loans, as the bankruptcy of a corporate debtor is a potential loss of the loan granted. In view of the importance of the problem, the subject has been raised by many authors.

This publication is also a follow-up to earlier studies related to the risk of bankruptcy of logistics companies from selected EU countries. Previous results of comparative analyses and bankruptcy risk assessment for Polish and Czech logistics businesses with the use of statistical forecasting models can be found in a study by Brożyna, Mentel, and Pisula (2016). Conventional models used in earlier research have been extended by the possibility of using ensemble classifiers to model and forecast the risk of business bankruptcy. The main research objective of the analyses presented in this study is to develop a model enabling early prediction of the risk of business bankruptcy using ensemble classifiers and to apply it to bankruptcy risk assessment for businesses from the logistics sector operating in Poland and the Czech Republic. The selection of the two countries for comparative analysis purposes was intentional since the Czech Republic is an important and economically competitive neighbor which, like Poland, belongs to the group of post-communist countries, as well as being a member of the Three Seas Initiative. Bankruptcy forecasting was based on the use of ensemble classifiers, proven by numerous studies by many authors to be more accurate (i.e. demonstrating better classification consistency) and provide more accurate forecasts (less susceptible to error) than conventional methods relying on single classifier models. A research method based on ensemble classifiers involves combining (aggregating classification results of) several single classifiers to form one ensemble classifier, which is characterized by superior classification performance (better accuracy) as opposed to a simple categorization of businesses as those threatened with and not threatened with bankruptcy. In this context, the study was aimed at

verifying a key research thesis that ensemble classifiers are more effective (i.e. offer better accuracy of valid classifications) in predicting company bankruptcy compared to conventional methods relying on single classifier models. This study also attempts to answer the following research questions: (a) what is the predicted bankruptcy risk for companies from the logistics sector in the two countries; (b) is the sector of logistics companies in Poland more exposed to bankruptcy risk than its Czech counterpart; and (c) does company size affect the potential risk of bankruptcy? The order of consecutive experiments presented in this study is governed by answers to the questions formulated above. The logistics industry in both analyzed countries was characterized in the initial stage of the study. In its subsequent phases, feature selection (i.e., methods of searching for an optimum subset of diagnostic variables) was used to select the best subset of diagnostic indexes (bankruptcy determinants). For a selected subset of financial indexes describing the financial health of the analyzed companies, a number of ensemble model variants were developed and the best model was selected (i.e. offering superior predictive performance and classification capabilities).

During the final stage of the study, the selected ensemble classifier model was applied to forecast the risk of bankruptcy for analysed businesses over a time horizon of up to 2 years, on the basis of currently available financial indexes for 2017 (accordingly, potential risk of bankruptcy was forecast over a period up to 2019). Based on the generated forecast, the potential risk of business bankruptcy was characterized by both countries of interest (on the basis of the probability of bankruptcy predicted by the model). This provided a foundation for the attempt to determine a rating class (according to S&P's standards) for the businesses. The analyses involved the author's calculation procedures and modeling methods using the "R" package and the Statistica software. The selection of businesses for the test sample was very diligent and intentional. Emerging Markets Information Service (EMIS) (<http://www.emis.com>), an online database, proved extremely helpful in selecting subjects to be analyzed in the study. When selecting logistics companies operating in Poland and the Czech Republic, the author made sure that if a company is registered in the Czech Republic, it should be qualified for the study only on condition that it has Czech capital, and if a company is registered in Poland, it should qualify only on condition that it has Polish capital (the EMIS database contains such information on the origin of share capital and shareholders). The group of bankrupt businesses in Poland and the Czech Republic was selected with similar precision. The group contains only those companies which were declared bankrupt by court (information retrieved from bankruptcy register and the EMIS database). The EMIS database was also a source of statistical data which were used to determine indexes quantifying companies' financial

health. The data was collected from financial statements of companies from emerging market countries contained in the EMIS database.

2. Literature background

The subject of modeling business bankruptcy and forecasting the likelihood of bankruptcy appeared for the first time in economic and financial literature in the year 1968. The first study on risk bankruptcy modeling was published by Altman (1968). Over several decades the methods and tools of forecasting and evaluating the risk of bankruptcy have developed quite rapidly. Many studies mainly discuss the use of conventional tools for modeling the risk of bankruptcy by statistical methods such as logistic regression (Logit), Probit models or linear discriminant analysis (LDA). One should also mention the Polish authors' significant contribution to the development of effective bankruptcy forecast models which take into account the specific nature of the Polish market and Polish economy. Their publications rely mostly on a conventional approach, making use of statistical or non-statistical methods (e.g. based on artificial intelligence and machine learning), albeit coupled with the application of single classification models to assess bankruptcy risk and categorize businesses according to the probability of bankruptcy. Results obtained by Polish authors studying bankruptcy risk modeling can be found, e.g. in publications by Hadasik (1998), Hamrol and Chodakowski (2008), Hołda (2001), Korol (2010), Mączyńska (1994), Pocięcha (2005), Prusak (2005), and Ptak-Chmielewska (2016). A detailed analysis of business bankruptcy forecasting and an overview of commonly applied models from the perspective of the developing economies of Central and Eastern Europe during the transformation period were published in a monograph by (Kliestik et al., 2018).

Business bankruptcy forecasting methods are being constantly developed, and they are based on increasingly advanced techniques. The advancement of computational techniques and increasing computing power allow us to employ many machine learning methods to forecast the risk of bankruptcy. Such methods include advanced techniques and algorithms based on classification tree models, neural network models, self-organizing maps (SOM, a type of neural network), support vector machines (SVM), and others. At the same time, techniques based on combining multiple classifiers forecasting risk of bankruptcy into ensemble classifiers or even several ensemble classifiers (hybrid classifiers), the results of which are aggregated by means of another ensemble meta-classifier, are constantly developed. In this way, an entire integrated system of combined classifiers is emerging, aimed at improving forecast and classification capabilities of the whole model in relation to single (base) classifier models.

A detailed overview of the methods and analysis of results of the application of ensemble classifiers in business bankruptcy forecasting can be found in studies by du Jardin (2018), Tsai, Hsu, and Yen (2014). An analysis of the latest literature on business bankruptcy forecasting by means of ensemble classifiers reveals two aspects of their practical application. The first one concerns the use of ensemble classifiers in business bankruptcy forecasting, while the second one (related to the first aspect) involves the use of such models in credit risk assessment. In the latter, credit risk models are a useful tool for lending institutions granting corporate loans, for whom the insolvency of a corporate borrower means the risk of the borrower's failure to meet its liabilities (i.e., defaulting on a loan).

Many studies on the application of ensemble classifiers in business bankruptcy forecasting refer to boosting and bagging methods (sequential correction and classification error minimization as well as component classifier result sampling and combining) in order to increase classification performance of the entire forecasting system. In studies by Cortes, Martinez, and Rubio (2007), or Heo, and Yang (2014) Adaboost, an adaptive boosting algorithm, was applied to decision trees as basic classification models. The use of ensemble classifiers with classifier boosting technique based on neural network classifiers was discussed in studies by Alfaro, Garcia, Gamez, and Elizondo (2008), Fedorova, Gilenko, and Dovzhenko (2013), Kim and Kang (2010), West, Delana, and Qian (2005). A different approach was adopted by Kim, Kang, and Kim (2015), Sun, Fujita, Chen, and Li (2017), who used support vector machines (SVM) as base classifiers, which were boosted as a group of ensemble classifiers. Bagging is also a method frequently used in practical applications of ensemble classifiers. This subject is dealt with in studies which analyze classification effectiveness of such ensemble classifiers relying on several models of base classifiers (Hua, Wang, Xu, Zhang, & Liang, 2007; Zhang, Zhou, Leung, & Zhen, 2010; Twala, 2010). The use of ensemble classifiers with combining (stacking) results of several classifiers in a single meta-classifier was discussed in studies (e.g., Iturriaga, & Sanz, 2015; Tsai, & Wu, 2008; Tsai, & Hsu, 2013). Furthermore, many studies are dedicated to the use of various techniques of combining the results of base model classification such as neural networks in the form of self-organizing maps (SOMs); rough sets techniques, case-based reasoning, and classifier consensus methods are also used. Examples of the use of this type of ensemble classifiers are discussed in studies by Ala'raj and Abbod (2016), du Jardin (2018), Chuang (2013), Li and Sun (2012). This review of literature relating to the application of ensemble classifiers to investigate bankruptcy risk does not cover all aspects of this vast area of knowledge.

3. Research approach and methods

The idea behind the application of ensemble classifiers involves the use of an ensemble of several classifiers in order to increase classification accuracy (the ability to discriminate between predicted classes) in relation to commonly used base single classifiers. This is done by suitably aggregating (or weighing) results of classification for each component model to obtain resultant classifiers with the best possible predictive capabilities, surpassing those of all base classifiers. A detailed description of ensemble classifier methodology, their types, characteristics, and numerous practical applications can be found, e.g. in monographs by Zhang and Ma (2012) and Zhou (2012). Three approaches are adopted in practical application of this methodology: boosting, bagging and stacking. The terminology of boosting ensemble classifiers refers to a broad class of algorithms which enable boosting “weak classifiers”, turning them into “strong qualifiers” (of excellent, near-perfect classification performance). An example of such approach is AdaBoost, an adaptive boosting algorithm (Freund & Schapire, 1997). Classifiers of the same type, e.g. boosted classification trees, serve as base classifiers in this approach. Voting strategies are most commonly used in order to determine object classes, aggregating their output classifications, such as majority voting, plurality voting, weighted voting or soft voting. An implementation of the AdaBoost.M1 adaptation boost algorithm was described in a monograph by Zhang and Ma (2012). The name of another group of ensemble classifiers (‘bagging’) comes from an abbreviated form of Bootstrap AGGREGatING (Breiman, 1996). This group of ensemble classifiers involves bootstrap sampling to obtain learning subsets for base classifiers; essentially, it makes use of classifiers of the same type as component classifiers. An example of this type of ensemble classifiers is the Random Forest approach. Bootstrap aggregation algorithm is described in detail in a monograph by Zhang and Ma (2012). A third frequently used group of ensemble classification methods is made up of the so-called combination methods which rely on classification results for base classifiers. This group of methods includes averaging (simple or weighted averaging of base classifier results), voting (involving the use of a voting strategy) and stacked generalization. Stacking ensemble methodology (see Wolpert, 1992) is based on a combination approach whereby base classifiers (level 1 classifiers) are trained on random samples, and then relevant classification results (their classification functions) are used as learning samples for the meta-classifier (level 2 classifier) and aggregated in resulting classifications.

This study analyses the classification of investigated logistics businesses into companies at risk of bankruptcy or at no risk of bankruptcy and predicts their bankruptcy risk (characterized by the likelihood of bankruptcy) by

means of each of the ensemble classification methods discussed above. However, every ensemble classifier methodology is based on the application of a suitable system of base classifiers. Four popular classification methods were used as conventional models for base classifiers: linear discriminant analysis (LDA, model M1), logistic regression (Logit, model M2), support vector machines with a radial basis function kernel (SVM Radial, model M3) and classification and regression trees (C&RT, model M4). The results of the classification function of the above-mentioned models were used as inputs for a level 2 meta-classifier (in stacking ensemble classifier) in the form of a classic neural network with a single hidden neuron layer with logistic activation functions for the neurons and mutual entropy as a function of learning error. In order to improve the consistency of correct classifications compared to other ensemble methods, two other ensemble classifier models based on boosting and stacking were also used. Algorithm C5.0 was applied as the classifier for boosted classification trees, while Random Forest was applied as the classifier in the bagging approach. The function of algorithm C5.0 is similar to that of the Adaboost.M1 discussed earlier, although it relies on the specific nature of classification trees. In contrast, the Random Forest classification approach is based on a classical Breiman algorithm using classification trees, augmented by such elements as a random selection of the learning set for each tree, a random selection of a variable (predictor) subset, on which tree pruning will be performed, a random selection of a pruning method for each tree, as well as a random differentiation for each node size. All of the applied methods and models are very well-known, widely discussed in the literature and frequently applied in many publications on forecasting and the use of classification methods. An accurate and detailed description of all the methods discussed above can be found in many publications and monographs (e.g., Kuhn & Johnson, 2013; Breiman, Friedman, Olshen, & Stone 1984; Cortes & Vapnik, 1995; Quinlan, 1993).

A significant classification-related issue is a problem of choosing the appropriate subset of predictive variables (i.e. feature selection problem). Wrapper methods are techniques which analyze possible predictor subsets and determine the effectiveness of their impact on the model's dependent variable on the basis of search algorithm, best subset of variables and the classification method applied. In order to search all variable subsets, the search algorithm is 'wrapped' around the classification model, hence the name of this group of methods. Wrapper feature selection methods are based on various approaches to searching for the optimum subset of predictors. Such approaches can be divided into two basic groups: deterministic and randomized. This group of deterministic methods applies various sequential algorithms, e.g. progressive stepwise selection or backward stepwise elimination. Wrapper feature selection

methods most frequently use random algorithms such as simulated annealing, genetic algorithms or ant colony optimization. Detailed characteristics of the selection of key predictive variables may be found in studies (e.g., John, Kohavi, & Pfleger, 1994; Jovic, Brkic, & Bogunovic, 2015), which relied on the wrapper method with an optimization algorithm to search for a subset of factors using a genetic algorithm.

For classification consistency purposes, well-known and frequently used validation measures served as accuracy criteria for forecasts obtained. A classification accuracy measure was used: $AC = \frac{TP+TN}{(TP+TN+FP+FN)} \cdot 100\%$, as well as classification accuracy measure for each class individually, i.e. bankrupt businesses: $AC_{BAD} = \frac{TN}{(TN+FP)} \cdot 100\%$ and for businesses not threatened by bankruptcy: $AC_{GOOD} = \frac{TP}{(TP+FN)} \cdot 100\%$. Quantities indicated in the formulas correspond to: TP – number of actual non-bankruptcies correctly qualified by the model, TN – number of actual bankruptcies correctly qualified by the model, FN (type II classification error) – number of actual non-bankruptcies incorrectly classified by the model (as bankruptcy), and FP (type I classification error) – number of actual bankruptcies incorrectly classified by the model (as non-bankruptcy). A validation measure often used for classification models is Area under the Curve for Receiver Operating Characteristic (AUC ROC). It is the measure of the area under curve being a visual representation of relationships in the coordinate system (X, Y) for the TPR (True Positive Rate) index, the so-called sensitivity (detection probability) expressed as: $TP/(TP+FN)$ relative to FPR (False Positive Rate, i.e. false alarm rate or 1-specificity) expressed as: $FP/(FP+TN)$.

4. Discussion and results

The subjects in this company bankruptcy risk assessment study using ensemble classifiers included Polish and Czech TFL (transport/freight forwarding/logistics) businesses in 2017. Their activities mostly focused on broadly-defined transport and forwarding of people and goods by different means of transport, storage and warehousing of commodities, postal and courier services, as well as supporting logistics operations in various aspects. Figure 3.1 presents the structure of the companies from the logistics sector in both analyzed countries according to classification of activities. A comparison of both sectors in Poland and the Czech Republic in terms of activities according to NAICS classification enables us to notice certain similarities in the structure of both sectors. The highest number of those businesses deals with land transport (63% in Poland and 64% in the Czech Republic). Next, there are companies which support transport activities (27% in Poland and 20% in the Czech Republic), and those

whose main activity is storage or warehousing (6% of logistics companies in Poland and 10% in the Czech Republic). Other classification groups of logistics companies' activities in both countries constitute a fraction (approx. 4% in Poland and 6% in the Czech Republic) of the total.

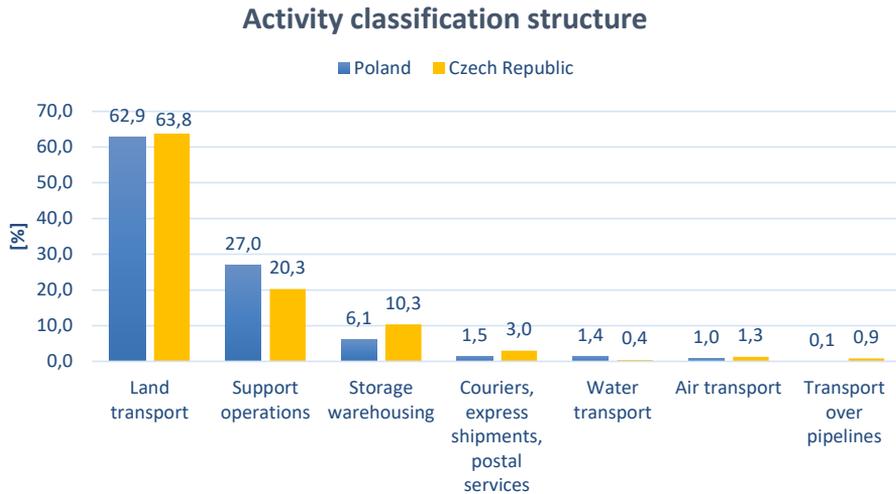


Figure 3.1. Percentage structure of companies in the TFL sector operating in Poland and the Czech Republic according to the classification of activity in 2017

Source: author's idea of presentation on the basis of data from the EMIS database.

Figure 3.2 illustrates the percentage distribution of logistics companies in both countries in relation to the balance sheet total (total assets) as the criterion determining the size of business. Apart from the number of employees, it is one of two possible criteria of company classification according to its size. An analysis of the percentages of businesses shows that in both countries the most numerous are companies of low total asset value, up to EUR 10m (84% in Poland and 70% in the Czech Republic). Companies of medium total asset value (EUR 10 to 43m) constitute approx. 11% in Poland and 19% in the Czech Republic. Companies of high value of total assets (above EUR 43m) form the smallest group: only 5% in Poland and 11% in the Czech Republic.

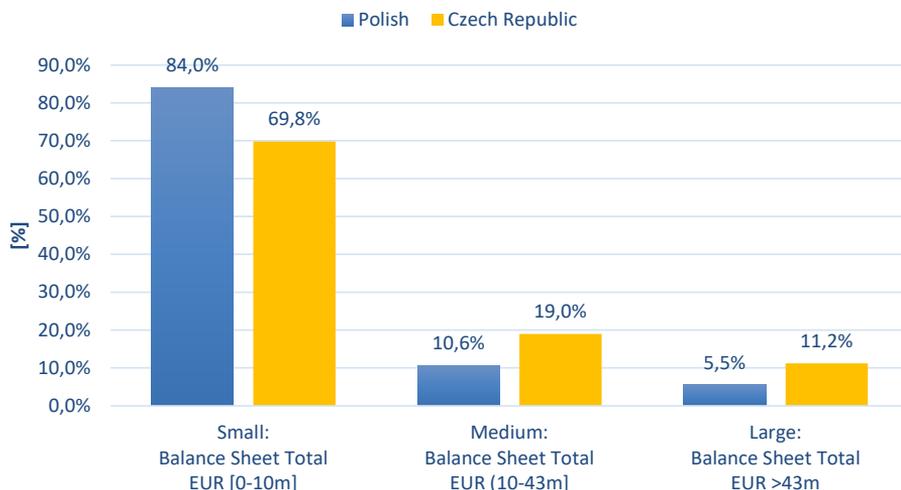


Figure 3.2. Percentage structure of companies in the TFL sector operating in Poland and the Czech Republic according to company size criterion defined as amount of total assets in 2017

Source: author's idea of presentation on the basis of data from EMIS.

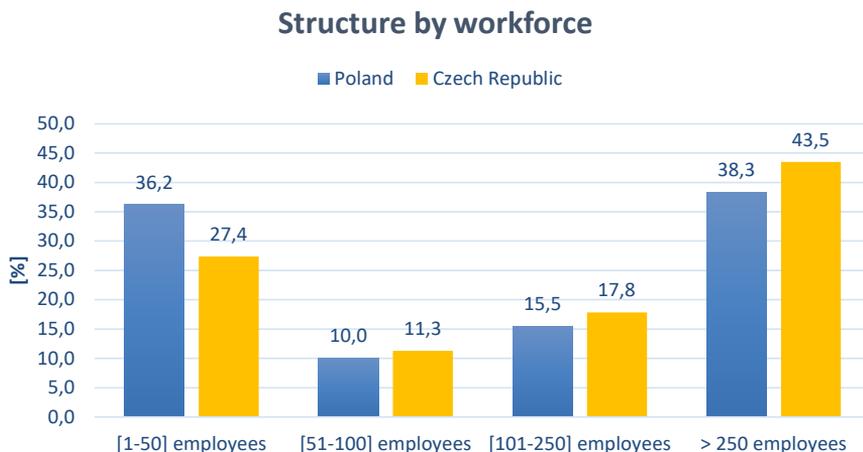


Figure 3.3. Percentage structure of companies in the TFL sector operating in Poland and the Czech Republic according to number of employees

Source: author's idea of presentation on the basis of data from EMIS.

An analysis of the percentage structure of employment (Figure 3.3) shows that most companies, ca. 38% in Poland and 43% in the Czech Republic are companies with a large number of employees (above 250). There are also plenty of small companies (with a workforce of up to 50): 36% in Poland and 27% in the Czech Republic. The smallest group includes companies with 50 to 100 employees (respectively 10% and 11% in the analyzed countries) and between 100 and 250 employees (respectively 15% and 18%).

An ensemble classifier-based approach was applied to assess the risk of bankruptcy of Polish and Czech logistics companies. By definition, such classifiers boost classification results and improve base models' classification capabilities. The ensemble classifier approach was discussed in depth in Section 3 of this study. Four methods well-known and commonly used in the literature were used to assess bankruptcy risk: linear discriminant analysis (LDA), logistics regression model (Logit), classification and regression tree (CaRT) and support vector machines with radial basis functions (SVM Radial). The application of ensemble classifier approach involved the use of a stacking meta-classifier (a neural network (NNet)), and resultant classification functions (likelihood of bankruptcy) obtained from base models were fed into the inputs of the neural network. The network aggregated the results and generated its classification function for the ensemble classifier. Alternatively, in order to compare the effects of classification performance of other models, boosting and bagging approaches were also employed. The idea of enhancing classifier quality by means of those methods was presented and discussed in detail in Section 3 of this study. Bankruptcy risk of logistics companies was assessed by means of two boosting ensemble classifiers: extreme gradient boosting (XGBoost) and boosted classification trees algorithm C5.0, while Random Forest (RF) and averaged neural network (avNNet) methods were used as bagging ensemble classifiers. Calculations were performed utilizing the *R* statistical analysis package and the author's calculation procedures developed using the following libraries from the *R* package (*Caret*, *CaretEnsemble*, *Nnet*, *Rborist*, *C50*, *Xgboost*, and *Kernlab*) and several auxiliary libraries.

Over 30 financial indexes described in the literature and commonly used in economics and financial analyses of companies were initially selected as variables (factors) characterizing financial health and potential bankruptcy risk of companies investigated in this study. Those indexes can generally be divided into 4 index groups describing a company's financial liquidity, profitability, debt level, management efficiency and effectiveness as well as capital structure. Out of those indexes, the best set of 8 optimum indexes (bankruptcy predictors) was selected. The *wrapper* feature selection method, previously discussed and characterized in detail (Section 3), with the optimization of the subset of selected factors using a genetic algorithm, was used to search for

the best set of indexes for diagnostic variables. As a predictive performance assessment criterion for selected variables, classification quality measure ROC (AUC) was applied, with calculations relying on the genetic algorithm feature selection (*Gafs*) procedure from *Caret* library of the “R” package. The resulting final set of diagnostic variables, together with validation statistics values characterizing their discriminatory performance, is shown in Table 3.10. High values of validation measures for the selected indexes confirm their good discriminatory performance in the correct classification and distinguish between businesses threatened or not threatened with bankruptcy.

Table 3.10. An optimum set of financial indexes used in bankruptcy forecasting models and approximate measures of their discriminatory capability (validity of predictors)

Bankruptcy indexes (predictors)	Information Value - IV	Gini coefficient - G	Cramer's coefficient - V
X_1 - Current Liquidity (Current assets / Short-term liabilities) [%]	1.25	0.46	0.49
X_2 - Return on Assets (ROA) (Net Profit / Assets) [%]	1.19	0.45	0.49
X_3 - Return on Equity (ROE) (Net Profit / Equity) [%]	0.85	0.10	0.40
X_4 - Return on Capital (Net Profit / (Assets – Short-term liabilities) [%]	1.00	0.10	0.44
X_5 - Overall Debt (Total Liabilities / Balance Sheet Total) [%]	1.71	0.59	0.56
X_6 - Debt (Net Profit + Depreciation) / Total Liabilities [%]	0.91	0.58	0.54
X_7 - Long-Term Debt (Long-Term Liabilities / Equity) [%]	0.90	0.31	0.41
X_8 - Stock Turnover [days]	0.47	0.11	0.34

Source: author's calculations using the Statistica software.

The test sample, containing a total of 286 cases, used for the calibration and testing of ensemble models in bankruptcy risk forecasts, was a balanced sample (with equal number of bankrupt and healthy companies) from the logistics sector in Poland and the Czech Republic, which included 143 cases of bankruptcy (115 in Poland and 28 in the Czech Republic). For bankrupt companies, time until the declaration of bankruptcy was between 0 and 2 years. Financial data were retrieved from financial statements in the EMIS portal database and, for bankruptcy model calibration purposes, included data from the years 2008-2016. A separate sample was a forecast sample on the basis of which the assessment of the risk of bankruptcy of Polish and Czech logistics companies was carried out with a time horizon of up to 2

years (based on data from 2017: predicted risk of bankruptcy until 2019). The sample included 234 selected businesses (large, medium and small) from the logistics sector in the Czech Republic (number of financial statements for 2017 available in the EMIS database as of the date of this study, i.e. January 2019) and their 317 Polish counterparts (91 available financial statements for large companies, 108 for medium-sized ones and 118 for randomly selected small companies). The test sample for ensemble models was randomly split into 2 subsets: the learning subset (70% observations), on the basis of which bankruptcy forecasting models were calibrated and trained, and test and validation subset (30% observations), on the basis of which model quality was verified and classification accuracy for new data absent from the learning sample was ascertained. Consequently, each of the analyzed ensemble models for forecasting bankruptcy was calibrated on the basis of data from the learning sample by means of a cross-validation technique (k=5 fold) and the use of ROC (AUC) as the selection assessment criterion. The range of the selection of possible parameter values was defined with the aid of the network search approach (minimum, maximum, increment).

Table 3.11 contains approximate values of validation statistics (for classification quality) of the analysed ensemble models: overall accuracy ratio (AC), accuracy ratio for 'bad' (bankrupt companies) – AC_{BAD} , accuracy ratio for 'good' companies (not threatened with bankruptcy) – AC_{GOOD} , and the ROC (AUC) measure where learning and test samples were applied. An analysis of the values of validation statistics indicates that the best classification performance for the learning sample was demonstrated by ensemble models for boosted classification trees C5.0 and the Random Forest (RF) model (highest values of $AUC=0.92$ among all models, significantly outscoring all base classifiers). Model C5.0 was characterized also by the best overall classification accuracy in predicting bankrupt businesses and businesses facing bankruptcy ($AC=84\%$). Moreover, the model offered superior classification accuracy for correctly identified businesses from the bankrupt group, corresponding to. Ensemble models also feature better predictive performance than base models for the test/validation sample intended to verify how models perform in cases which are new and unknown to them. For boosted classification trees model C5.0, values of all validation statistics suggest that the model surpasses all other models in terms of their predictive capabilities. The model was therefore used as the final ensemble model to forecast the probability of Polish and Czech logistics companies over a time horizon of up to 2 years (until 2019) based on latest financial indexes (determinants of business bankruptcy) available for 2017.

Table 3.11. Validation statistics for analyzed single models (no ensemble methodology used) and with the use of ensemble classifiers for the learning sample and test sample of investigated businesses

Classification model	Learning sample				Test/Validation sample			
	AC [%]	AC _{BAD} [%]	AC _{GOOD} [%]	ROC (AUC)	AC [%]	AC _{BAD} [%]	AC _{GOOD} [%]	ROC (AUC)
Conventional approach – individual single classifier								
Linear discriminant analysis (LDA) – M1	73.5	68.0	79.0	0.82	69.7	69.7	69.7	0.78
Logistic regression (Logit) – M2	79.5	72.0	87.0	0.84	73.2	67.4	79.1	0.80
Support Vector Machine (SVM Radial) – M3	77.5	70.0	85.0	0.84	66.3	65.1	67.4	0.73
Classification tree (C&RT) – M4	79.0	67.0	91.0	0.79	68.6	53.5	83.7	0.69
Ensemble classifier – stacking approach								
Meta-classifier ensemble: neural network (NNet) – inputs results for models M1-M4	79.5	69.0	90.0	0.87	72.1	60.5	83.7	0.81
Ensemble classifier – boosting approach								
Boosting Trees C5.0	84.0	80.0	88.0	0.92	74.4	72.1	76.7	0.82
Ensemble classifier – bagging approach								
Random Forest	83.0	78.0	88.0	0.92	74.4	67.4	81.4	0.80

Source: author’s calculations based on results obtained through the use of the “R” package.

Indexes (determinants of financial health) were calculated on the basis of most up-to-date financial data (retrieved from the latest financial reports of TFL companies in Poland and the Czech Republic). Forecast values for cumulative likelihood of bankruptcy were determined on the basis of ensemble model Boosted Trees C5.0 (over the period of up to 2 years, i.e. until 2019). S&P reports on business bankruptcy over a 2-year period (Vazza & Kraemer, 2018) were used to estimate bankruptcy risk ranges for the so-called implied rating of the businesses covered in the present study. Figure 3.4 presents the percentage distribution of the number of companies by rating class, corresponding to their predicted bankruptcy risk. An analysis of the calculated likelihood of bankruptcy of logistics businesses covered in this study and their

implied rating allows us to conclude that, overall, businesses operating in the Czech Republic are less exposed to risk (more immune to bankruptcy) than their Polish counterparts. Most businesses from the sector (87% in Poland and 69% in the Czech Republic) are characterized by a significant probability of bankruptcy over a period of up to 2 years. Such businesses belong to predicted high-risk and very high-risk classes (implied rating: BB, B, CCC/C and D). This percentage distribution results from the fact that none of the businesses was described by predicted probability of bankruptcy corresponding to implied BBB rating class, which is considered the lower limit of being relatively immune to bankruptcy.

Percentage of businesses by implied rating for the TFL sector

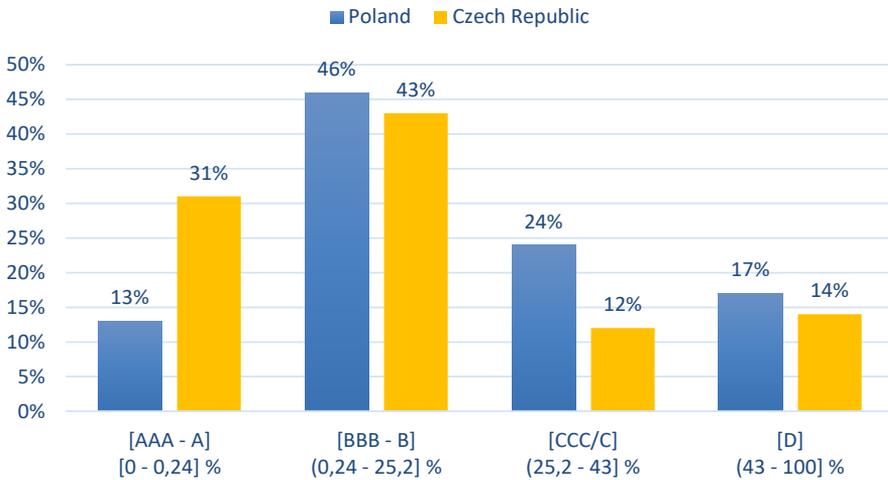


Figure 3.4. Forecast percentage of Polish and the Czech logistics companies by implied rating as for 2017

Source: calculated by the author using an Excel spreadsheet.

Below this limit, we find exclusively companies facing very high risk, bankrupt or close to bankruptcy (investment-wise they are highly speculative or virtually insolvent). Only 13% Polish businesses may be qualified as exposed to a very low risk of bankruptcy – AAA rating (likelihood of bankruptcy up to 0.03%), whereas in the Czech Republic 31% of companies are predicted to belong to this category. Similarly, the proportion of businesses with an

implied rating of CCC/C (extremely speculative business, approaching bankruptcy with low chances to recover assets) is forecast at 12% in the Czech Republic and as much as 24% in Poland. The percentage of logistics companies most exposed to the risk of bankruptcy (rating D – default) over a time horizon of up to 2 years is forecast at 17% in Poland and 14% in the Czech Republic. The proportion of businesses from the D-rated category, for which the probability of bankruptcy is greater than 50%, the classification threshold for the ‘bankruptcy’ category by classifier models, corresponds to 16% for Poland and 12% for the Czech Republic.

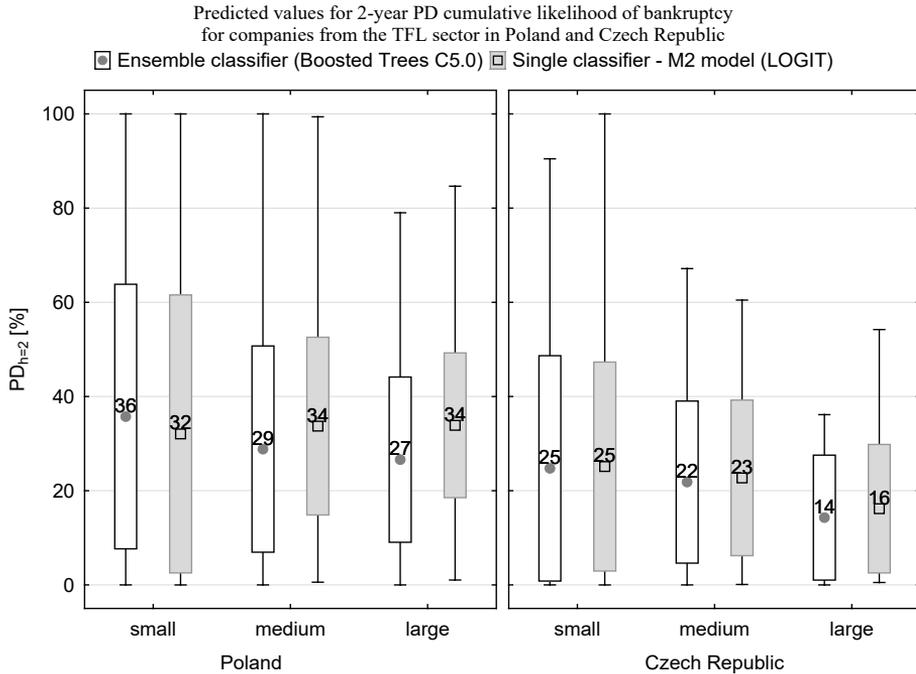


Figure 3.5. Mean values and variability ranges for predicted probability of bankruptcy (within up to 2 years) for businesses from the transport/forwarding/logistics (TFL) sector operating in Poland and the Czech Republic depending on business size

Source: author’s presentation with the aid of Statistica software.

Figure 3.5 shows the variability range and mean values for the 2017 forecast concerning the cumulative probability of bankruptcy for Polish and Czech businesses from the TFL sector depending on their size (according to UE classification) over a time horizon of up to 2 years. Forecasts generated

using Boosting Trees C5.0 ensemble classifier were compared with forecasts generated by means of a conventional logistic regression model, which as one of 4 analyzed single classification models offered relatively superior predictive performance (accuracy of correct classification). Forecasts obtained based on both models (with or without ensemble classifiers) gave very similar results for companies in the Czech Republic. For businesses operating in Poland, the logistic regression model for medium and large companies predicted a much higher likelihood of bankruptcy in relation to forecasts generated using the ensemble model. A detailed analysis of bankruptcy risk forecasts allows us to conclude that both in Poland and the Czech Republic, small companies are much more exposed to risk and thus more susceptible to potential bankruptcy. The larger the company is, the lower the potential risk of insolvency is. Another conclusion is that larger businesses are characterized by lower variability in the predicted likelihood of bankruptcy (i.e. more stable forecasts). Mean probability of bankruptcy for small Polish businesses estimated by the ensemble model (Boosted Trees 5.0) was 36%, whereas for Czech companies it was 25%. Half of small companies in Poland are characterized by a predicted probability of bankruptcy no greater than 36%, while the same measure for half of Czech companies covered in this study was 23% and less (with the maximum of respectively 90% in the Czech Republic and even up to 100% in Poland). Mean predicted bankruptcy risk values for large Polish companies (least exposed to risk) were 27%, with half of those businesses characterized by bankruptcy risk of 23%, while the maximum likelihood of bankruptcy was as much as 79%. For large companies in the Czech Republic, mean, median and maximum probability of bankruptcy was respectively: 14%, 23%, and 36%.

5. Conclusions

Summing up the analyses contained in the research section of this study, one must conclude that the main research objective, i.e. the development of a predictive model with good forecasting performance for early bankruptcy risk prediction using the ensemble classifier approach which could be practically applied to forecast and assess the risk of bankruptcy of Polish and Czech logistics companies, has been achieved. The developed model is based on ensemble classifiers with boosting (Boosted Trees C5.0). The model offers a very high (84%) overall accuracy of correct classification for the learning sample on the basis of which the model was calibrated (80% for bankrupt companies and 88% for companies not threatened with bankruptcy). For the test sample, correct classification accuracy for the same model was also high: 74% for both classes combined, 72% for bankrupt companies and 77% for companies not threatened with bankruptcy. Results of detailed tests concerning the application

of ensemble classifier methodology in forecasting and assessment of the risk of bankruptcy of Polish and Czech logistics companies enable us to formulate several important practical conclusions. At the same time, they provide answers to theses and research questions formulated in this study.

- 1) A comparative analysis of the values of validation statistics (Table 2) demonstrates that the research thesis formulated in the introduction, which states that ensemble models are better at forecasting the likelihood of company bankruptcy and thus provide a better tool for the prediction and assessment of bankruptcy risk than conventional models (relying on single classifiers), is fully substantiated. Ensemble classifier models, compared to conventional models based on single classifiers (models M1-M4), are more capable of accurate classification and provide more adequate forecasts (less prone to errors due to incorrect classification) for all classes and, in particular, for the class of companies in real danger of bankruptcy.
- 2) In addition, forecasts demonstrate that Polish logistics sector companies in 2017 were in greater danger of bankruptcy than their counterparts in the Czech Republic (Figure 3.4, Figure 3.5). It is predicted that within two years (until 2019) as many as 74% of logistics businesses in the Czech Republic and only 59% logistics businesses in Poland will be free from the risk of bankruptcy (predicted likelihood of bankruptcy up to 25%). For Czech businesses, as many as 31% of them may be assessed as financially stable (predicted bankruptcy risk up to 0.24%). In contrast, it is predicted that there are only 13% of such businesses in Poland. According to the forecast, 17% of the analyzed Polish and only 14% of analyzed Czech companies faced the highest risk of bankruptcy (predicted bankruptcy risk in excess of 40%) in 2017.
- 3) Company size affects the risk of its bankruptcy (Figure 3.5). Small companies are much more exposed to the risk of insolvency, medium ones are more financially stable, and large companies (with high overall asset value) are the least vulnerable (this is especially visible in the case of Czech businesses).

Finally, it should be emphasized that the ensemble classifier approach proposed in this study may constitute the basis for further interesting comparative analyses of bankruptcy risk assessment relating to other sectors and other countries, and that such research is currently under way.

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Health expenditure by sources of financing in the system of health accounts. Methods facilitating the management of health care

Agnieszka Strzelecka¹

Abstract

The paper presents an analysis of health expenditure on the basis of information provided by the System of Health Accounts. This article focuses on the analysis of the sources of financing of health care by SHA2011. Besides, it shows the medium-term rate of change in public spending dynamics: current health expenditure, voluntary health insurance programs, and household out-of-pocket payments, and also an analysis of total health care spending with the distinctions of three financing schemes. The study was conducted on annual data for the years 2014-2017 for the “new” EU countries. The study used data from the OECD database. In almost all the countries analyzed, health care is financed mainly from compulsory health insurance contributions. The share of public spending decreases (in Poland - an average year-on-year decline of public 0.71% and the increase by 1.67%), and there is increasing participation of private (average year-on-year increase of 0.97%). In addition, there is a noticeable increase in the share of voluntary health insurance in the current expenditure on health (in Poland - an average increase of 9.17% year-on-year). SHA may facilitate programs to stimulate public and private funding and make the right decisions. SHA2011 ensures greater transparency and related methods of providing financing services. The analysis examined changes in the economic phenomenon which play an important role in making decisions about health management. Analysis of health spending is very important because these expenses are an increasingly important part of GDP, and SHA is the basis for managing the complexity of health care.

Keywords: *health expenditure, contributory health insurance schemes, household out-of-pocket payment, the System of Health Accounts.*

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1. Introduction

Examination of the funding appropriations or outlays on health care requires the use of modern management tools. One of the basic instruments is the System of Health Accounts, which allows for a comprehensive presentation of financial flows in health care (Mueller & Morgan, 2017). In the tables of the System of Health Accounts - SHA/National Health Account - NHA you can find all the group health services, providers and funders of health. These tables are based on the International Classification for Health Accounts - ICHA, which is useful for health policy and issues related to the reforms, in particular, to determine the flow of financial resources in health care. The discrepancies between the total gross production of the healthcare system and the sum of final consumption in terms of health² made it necessary to apply input-output tables to the analysis. They allow you to trace the flow of expenditure for goods and services from various sources. What is more they show spending on health care, among others, according to what the SHA allows (OECD, 2000):

- analysis of the health care system from an economic point of view, in accordance with the rules for conducting national accounts;
- presentation of the tables to facilitate analysis of cash flows in health care;
- classification of various types of insurance funds and other forms of financing.

Besides enabling the comparison of health expenditure between countries, SHA's aim is also to provide instruments for the analysis of national financial flows in relation to health.

Also, in deciding in medical entities, it may help to indicate trends in the formation of expenses, especially when they become dependent on Gross Domestic Product (GDP) (Xu, Saksena, & Holly, 2011). This change³ causes a change in the number of funds in health care because GDP is considered the main factor, which is correlated with health expenditure (Akca, Sonmez, & Yilmaz, 2017). This relationship has so large an impact on the financial condition of therapeutic entities, and indirectly, the quality and quantity of services provided. This confirms Björnberg (2018) which indicates that there is a good correlation between those expenses and results of treatment or the availability of medical care. Therefore, in trying to improve the functioning of health systems, the state of health of the population, and the quality of care and patient satisfaction, it is necessary to compare the organization and financing of health care⁴. In many EU countries, the share of public expenditure is decreasing, which is offset by the growing share of households. However, when conducting comparative studies of health expenditure between countries, difficulties were

encountered because in each country the amounts of expenditures transferred to health care were reported differently (Orosz & Morgan, 2002).

Given the above considerations, the study focuses mainly on the aspect of financial flows in health care. The author, considering this issue, checked the distribution of health expenditure in the countries of Central and Eastern Europe (CEE). This was because the author wanted to test the hypothesis that the information from the observation of this issue testifies not only about the number of appropriations for health care, but that management can help them. Taking into account the financial aspect, analyses were presented, showing where and in what percentage, above all, the money spent on health protection in individual countries flows (Keegan, Connolly, & Wren, 2018; Orosz & Morgan, 2002).

2. Literature background

Given that one of the basic needs of the population is the use of medical care, it is vital to ensure “a sufficient” amount of resources, including financial, in the field of healthcare. This clearly affects the health situation of the population (Singh, 2014), and this affects the various economic factors and health policy. This is confirmed by studies showing the links between health and economic growth (Bloom, Canning, & Graham, 2003; Sala-i-Martin, Doppelhofer, & Miller, 2004; Alsan, Bloom, & Canning, 2006). For this reason, it is necessary to guarantee the number of funds required to cover the consumption of medical services, as this is of great importance in the management of healthcare facilities. According to the researchers, the experiences of other countries are very helpful here, because they allow the use of systemic and financial solutions in healthcare in the form appropriate (proper) for a given country (Toader, Firtescu, & Oprea, 2017). Considering that the population uses public health to a large percentage and that the amount of financial outlays allocated from public sources depends mainly on income, it can be assumed that the higher the level of this indicator, the more money goes to the health system (Łyszczarz & Nojszewska, 2015; Piekut, 2014). The macroeconomic studies show that the economic crisis which affected many countries and caused actions to discipline public finances were undoubtedly affected by this relationship (Simou & Koutsogeorgou, 2014). This method was applied to all components of public expenditure, and thus to expenditure on health care. Thus, the small public financial resources devoted to the described economy were reduced. Consequently, the patients have “limited” use of health services in public health care units (less amount of public money for benefits is usually associated with a smaller number of offered/performed medical services). According to Ryc and Skrzypczak (2013), the economic crisis negatively

influenced the change in expenditure on health *per capita*, breaking the long-term trend of their growth.

The dependence of health expenditure on GDP allows the capturing of the impact of the measure of economic growth on the amount of expenditure on health care. However, analysts note that this factor is important, but not the only, determinant. According to them, the structure of financing sources undoubtedly also has an undeniable impact on health care, i.e. the share of public and private expenditure in total current health expenditure (Okunade, Karakus, & Okeke, 2004; Potrafke, 2010).

Considering the problem in economic terms, it must be emphasized that it is the size of the level of health expenditure that mainly describes the performance of the health system in each country (Rabiej, 2017), and this is reflected in the decisions taken by the persons responsible for the management of therapeutic entities. Therefore, it seems necessary to determine what, and in what percentage, is covered by the expenses explained and who is allocating money for services in health care. Until the introduction of SHA, research in this area was extremely difficult, although necessary. There were large differences in the reporting of individual countries. This issue, however, was decided to be solved, all the more so because it seeks to deepen (increase) European integration in every sphere of activity, and thus health. To this end, a common structure was created for information boards on health expenditure based on ICHA. The new system includes various ways of classifying and reporting health expenditure and variously defined categories in individual countries. Therefore, one can find the answer to the question in SHA not only about the origin of the money and the place of its destination but also what kind of services are performed and what types of goods are delivered for these funds (OECD, 2000). In accordance with the EC Regulation (OJ L 62/6, 6.3.2015), the first version of SHA 1.0, binding until 2014, was improved and since 2015, expenditure analysis has been carried out on the basis of SHA2011 (Mueller & Morgan, 2017). The basis of this change was the evolution of the health systems of individual countries. The changes that took place were mainly related to the improvement of the flow of information about health and medical services between the patient and the provider, the change in the mechanisms of financing health care, the introduction of new solutions in the management of treatment facilities and healthcare organization. According to Kawiorska (2013), in the SHA2011 edition, the authors indicated the possibilities of linking SHA with information enabling a more compatible analysis of the functioning of health care systems. It follows that such reporting is very important, especially in the process of cost control, besides its contribution to the improvement (more efficient) of the activities of the entities (Bui et al., 2015).

3. Research approach and methods

For decisions to be taken in the process of health care management, it is important to report all expenses as well as to sketch out their changes. It is even tempting to say that the distribution of health expenses determines the possibilities of the offers of health care entities⁵. In this context, the System of Health Accounts plays a very important role, as it allows the tracking of the financial flows of various entities in health care. The second aspect, no less important, allows one to determine the type and size of changes in health care.

Analyzing these two issues prompted the author to trace the evolution of health expenditure in countries where the introduction of social and economic transformation began in a similar period as in Poland. The research work will concern the countries that have belonged to the European Union (EU) since May 2004, and the Organization for Economic Cooperation and Development (OECD). These are Poland, the Czech Republic, Hungary, Slovakia, Lithuania, Estonia, and Latvia. Annual data from the years 2005-2017 from the database of the OECD will be used. Initially, the analyses shown in percentages are: public and private expenditure in the current and public expenditure in GDP in the period studied. The choice of those years is dictated by the change of the methodology of SHA. Then this article has given the medium-term rate of change in public expenditure in each country in the years 2005-2017 and dynamics: current health expenditure (years 2014-2017), voluntary health insurance programs and household out-of-pocket payments (the years 2014-2016, 2017 - unknown).

Moreover, it lists three funding schemes – this has been done so as to visualize the main source of money in health care. Included here are the SHA2011 breakdown and health expenditure information provided in the form of input-output tables. The data is for 2016 as there is no data for 2017. For the purposes of international comparison data is expressed in USD per capita in purchasing power parity (PPP)⁶ and at the fixed prices of 2014.

4. Discussion and results

Analyzing sources of financing in healthcare, at the highest level of aggregation, they can be divided into public expenditure, expenses of private

5 However, one cannot disagree with the fact that some patients may find this sentence too trivial and not taking into account all the elements, especially the approach of health service providers to recipients of these services.

6 Purchasing Power Parity units (PPP) compensate for differences in the purchasing power of monetary units (resulting from the price difference) in individual countries. Therefore, to be able to make international comparisons, it is necessary to give the value of expenditure in relation to PPP and to calculate nominal expenditure on the so-called actual expenditure per capita. In addition, in the EU countries, the differences are mainly visible when the compared health care expenditures will be expressed, for example, in dollars per capita in relation to the purchasing power parity (Kawiorska & Kozierekiewicz, 2003).

entities (including insurance), household out-of-pocket payment and foreign insurance companies.

Due to the character of the study at work, the focus was on the first group, while two more were included in the analyses to show alternative sources of financing. However, it should be noted that in SHA2011, in contrast to SHA1.0, only expenditure is given in relation to the basic scope of health protection, i.e. the current one. However, all expenses related to the described sphere, including investment, are not included in the invoice. This is because they are perceived as capital expenditure (OECD, Eurostat, & WHO, 2011), and these may (but need not) be given by countries.

Analyzing the current ones, it can be seen that in the analyzed countries, in the last discussed year, the level of expenditures fluctuated per person according to PPP from 1722 USD (Latvia) to 2616 USD (Czech Republic). In Poland, this figure was at a level of 1955USD per capita according to PPP and was lower than in the Czech Republic by about 661 USD, and Slovakia by 341 USD. In the above-mentioned countries of the Visegrad Group, in relation to GDP, they were respectively: 6.68%, 7.08%, and 7.06%.

Considering the years 2005-2017, it can be noted that within the Visegrad countries, only in Hungary did public expenditure on health fall, on average by 0.43% year on year. In other countries, for example, there was an increase. In Poland, this amounted to 5.65%, 2.76% in the Czech Republic and Slovakia 4.79%.

A small percentage of GDP devoted to health care, and a large variation in the amount of expenditure transferred to various groups of healthcare providers, contributes to the lack of financial stability in the healthcare sector. This situation is not conducive to running a business in the sector in question. This is particularly important in the implementation of various investment (development) projects that allow the use of modern solutions(Strzelecka, 2014).

Considering the current expenditure dynamics in the CEE countries, compared to 2014, it can be observed that with the passage of time, the difference between expenditures from the current year and 2014 (Table 3.12) decreases. This is despite the underfunding of the health system, ineffectiveness in the activities of healthcare entities and large inequities in access to healthcare. However, analyzing what could have contributed to this dynamics, it can be concluded that these were the following factors: increased demand for health services, more and more frequent use of communication and information technologies, and the implementation of innovative solutions in medicine.

Table 3.12. Dynamics of current expenditure on health care in the years 2014-2017 (fixed prices)

Years	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Slovakia
	2014 = 100%						
2015	96.61	89.15	86.96	88.66	93.95	103.50	101.45
2016	99.61	94.55	91.48	101.08	99.71	109.69	109.14
2017	102.26	97.48	92.88	105.92	96.78	118.29	112.52

Source: own calculations on the basis of OECD (2018).

The above-described situation does not occur only in Lithuania and in the last year of the study (Table 3.12). In this country, a decrease in expenses by 3.22% can be observed. Such shaping of changes in expenditure is undoubtedly connected with institutional changes and economic development of the country.

When examining the share of public expenditure on health to the foremost gross domestic product, the Czech Republic advanced among the presented countries (5.99% on average). In addition, in the last year of the study one can observe a high level of this relationship also in Slovakia. This is a consequence of, among others, deep reforms carried out in this country. Out of all countries considered in the last year (2017), the smallest share was in Latvia and Lithuania (respectively: 3.43%, 4.22%). The one in Latvia differed from other countries. The predominance of these countries over Latvia was significant and in 2017 was, in percentage points, from 0.80 (Lithuania) to 2.39 (Czech Republic) (Figure 3.6).

Considering the percentage of public health expenditures in GDP, it can be noticed that in Poland the average share of health expenditure in the final result of activities of all entities of the national economy was one of the smallest. Compared to the countries of the Visegrad Group and Estonia, it was smaller by approximately 0.96 and 0.44 percentage points, respectively. It was only at a higher level in relation to two countries: Lithuania and Latvia (Figure 3.6). This can be explained by existing solutions in health care and the size and quality of commitments that governments have taken in health policy.

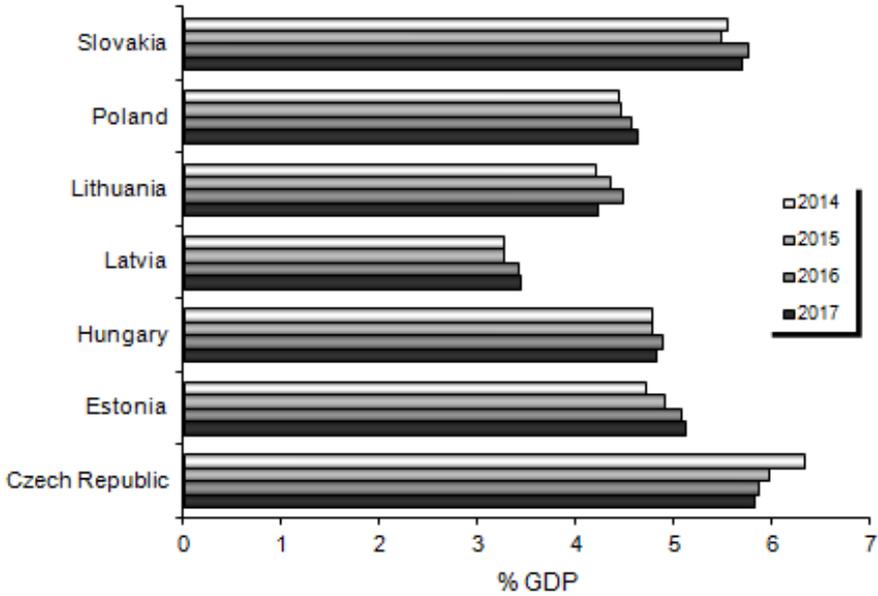


Figure 3.6. Percentage of GDP destined for health in countries in the years 2014-2017

Source: own calculations on the basis of OECD (2018).

An expression of the low level of financing in health care from public sources highlights the huge difficulties in reforming this sector (especially in Poland and Latvia). There are serious problems with the contracting of medical services, reimbursement of medicines and the number of wages in health care. In addition, rising costs of medical services and simultaneous reluctance of governments to limit the availability of health services mean that the issue of the amount of patient’s participation in the costs of treatment is increasingly being taken (Nojszewska, 2011).

The inefficiency of health care systems results mainly from the budget constraints of the CEE countries and the declining number of medical personnel. However, the patient’s condition is unlikely to be associated with the provision of medical services. From this point of view, more important is the ability to perform these services. Although the payment for the health service is not without significance for the consumer of the medical service, he mainly pays attention to how long he will wait for the performance of the service, where he can receive it and whether he will get professional help from the healthcare provider. On the other hand, the material situation of older and disabled persons and their increasing share in the consumption of health services should be

taken into account (Hady&Leśniowska, 2013). In their case, the amount of the pension or pension to be taken is of considerable importance, and this translates into the place of performance of the service (usually public entities). Observing changes in the age structure of the population, it can be concluded that changes in the organization of healthcare will be necessary for the future (Eenoet al., 2015). There is a conviction among Polish society that the excessively large administration absorbs too much money. All these aspects are reflected in the share of private and public health expenditure in current spending on health care. Although the share of public expenditure still dominates over private ones in Poland, Slovakia, and Latvia, this advantage decreases (Figure 3.7). This trend is the result of an increase in public awareness in caring for one's own health. In addition, the belief that having a private health policy always guarantees the delivery of health services quickly and at a high level and increasing the demand for services and medical goods, which have not attracted much or no interest from healthcare providers, is also of great importance.

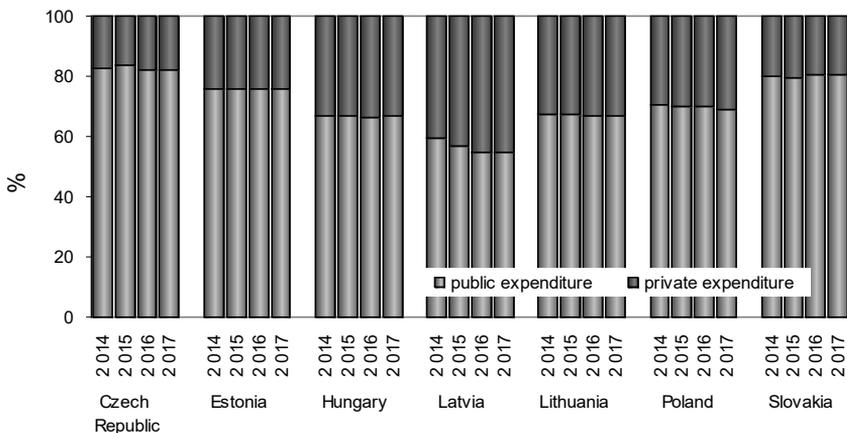


Figure 3.7. Share of public and private health care expenditure in current health care expenditure in the years 2014-2017

Source: own calculations on the basis of OECD (2018).

Based on Figure 3.7, it can be seen that the smallest share of public expenditure was Latvia (approx. 56%) and Hungary (approx. 12 percentage points), and the largest in the Czech Republic - ranged from 81.98% to approx. 82.17%.

In Poland in the years 2014-2017, the above share dropped (on average by 0.01% year on year) in favor of private expenditure described in the economy. This decrease in 2017 compared to 2016 was about 0.68 percentage points.

This shows that Polish society attaches great importance to the consumption of health services and medical facilities offered privately, usually a higher standard of health services and a greater range of medical services.

Considering the proportions of the various sources of spending it can be said that every country in the analysis is on a very different level. In almost all countries concerned health care is financed mainly from compulsory health insurance contributions (Table 3.13). This is the result of an accepted insurance model of financing health care. In every country, health insurance premiums are at a different level (e.g., 9% is the contribution in Poland and Lithuania, 7% of gross wages in Hungary, 14% of the basic salary in Slovakia), but everywhere the contribution rate is calculated so as to (could) balance revenues and costs of health benefits. It should be noted, however, that the contributions do not take into account the individual health risks, and given the current demographic changes, in general, it is difficult to balance these revenues and expenses. This problem is related to the situation of aging societies because this translates into greater health needs – there are more older people and fewer people able and willing to pay a premium (Golinowska & Tabor, 2014; Eenooet al., 2015). The question of funding is different only in Latvia, where the government funding scheme is at a value of 54.63% (Table 3.13). Such participation is a result of the costs of health care mainly from government sources (Mitenbergset al., 2012).

In addition to public entities also funding for health care expend private operators, for example, households (Thompson, Foubister, & Mossialos, 2009; Rechel & McKee, 2009). They actually decide about the volume of out-of-pocket payments (Chwała, Berman, & Kawiorska, 1998), which include charges for services purchased on the private commodities market and subsidies to the ones being financed by governmental institutions. As can be seen, direct payments represent a large percentage of patients (from 12.32 to 44.56) in the current expenditure on health care. In 2016, compared to the previous year, these fees increased in four countries, the Czech Republic, Hungary, Latvia, and Lithuania. Among these countries, the share in 2016 in the Czech Republic did not exceed 15.10%, but in Latvia accounted for approx. 44.60% of current expenditure (Table 3.13).

Table 3.13. Share of healthcare expenditure in % current health care expenditure according to selected financing schemes (SHA2011) in 2016

Financing schemes	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Slovakia
Government schemes	12.32	10.67	8.24	54.63	9.92	10.02	4.30
Compulsory contributory health insurance schemes	69.65	64.99	58.00	b	56.98	59.83	76.46
Household out-of-pocket payment	15.02	22.69	29.70	44.56	32.34	22.94	17.83

Note: b – no data.

Source: own calculations on the basis of OECD (2018).

This proves the degree of patient satisfaction with the quality and accessibility of health services offered by public service providers. Still, considering the size of the direct payments from households in USD PPP, the years 2014-2016 show an increase in these expenses in the countries concerned.

It should, however, be emphasized that in recent years in Poland, households or private insurers funds play an increasingly important role, especially in the age of the development of new technologies. This role is linked to the fact that the financing of health services in a large part that is not always the form of formal charges. The growing burden of private entities, in relation to the financing of health care is the result of, among others, a reduction in the possibility of covering the costs of medical services from public funds and a lack of ensuring a high level of medical services provided.

Table 3.14. Dynamic of current healthcare expenditure according to two financing schemes (SHA2011) in the years 2014-2016 (fixed prices; 2014=100%)

Financing schemes	years	Czech Republic	Estonia	Hungary	Latvia	Lithuania	Poland	Slovakia
Voluntary health insurance schemes	2015	89.57	124.79	89.96	91.84	107.72	111.21	b
	2016	87.12	118.80	83.51	71.77	81.66	119.18	b
Household out-of-pocket payment	2015	97.36	100.67	101.90	107.58	101.10	100.52	102.42
	2016	106.69	100.29	104.80	113.94	102.69	99.21	99.01

Note: b – no data

Source: own calculations on the basis of OECD (2018).

From Table 3.14 it can be seen that private expenditure (out-of-pocket)⁷ is greater in countries with a high degree of co-payment (Czech Republic) and popular payments for home visits (Latvia, Estonia). In Poland in 2016, compared to 2014, there is a visible decrease in these expenses, which stems mainly from changes in the population structure and the low affluence of Polish society. In contrast, the growth of voluntary health insurance comes through a younger approach (often wealthier) by part of the population to health services. These people purchase an insurance (but don't always use them) because they are not satisfied with the scope and level of services in the public health care system and limited access to medical services (Jurkiewicz-Świątek, 2012). Due to the fact that in the countries of Central and Eastern Europe, a small amount of funds is allocated to health care, it is often proposed to introduce subsidies for "public services." These fees are seen as the possibility of additional funds entering the health system and the elimination, or at least a reduction of, informal payments. However, the lack of approval of most societies for additional payments to guaranteed medical services has caused that in CEE or they never introduced such a solution (e.g. Poland), or withdrew from it (Hungary, Slovakia) (Golinowska & Tabor, 2014). However, informal payments were reduced in some countries. Examples are the Czech Republic, which introduced these regulatory charges (Tambor, Pavlova, Golinowska, Sowada, & Groot, 2013).

Therefore, taking all considerations into account, it should be emphasized that changes in health care are necessary in the face of new demographic, technological and economic challenges. Confirmation of this is the statement by Suchecka and Skrzypczak (2011) that all reforms are inevitable, because the importance of additional health insurance increases, moves away from financing health care from public funds to private health care, and some of the responsibility for health is transferred from public entities to private.

5. Conclusions

When conducting international comparative analyses, it seems necessary to use reports which allow the inclusion of various sources of financing of health goods and services. Such a solution can be found in the "System of Health Accounts," whose continuous modification allows one to take into account the changes taking place in the health care systems of individual countries (e.g. changes in the division of the healthcare area and health-related expenses). It can, therefore, be concluded that the discussed SHA2011 helps in the management of health facilities. This assistance is due to the greater transparency of reporting of both interrelated methods of service provision and financing, which belong to the so-called individual goods in health care,

⁷ In CEE countries, out-of-pocket expenses account for around 80% of private expenditure. In Lithuania or Latvia even over 97%.

as well as activities related to the provision of services in the field of public goods. This approach can facilitate the simulation of public and private funding programs and the proper application of new medical technologies by taking appropriate decisions.

Moreover, change of funding streams for health care - decline in the share of the government in financing the study sphere of the economy and increasing private spending on health makes, as a rule, the share of public spending is decreasing and the share of private spending, especially households (in Poland - an average of year on year increase by 1.67%) and private voluntary health insurance (in Poland - an average of year on year increase by 9.17%). It should be remembered that a significant impact on public expenditure has also offered the type of care, and the increased health needs of the population (e.g., the aging of the population) makes it necessary to increase outlays on health care, and with them the effectiveness of the existing health system.

In summary, the evolution of health expenditure in CEE countries is influenced by the economic development of the country, financial policy and the accepted model of financing health care. Although health care is financed mainly from public sources it does not translate into the improved functioning of health systems.

However, it needs to be stressed that the presented research may constitute a starting point for further analyses, which will provide more detailed information on the scope of health-care expenditures and which will consider non-profit factors (demographic, epidemiological and institutional ones). Indeed, these factors are important in determining the level of health expenditure, and hence have a strong impact on the people involved in the management of therapeutic entities.

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Chapter 4.

Socio-technical and environmental aspects of organization development

Organizational development should be seen primarily in the perspective of changes taking place in their environment. The research results presented in the fourth chapter require, first of all, a reference to socio-technical and environmental changes taking place in the economy. The next four studies contain the presentation of research in relation to phenomena and processes observable for many years, such as economic migrations, environmental protection, health protection, and technological progress. The collected observations, as intended by the authors, reflect the level of well-being of societies, which is a rapidly developing research trend, especially in the context of global change.

The first study refers to the issue of the economic migration of Ukrainians and their consequences on the Polish labor market. The attention of researchers from the University of Economics in Wrocław focused on shaping the working conditions of foreigners in Polish enterprises. The research was aimed at identifying forms of employment, their impact on job security, and determining the approach to ensure safe and healthy working conditions for migrants taking up employment in Polish enterprises. Both the scale of migration and the interests and expectations of employees and employers form a necessary and important area of research.

The next study presents environmental problems, which are becoming greater challenges for society. Małgorzata Dymyt of General Kosciuszko Military University of Land Forces' interest is the concept of the economy in a closed circuit. The researcher reviewed the literature to examine the nature, dimensions, and scope of the concept. To justify the need to develop the concept of scientific and implementation grounds, the author points out that the transition from a linear economy to a circular economy model is a priority policy of the European Union. As a result of the research procedure,

it was noted that Poland significantly stands out in terms of popularizing and developing the concept in its own area.

The issues of well-being in his research were taken up by Haim V. Levy, founder of three Biomed companies. He presented the results of a review of the health economy based on innovation and its impact on population growth and global well-being. It is an interesting research study based on the assumption that the impact of medical innovation, health economics and society's well-being, combined with agricultural advances and a focus on food supply and better nutrition, will continue to play a significant role in the global economy.

The last research topic in this part of the monograph is remote work, which in the opinion of Sergiusz Prokurat from the Institute of Economics, Polish Academy of Sciences is the most widespread in the IT environment. For this reason, the IT environment has become the subject of the study that aimed to identify employees' attitudes towards remote work. The author also pointed to the growing importance of remote work, while at the same time highlighting the difficulty in identifying all the consequences of remote work, both for employees and employers.

Workplace safety of Ukrainian workers employed in Poland

Anna Cierniak-Emerych¹, Katarzyna Piwowar-Sulej²

Abstract

The protection of the interests of employees related to ensuring their workplace safety remains a sensitive issue. It is worth emphasizing that this safety should be approached not only from the standpoint of shaping safe and healthy working conditions but also from the perspective of the so-called employment safety associated with the use of specific forms of providing work. This issue is gaining in importance, especially when the number of people migrating from Ukraine to Poland in search of employment has been growing for several years. It seems interesting to look at migrants from the perspective of challenges related to ensuring their workplace safety. The aim of this article is to answer the following questions: Q1: Which forms of employment are used in relation to migrants? Q2: How these forms of employment promote work safety? Q3: What are the characteristics of the approach to providing safe and healthy working conditions for Ukrainian migrants? In order to achieve the goal of this paper such methods as the subject literature studies, analysis of foreign research results, and the authors' own pilot research conducted with representatives of employees from Ukraine and their employers were used. The article presents shortcomings related to shaping workplace safety in relation to immigrants from Ukraine and points out the directions of changes in the analyzed area. The results of empirical research, as well as presented guidelines, can be used by managers in their business practice. They can be also a basis for further, in-depth academic studies. So far no broad scientific considerations have been made on this topic. The problem is valid in relation to the still growing number of immigrant workers from Ukraine.

Keywords: *workplace safety, employment safety, occupational health and safety, immigrants, Ukrainian citizens in Poland.*

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1. Introduction

Labor migration has always been an important type of migration flow, but it has acquired greater importance today because of advances which facilitate easier, faster and cheaper movements around the globe (Hatton, Williamson, 2005, p. 226). These days, there are more than 100 million workers moving around the world, which constitutes 3% of the global labor force (Betts, 2011). The main labor migration flows are directed from developing countries towards industrialized countries (IOM, 2010). Poland has been known as a country from which people have traditionally left to work abroad. In Poland net migration is negative (greater emigration out of the country than immigration into the country) (European Agency for Safety and Health at Work, 2007, p. 15). The number of Ukrainians in Poland is growing, which results from the difficult economic situation in Ukraine and the ongoing armed conflict in this country. According to an NBP survey, the majority of migrants until 2013 had come from western and central Ukraine and only a few percents from the eastern part of the country. Since 2014, there has been an increase in the number of migrants from eastern Ukraine. Poland is the most important destination for migration of Ukrainians. According to the data presented in the NBP report between 2015 and 2017, 507 thousand people from Ukraine came to Poland to find jobs, and in the first half of 2017, there were 303 thousand labor migrants from Ukraine living in Poland, including 285.6 thousand short-term workers and 17.4 thousand people who worked in the long term (Chmielewska, Dobroczycki, & Puzynkiewicz, 2016, p. 4).

Employees from Ukraine bridge the gap which employers are unable to fill with employees from Poland. The Polish labor market is characterized by a low unemployment rate. Furthermore, the economic emigration of Poles is also observed (Central Statistical Office 2017). Finally, a factor that will increasingly restrict employers' access to the labor force in the coming years is the progressing demographic changes. It is believed that it is worth employing Ukrainians because of (Brasco Recruitment, 2019):

- linguistic and cultural proximity;
- ease of employment (simplified rules);
- their strong motivation to work;
- attractive financial conditions for the employer;
- flexibility of forms of employment (directly or through agencies).

Taking into account the above problems, it is worth raising the issue of work safety of employees from Ukraine. The protection of the interests of employees related to ensuring their workplace safety remains a sensitive issue. Originally, work safety was viewed only as a set of conditions that should be met in the workplace so that workers can perform their assignments safely

and without harm to health. To a large extent, these conditions depended on the training and conduct of employees (Studenski, 2000). This safety should be approached not only from the standpoint of shaping safe and healthy working conditions but also from the perspective of the so-called employment safety associated with the use of specific forms of providing work. It seems interesting to look at migrants from the perspective of challenges related to the approach to ensuring their work safety.

Migrants in host countries are often „target earners.” Such workers commonly lack the motivation to organize in advance their conditions in foreign labor markets. This induces firms to treat low-skilled migrants as substitutable, disposable labor by employing them under exploitative employment conditions. According to segmentation theory, native workers refuse to accept such employment conditions and migrant workers are therefore seen as complementary rather than as substitutes for native workers: migrant workers realize a certain unfulfilled demand for labor. However, there are indications that firms sometimes use migrant workers not to complement but to substitute their core labor force (Lillie, 2012). With this background, the aim of the study was to answer the following questions:

Q1: Which forms of employment are used in relation to migrants?

Q2: How these forms of employment promote work safety?

Q3: What are the characteristics of the approach to providing safe and healthy working conditions for Ukrainian migrants?

To achieve this goal, the study used a literature survey, an analysis of foreign research results, and the authors' pilot research conducted with representatives of employees from Ukraine and their employers.

2. Literature background

2.1. Brief characteristics of labor migration in the context of workplace safety and with the focus on Ukrainian workers

As Lillie, Caro, Berntsen, and Wagner (2013) state in the international HRM literature, labor mobility is almost exclusively analyzed in terms of expatriate managers. This intensive focus on expatriate managers ignores the fact that most employees are not managers, and expatriate managers represent only a very small proportion of total labor migration. More important are the challenges of managing the relationships between multinational groups of workers.

After entering the phrase “migrants employment safety” in Google, we get around 18 million results. The report prepared by The European Agency for Safety and Health at Work is ranked in the first place. This institution

conducted literature studies on the analyzed topic in 2007. The focus of the literature survey was on recent European literature (mainly over the last 5 years). The main keywords used in the study were: migrant workers, immigrant workers, foreign workers combined with e.g. occupational, health, safety, work, job, workplace, working conditions, work-related risks, hazards, effects, accidents, psychosocial factors and unemployment (European Agency for Safety and Health at Work, 2007). As a result of the literature studies, it was revealed that there are many publications and reports on the analyzed topic. However, not many of them refer to the situation in Poland and Ukrainian citizens. Some general information from this study and detailed information related to Poland will be presented below.

(Im)migrant workers often have a higher unemployment rate than that of native workers. (Im)migrants are more occupied in certain sectors: on the one hand for high-skilled information technology and professional jobs, on the other hand for the “three D-jobs”: dirty, dangerous and demanding. For the “three D-jobs” most common sectors are agriculture and horticulture, construction, health care, households, transport, and food sector. Often the work is characterized by high work uncertainty, poor working conditions, part-time jobs, and low wages. The phenomenon of market segmentation of migrant workers is Europe wide. For example, the analysis of transformational processes in Poland, Slovakia, the Czech Republic, and Hungary points to the phenomenon of market segmentation which resulted in the demand for a foreign workforce in two market segments: the specialist and the less attractive secondary one.

One general remark to be made when analyzing the working conditions of migrant workers is the influence of the sector and occupation that was pointed out above. This means that, to a certain extent, some of the disadvantageous conditions that migrant workers face, and that are presented in this section, may be explained by the sectors and occupations where they are employed and not only for the fact of being migrants. However, there is evidence that even when taking the sector and occupation factors into account, migrant workers are still discriminated against. Bearing in mind the limited availability of reliable statistics on OSH for migrant workers in a majority of countries, existing data suggest a higher accident rate for migrant workers.

The Special Report of the Ukrainian Parliament Commissioner for Human Rights describes the situation of Ukrainian workers in some countries, such as Poland, the Czech Republic, and Hungary. The report emphasizes the risks for health and life stating that Ukrainian workers often suffer from violence and are victims of criminal groups. Their semi-legal status, lack of knowledge of law and poor language skills lead to a low position in the social and professional ladder. As pointed out above on over-qualification, even though

many of them have a higher education, they are engaged in harvesting fruit and vegetables, on construction sites and in private households (Ukrainian Parliament Commissioner for Human Rights, 2006).

In the literature on migrants and unemployment or the labor situation in general, language is often considered as a barrier or a difficulty for improving safety in the workplace. Electronic databases of publications available at the Wrocław University of Economics were used to find scientific publications on the situation of Ukrainian migrants in Poland. For the keywords ‘Ukrainian migrants’, ‘Poland,’ ‘safety’ and ‘employment,’ zero search results were returned in databases of scientific publications. Therefore, an attempt was made to search for the respective information in Google.

The first result in Google was the report “Ukrainian Migrants on the Polish Labour Market” prepared by the International Organization for Migration (IOM). According to this report, the scale of this illegal employment has never been properly estimated. However, the gap between the number of arrivals of Ukrainians and the number of work and residence permits granted to them since 1992, points to a stable phenomenon of irregular mass employment of Ukrainian nationals in Poland. The estimates of the number of foreign workers in Poland vary. Some analysts indicate a range of 50,000 to 300,000 persons annually taking 2929 up informal labor; others estimate foreigners working seasonally in Poland. The demand for Ukrainian labor shows that agriculture and construction have consistently attracted migrants. The unregistered Ukrainian workers have been active predominantly in the sectors that do not require any special skills and qualifications: manual work, petty-trade, simple services, etc. – in general, involved in those activities that are not particularly attractive for Poles. It is also very hard to compare the conditions between legal and irregular workers because they work in a different environment. For example, Ukrainian construction workers more often work on small construction sites (i.e., a single-family house) without a contract and the whole social sphere of a large company. There is a higher chance of employers behaving unfairly (not paying, not paying the whole remuneration, etc.) in grey zones or in smaller companies (International Organization for Migration (IOM, 2008).

In terms of the allocation of Ukrainians in specific sectors of the Polish labor market, especially construction, it should be noted that this is the sector where the greatest number of accidents involving heavy injuries and deaths take place. In the construction sector, the violations of safety regulations (BHP, Occupational Safety and Health) are noted most often. The statistics do not show, however, any overrepresentation of migrant workers among the injured (International Organization for Migration (IOM, 2008, p. 45).

Another result highly ranked by Google was “Working in Poland: violations of the labor rights of Ukrainian migrants in the construction and

services sectors” (Keryk, 2017). The period of research presented in this report was May – October 2017. According to this report, migrants work in sectors of the economy that require the flexibility of employment, such as construction, services, cleaning or agriculture. These sectors are characterized by grey-zone employment of both Poles and Ukrainians. There is a general tendency in the employment of migrants, that if they have any work contract it is likely to be a civil employment contract. At the end of 2016, 382,000 foreigners were registered with the Social Insurance Office (ZUS) and 286,000 of these were Ukrainian citizens (75%), which means that they have the type of employment contracts where social security taxes are paid. 164,000 Ukrainians had civil law contracts (57%).

One can note alliances between employer and employees in the abuse of short-term work permits and the avoidance of legal employment in order to maximize benefits. In consequence, however, it is mainly migrants who pay the costs of irregular work by being fined or deported. It also happens that an employer violates their rights, but being irregularly employed they have limited opportunity to pursue their rights. Many cases of violations of migrant workers’ rights occurred because of the malpractices of agencies. The most common are non-provision of work contracts and work permits, non-payment of salaries, the provision of poor housing conditions, and illegal deductions of money from salaries. Migrants, in general, rely on informal institutions such as their network of acquaintances. Thus, they rarely file complaints to the authorities about working, safety or housing conditions. They only decide to act when employers are not paying salaries. This means many of the violations of labor rights and malpractices by intermediaries are not processed by the authorities.

2.2. Principles of employment of Ukrainian citizens in Poland

It is worth emphasizing that no one sector in the Polish economy is closed to migrants; however, various regulations put considerable limits on foreigners’ employment in the public sector (IOM, 2008, p. 36). Employing Ukrainian citizens in 2019 requires that they have a residence permit to stay on the territory of Poland and the right to be employed. A Ukrainian staying in Poland on the basis of a visa or a temporary residence permit should obtain a work permit in order to take up work. Each of the above-mentioned permits to take up work in Poland requires meeting a number of criteria required by legal acts, especially the Act of 20 April 2004 on employment promotion and labor market institutions, acts implementing this Act, and the Act of 12 December 2013 on foreigners.

It is also possible to employ a Ukrainian based on a declaration of commissioning of work to a foreigner. This allows foreigners to find employment in Poland for a period of up to six months within 12 months

without the obligation to obtain a work permit. In order to employ a Ukrainian citizen, employers have to meet the following conditions (INFOR.PL, 2019):

- fill in the declaration and pay a fee of 30 PLN. The statement contains data identifying the employer, the foreigner and data concerning the work offered to the foreigner;
- register the statement with the Powiat Labour Office competent for its headquarters or permanent residence of the employer. The Powiat Labour Office records the declaration of commissioning work to a foreigner into the register of statements.
- provide the employee with the original statement - a registered statement is the basis for the foreigner to obtain a visa in the diplomatic and consular institution in the country of their permanent residence to perform work;
- on the day of commencement of work by a Ukrainian, notify the employment office in writing of this fact. If the Ukrainian does not take up employment, the employer is obliged to notify the employment office within 7 days from the date of commencement of work specified in the register of statements;

Furthermore, a new type of work permit, the seasonal work permit, has been used since 1 January 2018. This document is issued by a district administrator's office at the employer's request and entitles them to perform work in subclasses recognized as seasonal work for 9 months in a calendar year. This instrument was designed for all foreigners from non-EU/EEA countries. According to the Ministry of Family, Labour and Social Policy, upon the foreigner's arrival, the employer is obliged to inform the powiat employment office about this fact and provide the foreigner's place of residence. After these obligations have been met, the office issues a seasonal work permit (Szkwarek, 2018).

A Ukrainian should perform work based on a written contract concluded with the employer and the conditions contained in the statement. An employer who employs a Ukrainian or other foreigner has the same obligations towards such people as towards a Polish citizen with regard to, e.g. application for insurance in the Social Insurance Institution (ZUS) and payment of contributions, income tax or application of labor law regulations.

It is worth noting that the employer is obliged to check the legality of the Ukrainian worker's residence and his or her right to take up employment. Ignorance of the employer can lead to high costs. Failure to observe the legal provisions on employment of foreigners may result in a fine, restriction of liberty and, in extreme cases, imprisonment for up to 3 years.

Another method of employment typical of the Polish economic reality is concluding civil-law contracts (Cierniak-Emerych, 2012), especially contracts of a mandate, with persons providing work.

Self-employment is another legal solution for the regular economic activity of a foreigner in Poland. Because of the legal regulations, which make the legal employment of non-Polish citizens very complicated, it is easier to open one's own business than to go through the procedure of employment in any company. Self-employment is also the easiest way to obtain a temporary or permanent residence permit, and—as most of the immigrants we interviewed stated—this is the only way to make decent money in Poland. It is worth adding that such a form of employment is very popular, not only among immigrants but also among Poles themselves (IOM, 2008, p. 31).

2.3. Safety of working conditions of foreign employees in light of the legal regulations used in Poland

Ukrainian citizens can be directly employed by a Polish employer or delegated by a Ukrainian employment agency in the form of employee leasing. Regardless of the form of employment, according to the position of the National Labour Inspectorate, the employer (Polish or foreign) must provide employees from Ukraine with employment conditions which are not less favourable than those resulting from the Labour Code and other Polish regulations concerning the rights and obligations of employees in the area of occupational safety and health. Consequently, a medical check-up and training in the field of occupational health and safety of foreigners should cover at least the same scope as under Polish law. However, if the scope is narrower, it is necessary to conduct training and research according to Polish law (Pióro, 2011).

The provisions of law do not stipulate the method of health and safety training for foreigners performing work in Poland. Pursuant to Article 2373 § 1 of the Labour Code Act of 26 June 1974, an employer may not allow an employee to work without making sure that he/she has the required qualifications, necessary skills, as well as sufficient knowledge of the regulations and principles of health and safety. The regulations do not separately regulate the methods to conduct OHS training concerning foreigners performing work in Poland. However, since the knowledge gained during the training has a significant impact on improving occupational safety, the training should be conducted in a way that is completely clear to employees. This is also in the interest of the employer, who, in accordance with Article 207 § 1 of the Labour Code, is responsible for the occupational health and safety in the company.

Whether the training has been carried out correctly and whether the employee can be deemed fit to work must be preceded by an observation of the work during the work instruction and a positive result of an examination. The examination can also be conducted in Ukrainian. There is also no need to

document the interpreter's name and to confirm with a signature that the training was clear for the employee because the responsibility for the proper OHS training lies with the employer.

OHS training should be based on a detailed program. It is especially important to familiarize employees with instructions and job documentation. It is advisable that the training program includes the issues related to difficulties and risks connected with performing work by foreigners in Poland. These risks should also be included in the evaluation of professional risk (Łyjak, 2017). This is particularly important given the causes of work accidents involving migrants according to the National Labour Inspectorate. The number of accidents involving this group of employees has increased significantly over the last two years (Solawa, 2018).

3. Research approach and methods

Searching for an answer to the question about the forms of employment applied to migrants from Ukraine, and about the approach to ensuring safe working conditions for them, attention was first paid to the legitimacy of joint consideration of the issues indicated. Empirical research (Gableta, 2012; Cierniak-Emerych, 2012; Cierniak-Emerych & Gableta, 2014; Gableta & Cierniak-Emerych, 2015) concerning the problems of recognizing and respecting the interests of employees (one of the co-authors of this paper participated in the research) showed that the interests related to workplace safety occupy an important place in the group of employees' interests. The understanding of this notion of safety goes beyond the area of safe and healthy working conditions (OHS). In the context of the flexibilization of employment, extending the possibilities of using different forms of employment results in a significant number of workers having concerns about job losses, and thus reduces their sense of job security. Therefore, it is legitimate to adopt a broader view of this security in relation to both forms of employment used and the creation of working conditions.

With this in mind, the authors' pilot research was conducted in order to find answers to the research questions formulated in this study. The aim of the research was, on the one hand, to identify the interests of migrants related to the approach to employing Ukrainian migrants in Poland and shaping their working conditions. On the other hand, the research aimed to recognize employers' interests in the above-mentioned scope and the ways of satisfying these interests.

The survey was conducted in the second and third quarters of 2018. The survey covered 10 enterprises located in and around Wrocław. Wrocław is considered to be one of the cities in Poland, where the interest in employing foreigners is one of the biggest in the country (Ciesielak-Wróblewska, 2018).

The group of respondents consisted of 30 migrants working in Poland and 10 representatives of employers (one from each enterprise). One of the selection criteria for the representatives of enterprises and respondents (in addition to the location of the enterprise in and around Wrocław) was their consent to participate in the survey. The enterprises surveyed are small and medium-sized, mainly with only Polish capital in the capital structure, engaged mostly in providing services, including construction services, services related to care for older adults or hairdressing services.

In view of the above, respondents, i.e. the migrant workers from Ukraine and with employers' representatives, a categorized interview was carried out, supplemented by a free-form interview. A different set of questions was addressed to both groups of respondents, but both workers and employers were to point out the work-related interests important, in their opinion, to the employees. As a result, respondents (workers) during the categorized interview were asked to identify the job-related interests that they think are most important to them. Each of the respondents was asked to indicate a minimum of five of these interests, making them hierarchical from the most important to the respondent. Similarly, employers were asked to identify the interests which were important, in their opinion, to the employees. In other words, the interests which employers of immigrants expect to pursue in their work. In addition, both groups of respondents were asked questions about the approach to respecting their interests. It was also asked separately about the actions taken for immigrants to ensure safe and hygienic working conditions and the knowledge of both groups of respondents regarding the legal requirements for ensuring the security of immigrant employment, including safe working conditions.

Due to the lack of representativeness of the sample, the considerations presented later in this paper, including the conclusions, refer only to the surveyed companies and respondents. At the same time, the restrictions related to the volume of the article, allowed only selected results of the pilot studies to be presented.

4. Results and discussion

The interviews made with migrants revealed that, in addition to ensuring the legality of employment and simplification of procedures related to employing foreigners in Poland (87% of respondents) considered as particularly important, the most important interests related to working in Poland reported by migrants were stability (security) of employment (80% of respondents) and safe and healthy working conditions (including initial training preferably in Ukrainian) (79% of respondents) (Table 4.1).

Table 4.1. Employees' interests and their hierarchy in the opinion of the workers – immigrants from Ukraine

Employees' interests	Immigrants from Ukraine (% of indications)
Legality of employment	87
Simple procedures for hiring in Poland	87
Stability of employment	80
Safe and hygienic working conditions (OSH)	79
Providing OSH training in the Ukrainian language	79
Having job	66
High salary	68
Good working atmosphere	52
Burden of too many obligations	53
Remuneration adequate to the scope of the tasks pursued	74
Criteria for carrying out the tasks	64
Training at the expense of the employer	68

Source: own development using empirical data.

Employers, on the other hand, considered that the most important interests to be pursued by immigrants in Ukraine are: having work independently of the form of employment (all respondents), high wages (all respondents), remuneration adequate for the scope of the tasks pursued, the lack of burden on the employees with too many responsibilities (7 of 10 respondents), training at the expense of the employer (7 respondents), good working atmosphere (6 respondents), safe working conditions (5 respondents) (Table 4.1).

With reference to satisfying such interests, migrants pointed to the negligence observed by them. The negligence they indicated concerned, among others, the area of employment conditions, as well as providing a safe and healthy working environment. Nearly half of the respondents were employed in Poland by recruitment agencies and temporary employment agencies. Free interviews revealed a number of abusive practices used by agents. This concerns, in particular, the problems of salaries, but also the employment methods. However, almost half of the migrants are employed based on commissioning the work. Other respondents declared working under non-employment contracts which is, according to migrants, used as a way of “circumventing”, among others, issues related to the need to conduct initial and periodic medical check-ups and partly training in the field of occupational health and safety.

During the in-depth interviews, employers reluctantly admitted that the argument for applying civil law forms of employment to migrants is “releasing them” from rigorous care for working conditions, thus transferring this

responsibility to those performing the work. Furthermore, it was emphasized that this method of employment allows for the reduction of costs related to sickness benefits or holiday leave. It should also be noted that only about 20% of migrant respondents stated that they were familiar with the rules related to maintaining workplace safety in their positions. It was emphasized that the problem for this group of people of employees was a very cursory nature or no training in occupational health and safety.

It is worth mentioning the selected statements of the respondents' employees. "I was told to do my job, although there was no instructor. The manager said that you have to know what you should do if you are doing such a profession." Another quote was: "The manager conducted the training, what should I do, but he spoke quickly, I did not understand him. To my response, I do not understand, he said, as you came here, you should understand." The workers also said that: "I report a problem to the manager associated with a heavy workload, with the fact that he works without protective clothing, almost 16 hours a day, he does not react, I say I do not understand why I work in such conditions, does not explain to me, just says if you want to work, work."

The problems highlighted above are usually explained by employers with language barriers that make it harder to provide effective training in occupational safety. It is especially important to familiarize employees with instructions and job documentation. Employers from only two enterprises indicated that they provide training for migrants in Ukrainian or with the participation of an interpreter. Although legal regulations, as already mentioned above, do not oblige employers to provide training in the native language of employees, the employers are obliged to provide employees with health and safety training in a form that allows them to acquire the necessary knowledge. It seems worrying that only ca. 30% of employer respondents declared that care of safety and health of migrants is as important to them as taking care of safety of Polish employees.

In in-depth interviews, employers, admit unwillingly that they treat immigrants from Ukraine as a "cheap workforce." They stated that: "After all, the majority of immigrants take up work for three months, because of the legal realities of employment in Poland, then they leave and there is no certainty that they will come back." Such extreme utterances also took place as: "... As if I wanted to invest in raising the level of OSH, why should I employ immigrants?" The employers' statements cited here clearly indicate not only the dominant economic greed among the employers, which is still predominant on the implementation of the preferred personal treatment of workers. It seems right here even to risk the finding that they testify of the lack of ethical conduct and even the manifestations of discrimination in employment. Regardless of the above-mentioned problems related to working conditions,

the vast majority of migrant respondents are positively surprised by the level of workplace safety in Poland. The respondents reported that safety standards of working conditions in Poland are higher than in their country.

5. Conclusions

At the international level, the International Organization for Migration (IOM) is a UN agency set up to promote the rights of migrant workers. The IOM seeks to do this through advocating for good practices in the treatment of migrants, conducting research on migration, and providing technical assistance to countries in developing practices which protect the rights of migrants. The International Labour Organization (ILO) is another UN-associated bureaucracy, with a mandate to protect workers' rights. Despite the efforts of the IOM and ILO, it cannot be said that there is an international consensus to protect migrant worker rights. States tend to place domestic economic interests and security policy higher on their priority list than the protection of foreign nationals working on their territory (Lillie, Caro, Berntsen, & Wagner, 2013, p. 232). Examples of deficiencies in providing job security and good working conditions were also found among migrants and employers participating in the survey. The causes for this state can be expected in shortcomings related to human resource management and in specific generality of the provisions of the law.

Although the results of the pilot research presented in the paper cannot be considered representative, these results, together with the literature survey, lead to the conclusion that it is justified to continue and deepen the explorations in the area discussed. In the opinion of the authors, the above-mentioned observations show that further in-depth research should be conducted, aimed at determining the "mechanisms" of ensuring work safety in the reality of the functioning of an increasingly culturally complex group of employees. As indicated by many factors, migration from Ukraine is important, but it is also one of the directions of economic migration to Poland. More and more often Poland has to cope with migrants from countries that are substantially different culturally from Poland, such as Asian countries, where labor standards, including workplace safety, significantly differ from Polish regulations.

In the opinion of the author, it is, therefore, appropriate to conduct in the future, comparative studies related to the recognition of the approach, in the Polish realities, of the management of employment security, in relation to other groups of respondents than just immigrants from Ukraine. For example, it is about Vietnamese, Koreans, Hindus, but also Germans, or French and Italians who are working in our country. It must be borne in mind that, irrespective of nationality and other factors, all persons providing work should be provided

with comfort and safety. Especially the latter decides on the health and even the life of the people who work.

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Circular economy - analysis of the essence, dimensions, and scope of the concept

Małgorzata Dymyt¹

Abstract

The problem of a circular economy selection flowed from the aim and cognitive value. The aim of the article is the synthesis of literature in the field of the circular economy, identification of the main trends, presentation of the essence and analysis of the dimensions and scope of the concept. The research was conducted to formulate a synthetic definition of the circular economy, taking into account the multidimensional character of the concept. The article is conceptual and mainly based on the method of critical analysis of the concept. An in-depth review and analysis cover leading scientific journals, international documents, and public reports. The problem of a circular economy is becoming one of the leading themes for discussion at political, economic and scientific levels. The transition from a linear economy to a circular economy model is a priority policy of the European Union. Although in the foreign literature the problem is being widely discussed, in Polish literature it is the contrary, as the concept of the circular economy does not seem to be sufficiently popularized. The article is valuable for systematizing the idea of the circular economy, based on theoretical and practical aspects of this phenomenon, and might be a premise for further research and development of this concept. The results of the analysis are an important contribution to the conceptualization of the circular economy. Furthermore, they have practical significance for the process of modeling and implementing this idea in Poland, which requires in-depth knowledge of the essence, its social, economic, legal and technological conditions, and its effects on the economy and citizens.

Keywords: *circular economy, sustainable development strategy, economic model, system approach.*

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1. Introduction

The circular economy (CE) issues have become one of the leading topics in the political, economic and scientific spheres. Representatives of various environments, representing public institutions, business, universities and research centers, environmental organizations, attend the debate. The implementation of the circular economy concept is one of the priority policies of the European Union. In 2012, the European Commission, in the document entitled “Manifesto for a Resource-Efficient Europe,” pointed out that “with growing pressures on resources and the environment, the EU has no choice but to go for the transition to a resource-efficient and ultimately regenerative circular economy” (European Commission, 2012). Two years later, in the document “Towards a circular economy: A zero waste programme for Europe” it assumed that “moving towards a more circular economy is essential to deliver the resource efficiency agenda established under the Europe 2020 Strategy for smart, sustainable and inclusive growth” (European Commission, 2014, p. 2).

The European Union sees, in the process of transition to the circular economy, opportunities to achieve economic benefits, in particular as regards ensuring a sustainable competitive advantage for Europe, protection of enterprises against scarcity of resources and price volatility, creating new business and innovation opportunities, more efficient ways of producing and consuming, creating local jobs at all skills levels, as well as opportunities for social integration and cohesion while contributing to energy savings (European Commission, 2015, p. 2). It is emphasized that the circular economy “offers developed economies an avenue to resilient growth, a systemic answer to reducing dependency on resource markets, and a means of reducing exposure to resource price shocks as well as societal and environmental ‘externality’ costs that are not picked up by companies” (EMF-Ellen MacArthur Foundation, 2014, p. 19). The efforts to implement the circular economy idea are also declared by member states, at the level of national policies. The Polish government, in the document entitled “The Roadmap for Transformation towards a Circular Economy” proposed in 2018, declares the transition from the linear economy to the circular economy, treating it as an important element of creating a low-carbon, resource-efficient, innovative and competitive national economy (The Council of Ministers, 2018).

In foreign literature, the problem of the circular economy has been widely discussed and has led to the emergence of various approaches to understanding the essence of this concept. Within the main directions of theoretical and practical considerations, a concentration on various aspects of the circular economy idea is noticeable. The complexity and multidimensionality of this concept are manifested in the emphasis on values, approaches to methods

of operation and the involvement of many entities. However, in the Polish literature the concept of a circular economy is not sufficiently popularized. Understanding the essence, dependence, and determinants of the idea of the circular economy is crucial for further development of the concept both in the research and in the application aspect. The transition from the linear economy to the circular economy model is becoming a challenge for policymakers, including the Polish government. However, effective implementation of this concept requires knowledge and understanding of its premises, objectives, principles, and methods of operation, as well as conditions and effects that will take place in the economic and social sphere.

The aim of the article is to synthesize the literature referring to the circular economy, identifying the main trends in literature, presenting the essence, and analyzing the dimensions and scope of the concept. The research was also focused on the implementation of the objective related to the formulation of a synthetic definition, taking into account the multidimensional and complex nature of the circular economy concept. In particular, the implementation of the adopted objective consisted in the application of the critical concept analysis method. The article is conceptual and based on a review of domestic and foreign literature in the field of economics and management, as well as documents and reports prepared by governments, European Union institutions and industry organizations.

2. Literature background

The concept of the circular economy (CE) has been present in the global discourse for several decades. The first time this term was formally used was in 1990 by Pearce Turner (1990). The basis for the discussion was the awareness and recognition of the limits of the Earth's resources and energy consumption, and the importance of perceiving the world as a system in which pollution and waste are viewed in the category of failure (Bocken, de Pauw, Bakker, & van der Grinten, 2016). The concept grew in opposition to the linear model of the economy. The circular economy is an alternative economic model that is a challenge for the traditional linear industrial economy, which is "based on a linear process, optimized towards high throughput and low production costs relying on the abundant availability of raw materials at relatively low cost" (Taranic, Behrens, & Topi, 2016, p. 1). Consequently, the linear model follows the depletion of resources and the generation of "chronically high levels of waste and creates dependence between economic development and inputs of new virgin materials" (Macarthur, 2015, p. 7). The traditional, linear economic model, based on a 'take-make-consume-throw away' pattern, is replaced by the circular concept, in which waste is reduced to a minimum by

such activities as reusing, repairing, refurbishing and recycling, and can be used as a valuable source (Bourguignon, 2016).

The concept of the circular economy means a transformation of the traditional patterns of economic growth and production within which the conventional, linear system “is converted to a circular system when the connection between resource use and waste residuals is made” (Bilitewski, 2012, p. 1). Consequently, a closed circuit, aimed at maximizing the efficiency of resource use and minimizing waste, is a key idea of this transformation. The concentration of activities concerns closing the loop of material flows and energy, which contributes to long-term sustainability (Geng, Sarkis, Ulgiati, & Zhang, 2013). It is indicated that the benefits may result not only from closing but also from slowing loops. The basic premise for CE seems to be closing and slowing the loop, which consists in striving to maintain and preserve the value of the product through maintenance, repair and refurbishment (Bocken, Ritala, & Huotari, 2017).

According to McCarthy, Dellink and Bibas (2018, pp. 14-15), in the literature, despite the diversity of definitions, there are three main views, based on a common understanding of the result as “increased resource efficiency or, in other words, the decoupling of natural resource extraction and use from economic output”, such as: closing resource loops (consisting of increased product repair and manufacturing and increased material recycling), slowing resource loops – slower material flows (robust, long-lasting products) and narrowing resource flows – a more efficient use of natural resources, materials, and products within an existing linear system.

Based on the definition proposed by Geisendorf and Pietrulla (2018, p. 779) we can assume that the following three premises of action are essential in the circular economy concept: “the value of products and materials is maintained, waste is avoided, and resources are kept within the economy when a product has reached the end of its life. Problems of resources, waste, and value of products are not the only issues raised by authors dealing with the concept of the circular economy. Multidimensionality of this concept refers also to the economic and social aspects. In this sense the circular economy is defined as “an economic model wherein planning, resourcing, procurement, production and reprocessing are designed and managed, as both process and output, to maximize ecosystem functioning and human well-being” (Murray, Skene, & Haynes, 2017, p. 377).

Overview definition allows the conclusion that the basis for the development of the circular economy is the need for effective management of limited material resources. However, the consequences of changes in the current linear economy model and the transition to the circular economy model

concern many areas of economic and social activity at the global, national, institutional and individual levels.

3. Research approach and methods

The starting point in the research process was the assumption that the concept of a circular economy is complex, multifaceted, multi-level, dynamic, and interdisciplinary. In view of the global, national and individual dimension, it becomes a moral and formal imperative and a challenge for economies and societies. Due to the importance of this idea, for an effective transformation of the socio-economic model and implementation of the principles of the circular economy, it is necessary to understand and promote it in a scientific and practical dimension. The author attempted to answer the following key questions:

- 1) What is the essence of the circular economy, what key issues, features can be pointed out?
- 2) What approaches to define the concept of a closed circulation economy appear in the literature?
- 3) What aspects are underlined in the individual approaches, which areas of activity, functions, and goals are indicated?
- 4) What is the complexity and multidimensionality of the concept?
- 5) In which direction will the concept develop?

The article is conceptual and aimed at achieving the following goals: a) analysis of the definition of the circular economy, the essence, dimensions and scope of the concept, and identification of the main trends in the literature, and b) formulation of a synthetic definition, taking into account the multidimensional and complex nature of the circular economy concept. The research was based on the analysis of the subject literature and documents. The following research methods were used:

- 1) Study of literature - review and in-depth analysis of domestic and foreign literature in the field of economics and management, related to the issues of the circular economy,
- 2) Analysis of documents - review and in-depth analysis of international documents and reports of public legal acts, including governments, European Union institutions and industry organizations, presenting action plans, defining policy principles, responsible and committed entities.

In particular, the implementation of the adopted objectives and assumptions consisted in the application of the critical concept analysis method, as part of the research procedure including the following stages: 1) collecting and reviewing available definitions, 2) comparison of definitions in order to identify key aspects, 3) characteristics of definitions, systematization of

approaches to define, 4) synthesis of the essence of the concept - a proposal for a synthetic definition, 5) formulating final conclusions.

4. Discussion and results

As a result of the literature review, several main approaches to defining the concept of the circular economy have been identified. At the general level, two main approaches can be indicated, taking into account the relational and dynamic nature of the concept and treating CE as a system or a process. Within these approaches, definitions can also be distinguished in which the aspects of the subject (activities, elements, and rules), goals (aims, values) and involved entities (enablers, sectors) are underlined. The analysis of definitions allows indicating the following coding dimensions: 1) core principles: 4R framework/4R dimensions (reduce, reuse, recycle, and recover), waste hierarchy, 2) systems perspective: micro, meso and macro-system perspective, 3) aims: sustainable development, environmental quality, economic prosperity, social equity, future generations (time dimension) and 4) enablers: business models, consumers (Kirchherr, Reike, & Hekkert 2017).

One of the basic approaches to defining the circular economy is to consider the essence of this concept through the prism of processes, transformations, actions, strategies. In this approach, the concept is perceived as a set of processes, a transition, a mechanism that activates, stimulates new processes, a positive reinforcing development cycle. Transition to the circular economy involves any process that aims to reduce the level of extraction and use of natural resources (McCarthy et al., 2018). The main circular economy processes include: 1) use less primary resources: recycling, efficient use of resources and utilization of renewable energy sources, 2) maintain the highest value of materials and products: remanufacturing, refurbishment and re-use of products and components, product life extension and 3) change utilization patterns: product as service, sharing models and shift in consumption patterns (Rizos, Tuokko, & Behrens, 2017).

The concept is dynamic and becomes a stimulus for new processes that are developing in other industries and sectors (chemical recycling, closing loops for nutrients, water reuse and use of wood-based side streams in by-product applications) (Rizos, Behrens, Drabik, Rinaldi, & Tuokko, 2018). In a broad sense, the CE is a continuous positive and reinforcing development cycle that “preserves and enhances natural capital, optimizes resource yields, and minimizes system risks by managing finite stocks and renewable flows” (EMF, 2015a, p. 46). In a static approach, the concept of CE refers to the desired state, characterized by specific features, which provides certain

benefits, whereas in dynamic terms it means the process of reaching this state.

In this context, the circular economy is defined as:

- a sustainable development strategy that is being proposed to tackle urgent problems of environmental degradation and resource scarcity (Heshmati, 2015, p. 1);
- a development strategy that enables economic growth while optimizing resource consumption (Deloitte, 2018);
- a decoupling strategy aimed at growing prosperity, whilst intelligently managing resources within the boundaries of our planet (de Wit, Hoogzaad, Ramkumar, Friedl, & Douma, 2018, p. 14);
- an alternative strategy for the extension of product lifetimes may be to use products more efficiently through sharing them or making them multifunctional. All these strategies may be facilitated through changes in ownership relationships, such as leasing and product service systems (PSSs). (Bocken, Olivetti, Cullen, Potting, & Lifset, 2017, p. 476).

The dynamic nature of the circular economy concept manifests itself in changes that take place in the technological, economic, and consumption spheres. In this approach, CE means “a transformative economy redefining production and consumption patterns” (Circular Academy, 2018). Examples of definitions in which the aspect of change is emphasized are presented in Table 4.2.

The transition from a linear economy to the circular economy is a systemic change. The basis of the new model is systemic thinking that focuses on non-linear systems in which feedback loops play a fundamental role (Stegeman, 2015), and in which the product is a link in the processing and reuse chain (Janikowski, 2017). In accordance with the principle of systems-thinking, companies, people, or plants as components of complex systems are closely linked (EMF, 2015b). In this context, the second basic way of defining CE is related to the systemic treatment of this concept. The following terms of CE have been found in the literature: the circular economy system, an industrial system, an economic system, a new systemic approach, the essence of the systemic approach. Examples of definitions presenting the systemic aspect are included in Table 4.3.

The diverse approach to defining manifests itself in emphasizing the subject of economic transformation, the scope of activity. In the general dimension, the object of the circular economy concept is action-oriented towards the optimal use of material resources and minimization of waste.

Table 4.2. Selected definitions of the circular economy – change perspective

Sources	Definitions
European Commission (2014, p. 2)	Transition to a more circular economy requires changes throughout value chains, from product design to new business and market models, from new ways of turning waste into a resource to new modes of consumer behavior. This implies full systemic change, and innovation not only in technologies but also in organization, society, finance methods, and policies.
European Commission (2015, p. 18)	The transition to a circular economy is a systemic change. In addition to targeted actions affecting each phase of the value chain and key sectors, it is necessary to create the conditions under which a circular economy can flourish, and resources can be mobilized.
de Wit et al. (2018, p. 15)	Going beyond just closed-loop thinking, or mitigation of linear risks, the circular economy is ultimately about achieving a fundamental, structural, and cultural shift.
Bonciu (2014, p. 84)	The large scale implementation of the circular economy involves a paradigm shift because it includes all aspects of social and economic activities.
Italian Ministry of Economic Development and Ministry of Environment, Land & Sea (2017, p. 11)	The transition towards a circular economy requires a cultural and structural change: a profound revision of our patterns of consumption and innovation are the cornerstone of this change, along with abandoning the linear economy, shifting from the recycling economy to the circular economy.
Raftowicz-Filipkiewicz (2015, p.145)	A circular economy is based on a change in the management paradigm because all kinds of waste can become raw materials.
Frérot (2014)	A circular economy is based on a paradigm shift because within it the waste of some becomes resources and raw materials of others. Thus, it is the economy of recovery and re-use of resources, but also, and most of all, the reproductive economy. In this way, it leads to a deep transformation of production chains, as well as consumption standards, and makes it possible to break the dependence of the GDP growth rate on the impact on the natural environment and on the consumption of natural resources.
Pichlak & Kruczek (2017, p. 29)	The implementation of the circular economy concept requires systemic and multi-level changes that combine top-down (political and social) initiatives with bottom-up activities implemented by enterprises.
Ghisellini, Cialani, & Ulgiati (2016, p. 12)	CE has the potential to understand and implement radically new patterns and help society reach increased sustainability and wellbeing at low or no material, energy, and environmental costs.
Institut Montaigne (2016, p. 15)	The transition to a circular economy encompasses all of the changes which allow different economic actors (including end-users) to continue creating value while preserving the natural capital and using increasingly fewer limited resources (whether non-renewable or renewing too slowly compared to consumption).

Source: own study based on selected sources.

Table 4.3. Selected definitions of the circular economy – system perspective

Sources	Definitions
European Commission (2014, p. 2)	A circular economy system keeps the added value in products for as long as possible and eliminates waste. They keep resources within the economy when a product has reached the end of its life, so that they can be productively used again and again and hence create further value.
Ellen MacArthur Foundation (2014, p. 15)	A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems, and business models.
Dutch House of Representatives (2013)	A circular economy is an economic system that takes the reusability of products and materials and the conservation of natural resources as a starting point. It also strives for value creation for people, nature and the economy in each part of the system.
Bonciu (2014, p. 88)	A circular economy represents an industrial system based on re-use and regeneration at three levels: a) conceptual; b) organizational; c) operational. Within this system, the re-use and regeneration are fundamental and intrinsic characteristics and not just additions or improvements of the linear economy. A significant aspect is that the circular economy is based on the study of the non-linear systems, particularly of the living systems.
Burchart-Korol (2016, pp. 53-54)	It is not only a method or a tool, but it is a philosophy of conduct, that determines the direction of the work and way of thinking. The circular economy “promotes a new systemic approach, according to which products are subject to re-use.”
Raftowicz-Filipkiewicz (2015, p. 148)	A circular economy is the essence of the systemic approach, which consists in treating the studied objects as open systems, connected in such a way that they create a new whole. (...) circular economy derives its strength from the ability to combine a sectoral and synergistic approach, creating a comprehensive system.

Source: own study based on selected sources.

Rizos, Tuokko and Behrens (2017) distinguish two main groups of ways of the CE interpretations, such as: a) resource-oriented definitions, in which the need to create closed loops of material flows and reduce the consumption of virgin resources is emphasized and b) interpretations, which are not limited to the management of material resources and contain additional dimensions. The detailed scope of activities may concern eight components: building blocks of the circular economy and their mutual relations such as industrial symbiosis, material resource efficiency, product life-cycle extension, biological products, efficiency and renewable energy, the performance economy, the sharing economy and the platform economy (Taranic et al., 2016).

Hausner and Paprocki (2017, p. 26) indicate that “the essence of circuitry lies in the social mechanism of communication and cooperation, not in individual actions and interactions.” This means that the scope of activities related to the concept of circular economy is broad, goes beyond the industrial and production sphere, and includes services and information and communication technologies, necessary for the popularization of the idea and cooperation in a broad socio-economic dimension. The Ellen MacArthur Foundation indicates four essential building blocks of the circular economy, such as: circular design to facilitate product reuse, recycling and cascading, new innovative business models that either replace existing ones or seize new opportunities, reverse cycles (cascades and the final return of materials to the soil or back into the industrial production system), enablers and favorable system conditions focused on collaboration, rethinking incentives, providing a suitable set of international environmental rules, leading by example and driving up scale fast and access to financing (EMF, 2018).

Such a wide scope of activity means that an important subject of considerations, regarding the essence of the circular economy, is also the problem of functions, goals, results, benefits that appear in the transition from the linear model to the circular model and concern all elements of the newly created economic system. In general, the circular economy ensures independence from resources, innovation, employment and growth (EMF, 2015a). The benefits of the concept therefore concern the creation of environmental (resilience of natural resources), social (minimization of social costs of prevention of unhealthy working conditions in the extraction of raw materials and reuse) and economic values (increase in the value of products) (van Buren, Demmers, van der Heijden, & Witlox, 2016).

According to Degórski (2018), the core of the circular economy is the integration of economic and environmental policies, and the transformation process can contribute to strengthening social capital, fair access to environmental benefits, creating new jobs in many sectors of the economy, improving the environment and quality of life. In broad terms, a circular economy is “based upon an organic worldview and a humanistic image of man, representing significant ideas for reaching the common goals of individual, social and environmental well-being” (Ingebrigtsen & Jakobsen, 2011, pp. 269-270). This means that the concept applies not only to the sphere of production but also consumption, as well as to politics, education, science, research and development. To ensure efficient, innovation-based implementation of the circular economy, coherent and integrated cooperation within three sectors is crucial: an industrial sphere closely related to materials and products, the government sphere responsible for creating innovative waste policies and the university sphere responsible for the development of

knowledge and cooperation with other spheres (Anttonen, Lammi, Mykkänen, & Repo, 2018).

Multi-stakeholder engagement requires new forms of cooperation and relations between sectors, institutions, and communities. In this context, the circular economy is a concept based on the integration of seemingly disconnected areas, such as decisions taken by stakeholders at different levels of society (producers, recycling companies, collectors, consumers, authorities, etc.), product design and development, business models innovation and policy instruments (Laurenti, Singh, Frostell, Sinha, & Binder, 2018).

Another way of defining the circular economy is the holistic approach, in which the authors combine subjective and functional aspects. Examples of such a comprehensive, broad approach may be the following definitions:

- “circular economy is an economy constructed from societal production-consumption systems that maximizes the service produced from the linear nature-society-nature material and energy throughput flow” (Korhonen, Honkasalo, & Seppälä, 2018, p. 39);
- “a circular economy describes an economic system that is based on business models which replace the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes, thus operating at the micro-level (products, companies, consumers), meso level (eco-industrial parks) and macro-level (city, region, nation and beyond), with the aim to accomplish sustainable development, which implies creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations.” (Kirchherr et al., 2017, pp. 224-225).

On the basis of the above definitions, it can be concluded that the circular economy is an open, social and economic system, the aim of which is to achieve a variety of goals of many different participants and stakeholders.

5. Conclusions

As a result of the analysis of the literature and documents, it can be concluded that the circular economy is a complex, multi-faceted concept. It has a dynamic character and concerns changes and transformation processes. Its essence is a change based on multi-sectoral dependencies that should take place in a multi-sectoral dimension, in the public, private, and social spheres. Analysing the essence of the concept, considering the conditions for its successful implementation, attention should be paid to the following key elements: changing the way of thinking about product design in order to facilitate recovery of components and materials; implementation of innovative business models that will support changes in the approach to products (incentives and

the collection of products); introduction of new reverse logistic processes which enable the recovery of products from consumers or users and return them back into the supply chain, system support, creating system conditions conducive to change (education, political framework, cooperation platforms or indicators) (MacArthur, 2015).

The concept of the circular economy has a holistic dimension and concerns resource management, creating business models at the macro, meso and microeconomic levels, development of innovation and shaping national policies as well as creating new social attitudes. Therefore, the considerations should take into account the aspect of entities (subsystems, stakeholders), the subject and principles of operation, as well as functions, benefits, and effects. To present the complexity of the CE, the main categories should be identified and their characteristics should be specified (presented in Table 4.4). Identified categories and their features are the basis for formulating a definition that comprehensively describes the phenomenon of the circular economy.

The categories highlighted above form the basis for formulating and proposing a definition that holistically describes the phenomenon of a circular economy. Circular economy is an economic model based on a radical, comprehensive, strategic change in the functioning of socio-economic systems, covering processes related to: reuse, repair, renewing and recycling (closure, slowdown of resource loops, narrowing of resource flows) and oriented towards ensuring sustainable development, maximizing the functioning of the ecosystem and human well-being, creating environmental, social and economic benefits. The process of transition to the circular economy model is a key global challenge, requiring strategies aimed at creating conditions for multilevel, multi-sectoral engagement and cooperation in the field of changes in the industrial, economic, legislative, innovative, consumer and social spheres.

In the face of climate change and environmental threats, the transition to the circular economy is becoming not only a challenge but also an imperative at the political, business and social level. In this context, a significant direction for the development of CE is to consider the humanistic dimension, the moral and ethical values in the activities of citizens, communities, local and government authorities or business. The concept requires development in a theoretical and practical dimension. It is important to improve and disseminate theoretical aspects to support innovation and education. On the other hand, political and legislative activities that stimulate the creation of new models of production and consumption in practice are fundamental.

Table 4.4. Characteristics of the circular economy - categories and features

Categories	Features
Key ideas	transition from a linear to a circular model maximizing the efficiency of resource use (use less primary resources) minimizing waste, maintaining the highest value of products and materials, change utilization patterns, change business models
Processes	reusing, repairing, refurbishing and recycling, 4R dimensions (reduce, reuse, recycle, recover), closing resource loops, slowing resource loops, narrowing resource flows
System: sectors, subsystems, stakeholders	systems perspective: micro, meso, and macro-systems businesses and supporting services governments, political decision-makers, administration organizations: social, ecological, universities, education, science, research and development (innovation) consumers/citizens (current and future generations)
Goals	decoupling of natural resource extraction and use from economic growth/ development, independence from limited resources maximize ecosystem functioning and human well-being creating benefits for current and future generations sustainable development
Benefits	environmental benefits (resilience of natural resources), creating environmental quality economic values: economic prosperity (increase in the value of products), creating new markets, new businesses, innovation opportunities, resilient growth social benefits: reducing system damage, minimization of social costs of prevention of unhealthy working conditions in the extraction of raw materials and reuse), social equity, creating new jobs, local jobs
Conditions	cooperation, integration, networking, multisector collaboration (cooperation platforms), industrial symbiosis creating a new culture (behavior) of treating nature and using limited resources change of consumption patterns, change of the way of thinking about resources, change of business models, legislation, institutional framework , coherence of government policies, system support, measuring and monitoring the progress of the transformation process, implementation strategies innovations, technological support, financial support, digitalization, new technologies, new skills, education, popularization of the idea, (communication platforms), supporting social, local initiatives (bottom-up) (sharing platforms)
Concept specificity: terms used in defining	restorative or regenerative by intention and design a dynamic solution to the problems, a transformative economy a systemic change (fundamental, structural, cultural, paradigm shift) a continuous positive and reinforcing development cycle, a strategy of development, a sustainable development strategy

Effective implementation of the new economic model requires constant monitoring, measuring progress and response, and adapting policies and ongoing activities. Therefore, it is important to present examples of

activities consistent with the idea of circulation, to support communication platforms, and to popularize good practices. The article is valuable for the systematization of the circular economy concept based on the theoretical foundations of this phenomenon, which provides a basis for future research and enable further in-depth analyses.

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The innovation-driven health economy and society welfare paradigm: An overview

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Abstract

The correlation between medical innovation (concurrent with nutrition and sanitation) and an increase in life expectancy in the past century and a half is apparent. 'Innovation and Health Economy' are directly proportional to the advancements in medicine and health expenditures. However, we should distinguish between the effect of medical innovation on life expectancy and health, and the effect of medical expenditures, or health financing, on life expectancy and welfare. The growth in human population and aging populations affects all people through its impact on the economy and environment. It coincidentally brings forth serious economic implications and a significant burden on human well-being. Indeed, all countries face difficult challenges and choices in financing their health systems. Evidently, large and medium pharmaceutical companies will continue to bear the costs of the development of new pharmaceuticals, based on and arising from basic research novelty. Contemporaneously, government leaders, NGO's, industry, civil society, farmers and academia collaboration platforms will continue to strengthen innovation ecosystems aimed at the transformation of global food systems. Consequently, the impact of medical innovation, health economics, and society welfare, in conjunction with agriculture advancement on food supply and enhanced nutrition, will continue to considerably attribute and play a marked role in the global economy. In this paper, I set forth to overview the Innovation-Driven health economy and its impact on world population growth and welfare.

Keywords: *innovation-driven health economy, medical innovation, pharmaceutical industry, health economics, health expenditures, society wealth, life expectancy, aging populations, population growth, agrotechnology, food and nutrition.*

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1. Introduction

I have previously discussed the substantial contribution of discoveries and inventions, originating from basic medical and related research (e.g., biochemistry, biotechnology, immunology, genomics, physics, electronics, computers, etc.), to the economic benefit and welfare of society (Levy, 2011). This paper - the third in a series (see Levy, 2011; 2012), discussing Innovation, Knowledge-Economy and Technology Transfer - encompasses a concise and comprehensive overview of the economic and social aspects of the impact of medical innovation on public health in modern societies.

The last 150 years have witnessed a revolution in human health, henceforth, an increase in life expectancy, which is generally attributed to new medications, vaccines, antibiotics, advanced diagnostic methods, improved drugs, biopharmaceuticals, and other medical treatment breakthroughs. According to a recent WHO report (WHO, 2018), global life expectancy at birth in 2016² was 72.0 years (74.2 years for females and 69.8 years for males), ranging from 61.2 years in the WHO African Region to 77.5 years in the WHO European Region.

Innovative technologies and novel treatment modalities are entering the healthcare systems at an unprecedented pace. Among them are genomics, stem cells, biosensors, robotics, artificial intelligence, precision medicine, nanotechnology, biopharmaceuticals, and personalized therapies. Success rests on continuous innovation predominantly originating from publically supported basic research carried out at universities and research institutes. Indubitably, its transfer to the private sector is crucial in order to capture the benefits of its commercialization (Levy, 2011).

Commercialization costs are enormous and they will be discussed in details hereinafter. It is apparent that health is directly proportional to the advancements in medicine yet depends on significant investment, which I propose to designate as '*Innovation-Driven Health Economy*' – an argument that will be elaborated and discussed in a forthcoming paper. It would be reasonable to presume that health performance and economic performance are interlinked. As a matter of fact, wealthier countries have healthier populations.

It is axiomatic that health is an elementary universal human right in modern societies³. The right of men and women to health was first considered by the French Constituent Assembly in 1791, reflecting the growing interest in public health - '*Santé*' (Crosland, 2004). *Santé* is defined as "*the most perfect state of life*" (Diderot & Le Rond D'Alembert, 1778). One hundred and fifty

² Between the 16th century and the mid-19th century, average life expectancy around the world averaged under 40 years.

³ Note that the U.S. Constitution contains no express textual reference and has never been interpreted to provide any specific protection for health (Weeks, 2010).

years later, a Constitution was adopted by the International Health Conference proclaiming, among others:

“The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being ... Governments have a responsibility for the health of their peoples” (WHO, Constitution of the World Health Organization, 1946).

In the egalitarian theory of John Rawls, health is specified as a primary natural goods that society distributes (Rawls, 1999), taking into account, however, utilitarian values, such as health care expenditures, cost-benefit, and cost-effectiveness. Hence, investment in health is not only a desirable but also an essential priority for most societies. Accordingly, appropriate distribution of this primary natural goods would result in a healthy, cohesive, and more productive society.

In general, health spending measures the final consumption of health care goods and services. Health care is financed through a mix of financing arrangements, including government spending and compulsory health insurance, as well as voluntary health insurance and private funds such as households' out-of-pocket payments, non-governmental and private corporations.

The resources of health systems are measured by several indicators such as health expenditures (i.e. total expenditures on health per capita, health expenditure as percent of GDP, percent of public expenditure in total health expenditure), number of physicians, number of hospital beds, number of computed tomography scanners, etc. It is estimated that global spending on health will increase from US\$9.21 trillion in 2014 to US\$24.24 trillion in 2040 (Dieleman et al., 2017).

2. Research approach

The aim of this paper is to discuss the major medical innovation (particularly pharmaceutical) impact on human health and economic aspect from there; the economy of new drug development and commercialization; the interaction between health and economy referring to the public domain and private insurance expenditures on health services and health financing policies. In addition, arguing the serious economic implications and significant burden to human well-being resulting from the growth of the human population. In preparation for this paper, a literature background was carried out using browser methods in web and international databases. This paper is by no means an exhaustive review but rather aimed at stimulating discussion and expectantly leading to new research on various aspects of medical innovation vis-à-vis health economy and society wealth.

3. Literature background

3.1. The economy of medical innovation

Saving millions of lives around the world, preventing the spread of disease, allowing for more accurate diagnosis and enabling better patient care are just some of the great individual and public benefits medical innovation have made on society. Medical progress, together with sanitation and nutrition, has led to a dramatic decline in death rates for diseases such as bacterial infections, polio, measles, cancer, heart disease, and more. For example, the number of AIDS-related deaths worldwide peaked at 2.5 million in 2005 and has since fallen to an estimated 1.1 million deaths in 2015⁴. This is attributed mainly to the introduction of new antiretroviral therapies combined with more patients being provided with treatment (as well as other social activities, e.g. education, prevention, etc.).

Pharmaceutical innovation can also reduce the costs incurred by governments and healthcare systems. For example, every US\$1 spent on childhood vaccination in the United States saves US\$10.20 in disease treatment costs⁵. In this manner, pharmaceutical innovation directly impacts patients' health and indirectly alleviates the unseen economic burden of disease.

It is beyond the scope of this paper to discuss the scientific and technical aspects of medical innovation (the reader is referred to Annex I that encompasses a list of the top 10 medical innovations recently announced by Cleveland Clinic⁶).

The economy of medical innovation, with particular emphasis on the pharmaceutical and biopharmaceutical (collectively "pharmaceutical") industry, is discussed hereinafter. I have elected to limit my discussion on the pharmaceutical industry, which has a substantial impact. I have intentionally omitted a discussion on medical devices, digital technology, telemedicine and the like innovations, which would pointlessly expand this paper.

The research-based pharmaceutical industry plays a unique role in turning basic research into innovative treatments. Government-funded research plays a major role in the discovery of new pharmaceuticals (Levy, 2011). Accordingly, most of the important new drugs introduced by the pharmaceutical industry were developed with some imperative contribution from public-sector research.

The cost of developing a new drug, from research and development (R&D) to marketing approval, a process that can take 10 to 15 years (Levy, 2011), is approximately US\$2.6 billion (2013 dollars). This includes actual out-

4 UNAIDS (2016) Fact Sheet 2016 Statistics: Geneva: United Nations AIDS. Retrieved from http://www.unaids.org/sites/default/files/media_asset/UNAIDS_FactSheet_en.pdf

5 Retrieved from https://www.pfizer.com/sites/default/files/health/VOM_MedicalCosts4.pdf

6 Retrieved from <https://www.crainscleveland.com/health-care/cleveland-clinic-announces-top-10-medical-innovations-2019> - note that this list was randomly elected among other sources.

of-pocket costs averaging \$1.4 billion, opportunity costs of nearly US\$1.2 billion, and the cost of post-approval studies amounting to US\$312 million (DiMasi, Grabowski, & Hansen, 2016)⁷.

In my opinion, the most evident investment is, and will probably continue to be, in R&D, which begins once researchers identify a promising compound among 5,000–10,000 chemical and biological compounds screened for the potential treatment of new or existing conditions. Worldwide pharmaceutical R&D spending totaled US\$165 billion in 2017 and is expected to increase by 3.0 percent each year⁸, reaching \$203.9 billion in 2024 (EvaluatePharma®, 2018). In 2015, 56 new medicines were launched, while more than 7,000 compounds are at different stages of development globally (IFPMA, 2017). This fact demonstrates the many hurdles to be overcome and uncertainty in developing new medicines.

Remarkably, in the 1990s, a wave of mergers of large, traditional pharmaceutical companies transformed the structure of the drug industry. By 2002, the 10 largest drug firms accounted for 48 percent of pharmaceutical sales worldwide, up from about 20 percent in 1985. Currently, eight of the top 10 firms are mergers between two or more large drug companies, all of which occurred since 1989 (Danzon, Epstein, & Nicholson, 2007). The common rationale for this consolidation, by supporters of these mergers, is the existence of economies of scale in R&D, overcoming declining R&D productivity⁹, imminent patent expiration and in sales and marketing. Examination of the determinants and effects of M&A activity by these authors shows that for large firms, mergers are a response to expected excess capacity due to patent expirations and gaps in a firm's product pipeline. For small firms, mergers are primarily an exit strategy in response to financial trouble.

This private-sector produces nearly all the medicines and vaccines on the market. Globally, the production value of the pharmaceutical industry amounted to US\$ 997 billion and accounted for 3.8 percent of the gross value added in manufacturing worldwide (IFPMA, 2017). The QuintilesIMS Institute predicts that the pharmaceutical market will reach nearly US\$ 1,485 billion by 2021, an increase of US\$ 350–380 billion from the US\$ 1,105 billion recorded in 2016 (QuintilesIMS Institute, 2016). Apparently, the pharmaceutical industry is also facing significant barriers in the form of pricing and reimbursement, continued patent expirations and challenging market dynamics (e.g., Gautam & Pa, 2016).

7 It should be note that a number of consumer advocates and academics criticized the data. See e.g. <https://www.policymed.com/2014/12/a-tough-road-cost-to-develop-one-new-drug-is-26-billion-approval-rate-for-drugs-entering-clinical-de.html>; being active in this domain, I tend to agree with DiMasi et al. findings.

8 Notably, compared with other high-technology industries, the annual spending by the pharmaceutical industry is 5.5 times greater than that of the aerospace and defense industries, 5 times more than that of the chemicals industry, and 1.8 times more than that of the software and computer services industry (European Commission, 2017).

9 Several articles have reviewed the industry's declining productivity challenges, see e.g., Paul et al. (2010).

The pharmaceutical industry also plays an important role in disseminating advanced medical technology¹⁰. That can help improve the health of transferee countries' populations by increasing access to innovative medicines and vaccines. It is one of the resources by which low and middle-income countries can accelerate the acquisition of knowledge, experience, and equipment related to advanced, innovative industrial products and processes. It likewise benefits the overall economy by increasing the reliability of supply, decreasing reliance on imports, and raising the competence of the local workforce (IFPMA, 2011). Key indicators of the European pharmaceutical industry are shown in Table 4.5.

Noteworthy, an additional remarkable impact of the pharmaceutical industry is attributed to its contribution to employment. For instance, in 2014, it employed approximately 5.1 million people worldwide; almost a 1.5 million increase from 2006. Spending on services and supplies totaled US\$659 billion, translating into more than 4.4 million jobs. The industry currently directly employs more than 854,000 people in the United States and 736,358 people in Europe (IFPMA, 2017) (WifOR, 2016).

Table 4.5. Key indicators of the pharmaceutical industry in Europe (includes intra-EU trade)

In € Million	Year	2000	2010	2014	2015
Production		125,316	199,400	221,088	225,000
Exports		90,935	276,357	324,452	361,500
Imports		68,841	204,824	251,427	27,500
Trade Balance		22,094	71,533	73,025	86,500
R&D Expenditure		17,849	27,920	30,887	31,500

Source: adapted from EFPIA (2016).¹¹

3.2. Health economy

Undoubtedly, the health of the population is under the impact of both the type of health systems and their resources. WHO describes health systems in terms of six “building blocks”: (1) service delivery, (2) health workforce, (3) health information systems, (4) access to essential medicines, vaccines and technology (5) financing, and (6) leadership/governance (WHO, 2010). A health system consists of all the organizations, institutions, resources and people committed to improving health. Notably, the input of the health care system is generally by health care expenditures per capita, whereas the output

¹⁰ Technology transfer is strongly influenced by conditions in the host-country, e.g. political stability, efficient governance, infrastructure and human capital, together with economic and legal requirements.

¹¹ The Pharmaceutical Industry in Figures, Brussels: European Federation of Pharmaceutical Industries and Associations, p 3. Retrieved from <http://www.efpia.eu/uploads/Modules/Documents/the-pharmaceutical-industry-in-figures-2016.pdf>

of the health care systems is usually expressed by life expectancy at birth (Figure 4.1). Medical products, technologies, and service delivery reflect the immediate outputs of the health system. Other key input components to the health system include financing and the health workforce. Successful health systems ensure equitable access to essential medical products and technologies of assured quality, safety, efficacy and cost-effectiveness.

Understanding the social health and economic benefits of pharmaceuticals are vital to warrant the most efficient deployment of healthcare costs and resources. Hence, investments in health and the design of health financing policies should be addressed in terms of the interaction between health and the economy, as well the roles played by the government (state), NGOs and the private sector.

The source of health funding often dictates the types of services and supplies procured and how efficiently those resources are deployed. In general, health systems are financed either through taxes, in the case of healthcare services owned by the state (national health services), through income-related social contributions (social security systems), and privately (out-of-pocket payments by families and medical insurance companies). Global health care expenditures total about \$7.35 trillion [increasing] each year, much of which comes from out-of-pocket payments by families, insurance reimbursements and public funding (National Academies of Sciences, Engineering, and Medicine, 2018). Social health insurance institutions are a very limited source of health care spending in low-income countries. They accounted for only some 2 percent of total spending on health in low-income countries, 15 percent in lower-middle-income countries, and 30 percent in upper-middle-income and high-income countries (Gottret & Schieber, 2009).

The disparity in the wealth of countries has a major impact on the performance of healthcare systems. The higher the country's GDP the higher the health expenditure (Figure 4.2). A recent study estimates that global spending on health will increase to US\$24.24 trillion in 2040. Noticeably, increased per capita health spending in upper-middle-income countries is expected to grow at 5.3 percent per year due to continued growth in GDP, government spending, and government health spending. Lower-middle income countries are expected to grow at 4.2 percent.

Despite this growth, health spending per capita¹² in low-income countries is expected to remain low at \$154 per capita in 2030 and \$195 per capita in 2040 (Dieleman et al., 2017).

12 In 2014 spending per capita in low-income countries varied from US\$33 to US\$347 whereas in high-income countries varied from US\$853 to US\$9237.

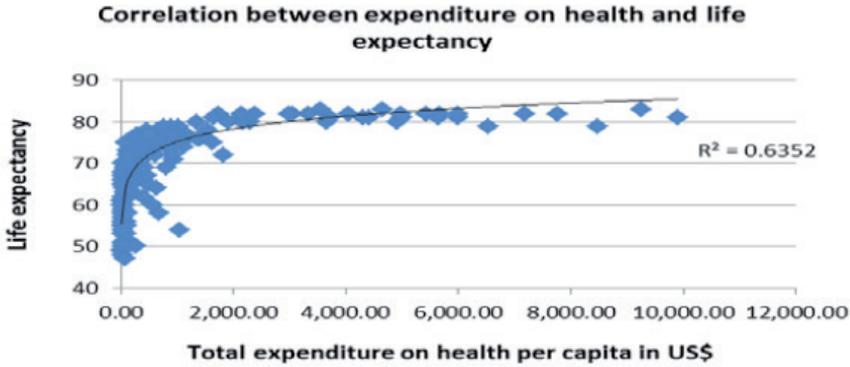


Figure 4.1. The relationship between health expenditure and life expectancy (2011)
Source¹³: Global Health Expenditure Database (GHED) - WHO global health expenditure atlas (2014).

Nevertheless, at present, half the world’s population lacks access to essential health services. Moreover, 800 million people spend at least 10 percent of their household budgets on health expenses (World, 2017).

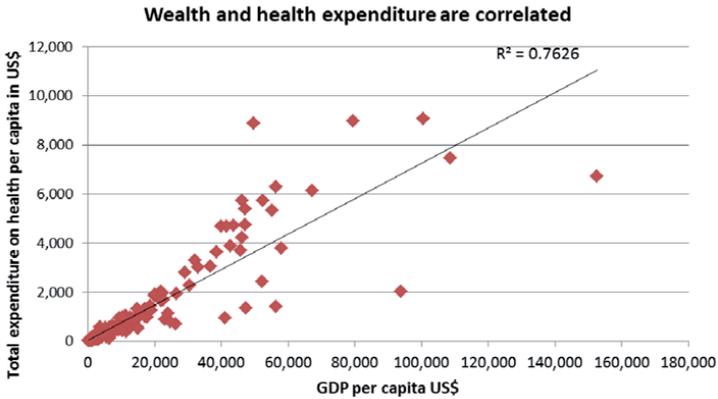


Figure 4.2. Wealth, health and health expenditure

Source¹⁴: Global Health Expenditure Database (GHED) - WHO global health expenditure atlas 2014.

13 With permission from WHO global health expenditure atlas (2014, p.10). Retrieved from <http://www.who.int/health-accounts/atlas2014.pdf>

14 With permission from WHO global health expenditure atlas (2014, p. 10). Retrieved from <http://www.who.int/health-accounts/atlas2014.pdf>

It is on point to accentuate that private health insurance plays a significant role in modern health care organizations. It has become an increasingly important part of the financial sector as well as a major source of investment in the capital market. For instance, in 2017, the total revenues of the top five largest health insurance companies in the US were over US\$430 billion (Table 4.6). Whereas the United States and Switzerland have chosen for a highly privately financed system, in which private insurance intervenes even in primary care, in the majority of OECD countries private health insurance is merely supplementary to the public scheme, and covers specific services not covered by public financing¹⁵ (for further details on the Private Health Insurance in OECD Countries (e.g., Colombo & Nicole, 2004).

Table 4.6. Top 5 Largest health insurance companies in the United States

COMPANY	REVENUES 2017 (rounded, in billion US\$)	MEMBERS (in million)
United Health Group	201	50
Anthem	90	40
Aetna	60	23
Cigna	41	16
Humana	41	14

Source: revenue and membership data were collected from the companies' 2017 Financial Reports (e.g., Form 10-K Annual Reviews).

3.3. The economic burden of rapid population growth

According to a recent United Nations report¹⁶, the current world population of 7.6 billion is expected to reach 8.6 billion in 2030, 9.8 billion in 2050 and 11.2 billion in 2100. This rapid growth of the world's population results from a difference between the rate of birth and the rate of death, which, as aforesaid, is attributed mainly to innovative medicine and nutrition. However, it coincidentally brings forth serious economic implications and a significant burden to human well-being, including the need for more food, water, health care, innovation, and education. It should be similarly pointed out that the population over the age of 60 will continue to grow and estimated to reach nearly two billion by 2050. That imposes an additional challenge on how to address conditions associated with aging and elderly physical and mental conditions. There is an undoubted need for more medical and social research in this domain.

¹⁵ Retrieved from <http://www.oecd.org/pensions/insurance/1902544.pdf>

¹⁶ Retrieved from https://population.un.org/wpp/Publications/Files/WPP2017_Wallchart.pdf

A multi-disciplinary approach will be required to help overcome these many challenges. The following brief discussion is aimed at the impact of agriculture innovation on food supply and nutrition, which in conjunction with innovative medicine, considerably attribute to human health and welfare. It is beyond the scope of this paper to elaborate on the ‘World Agriculture’ economy. Nonetheless, I compendiously address this topic as I deem it relevant. For further reading on this intriguing matter, the reader is referred, for example, to this comprehensive review (Alexandratos & Bruinsma, 2012).

Between 1961 and 2009 agriculture production has increased by 170 percent. Thus far, the growth of global agriculture produce has been sufficient to exceed population growth, seemingly, with a slow increase in average per capita food availability¹⁷. However, world food production will probably need to increase over the coming decades. Recent FAO¹⁸ estimates indicate that in order to meet the projected demand of the year 2050 global agricultural production must grow 60 percent above the level of 2007.

Some important key economic facts which are worth bearing in mind: total per capita food production for human consumption is about 900kg a year in rich countries in comparison to the 460kg a year produced in the poorest regions. Regrettably, food losses and waste amounts reach to roughly US\$680 billion in industrialized countries and US\$310 billion in developing countries¹⁹. It should be noted that the FAO is leading a ‘save food initiative’ with international organizations, the private sector, and civil society, to look at innovative ways to reduce food loss and waste across the entire food supply chain in both the developing and the developed world²⁰.

Clearly, in recent decades there has been impressive growth in food production, which has been attributed to the development of improved, disease-resistant varieties of essential crops; the increased use of chemical fertilizers and pesticides, irrigation, IT, sensors and more. Readers are referred to Annex II for a list of some of the top agriculture innovations. Nowadays, innovation in agriculture involves different social, organizational or institutional processes, ranging from access to markets, credit, or extension services to marketing produce in a new way.

The UN general assembly recently proclaimed 2019–2028 the decade of family farming, recognizing the role of family farming, pastoralism and smallholder farming in contributing to the achievement of food security and improved nutrition. In its resolution, the UN general assembly gave particular attention to innovation, recognizing “the important role of science, technology,

17 Retrieved from <http://www.fao.org/docrep/015/i2490e/i2490e03a.pdf>

18 The Food and Agriculture Organization of the United Nations

19 Retrieved from <http://www.fao.org/save-food/resources/keyfindings/en/>

20 Retrieved from <http://www.fao.org/3/CA2460EN/ca2460en.pdf>

innovation and entrepreneurship in supporting smallholders, including family farmers, in particular women and youth in rural areas”²¹.

Agriculture innovation will continue to increase crop yields and nutrition-values²². Knowledge exchange between agencies, governments, universities, research organizations, NGO’s, farmers’ organizations, private sector, and the wider community, is vital. The outcome thereof will certainly contribute to food security, society health, and well-being.

4. Discussion and final remarks

The commercialization of innovation and technological inventions is vital for sustained economic growth and improved well-being. In this paper, I specifically discuss the impact of medical innovation in relation to health economy, world population growth, and welfare. The correlation between the enormous progress in medicine and life expectancy, in the past 150 years, is evident. The impact of Innovation on Health Economy is directly proportional to the advancements in medicine which depends on significant investments. However, one should distinguish between the effect of pharmaceutical innovation on life expectancy (and health, in general) and the effect of pharmaceutical expenditure on life expectancy and welfare.

I have argued that the research-based pharmaceutical industry plays a substantial role in turning basic research into innovative medications and treatments. Most of the important new drugs introduced by the pharmaceutical industry were developed from basic research carried out at universities, which is normally supported by the public-sector (Levy, 2011). The pharmaceutical private sector bears the enormous costs of new drug development, from R&D to marketing approval. Globally, the production value of the pharmaceutical industry amounted to US\$997 billion (IFPMA, 2017) and is expected to increase in coming years. Indubitably, this is definitely a powerful and influential industry on world society health, welfare, and economy.

There is no model for how health financing systems should be organized. In general, health systems are financed through taxes, social security systems and privately (i.e., out-of-pocket and insurance companies). Global health care expenditures total about \$7.35 trillion [increasing] each year. The total spending on health per person is positively correlated to the wealth of a country (Figure 4.1). There is also a positive correlation between total health expenditure and life expectancy (Figure 4.2).

21 72/239, United Nations Decade of Family Farming (2019–2028). Retrieved from <http://undocs.org/A/RES/72/239>

22 In this context nutrition-values refer to the increase of the amount of basic nutrients (e.g., protein, lipids and carbohydrates) per crop weight unit (e.g., gram).

Health financing is concerned with how financial resources are generated, allocated and used in health systems. It has long been recognized that many countries lack sufficient funds to ensure universal access to critical health interventions and services. A minimum of US\$44 is needed per person per year to provide basic, life-saving health services. 100 million people are pushed into poverty every year because they have to pay directly for their health care²³. It is thus expected from the international community to increase its financial support to low and low-middle income countries.

The advancement of precision and personalized medicine into routine clinical practice has been highlighted as an agenda for national and international health care policy. A principal barrier to this advancement is in meeting requirements of the payer or reimbursement agency for health care – in rich countries. I have argued the major economic impact of private health insurance companies, which plays an important role in western countries. To illustrate, I have indicated that in 2017, the total revenues of the top five largest health insurance companies in the US were over US\$430 billion (Table 4.6), certainly, a significant player in the health economics.

It is pointed out that the growth in human population around the world affects all people through its impact on the economy and environment. It coincidentally brings forth serious economic implications and a significant burden on human well-being. Some people arguably believe that the greatest threat to the future comes from overpopulation. Understanding the factors which affect population growth patterns can help policymakers and governments plan for the future.

5. Conclusion

In conclusion, the impact of medical innovation in conjunction with agriculture advancement on food supply and nutrition will continue to considerably attribute to human health and welfare as well as play a marked role in the global economy. Notwithstanding, this would require equitable health systems, properly financed, on the one hand, and affordable medicine prices, on the other hand. Medicines prices are expected to decrease as a result of growing competition in the pharmaceutical industry, particularly due to major patents expiration. Nonetheless, large and medium pharmaceutical companies will continue to bear the costs of developing new pharmaceuticals, based on basic research. Contemporaneously, government leaders, industry, civil society, farmers and academia collaboration platforms will continue to strengthen the innovation ecosystems aimed at the transformation of global food systems.

²³ Retrieved from <http://www.who.int/health-accounts/atlas2014.pdf>

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Annex I

Top 10 medical innovations of 2019 announced at the end of the Clinic's 16th annual 2018 Medical Innovation Summit, organized by Cleveland Clinic Innovations, the system's commercialization arm. (Retrieved from <https://www.craainscleveland.com/health-care/cleveland-clinic-announces-top-10-medical-innovations-2019>):

- 1) Alternative therapy for pain.
- 2) The advent of Artificial intelligence in health care.
- 3) Expanded window for acute stroke intervention.
- 4) Advances in immunotherapy for cancer treatment.
- 5) Patient-specific products achieved with 3D printing.

- 6) Virtual and mixed reality for medical education.
- 7) Visor for prehospital stroke diagnosis.
- 8) Innovation in robotic surgery.
- 9) Mitral and tricuspid valve percutaneous replacement and repair.
- 10) RNA-based therapies.

Annex II

Below are technologies under four key areas of accelerating changes²⁴:

- 1) **Sensors** – Air, soil and crops; Equipment telematics; Livestock biometrics (Collars with GPS, RFID); help agriculture by enabling real-time traceability and diagnosis of crop, livestock and farm machine states.
- 2) **Genetically designed food; In vitro meat** - Food may benefit directly from genetic tailoring and potentially from producing meat directly in a lab.
- 3) **Agricultural robots; Precision agriculture** - Automation will help agriculture via large-scale robotic and micro-robots to check and maintain crops at the plant level.
- 4) **Engineering** - involves technologies that extend the reach of agriculture to new means, new places and new areas of the economy. Of particular interest will be synthetic biology, which allows efficiently reprogramming unicellular life to make fuels, byproducts accessible from organic chemistry and smart devices.

Biographical note

Haim Levy (Ph.D.) after close to fifteen years in academia as a cancer research scientist at leading universities, Dr. Levy has embarked on an entrepreneurial business career dedicated to identifying and nurturing Innovation and Hi-Tech new business opportunities. During the past 35 years he co-founded and served as CEO and director of three Biomed companies: Agrilab Ltd. (1990), which later merged with a large commercial service laboratory. Neuromuscular Electrical Stimulation Systems Ltd. (NESS) (1991). In 2008, it was acquired by an American entity and renamed BIONESS INC. (USA); and NanoDerma Ltd. (2006). In addition, he has lectured at a number of universities on subjects such as, among others, Technology Transfer, Innovation Management, Entrepreneurship and Project Management. Dr. Levy is also a practicing attorney, engaged in various international business transactions, including Hi-Tech investments deals, private equity and Venture capital Funds, innovation technology transfer and licensing agreements.

²⁴ This list was compiled from various websites.

Approach and attitude of Polish employees towards remote work. Empirical evidence from the ICT sector in Poland

Sergiusz Prokurat¹

Abstract

Constant connectivity allows work in the 21st century to be performed at any time and from almost anywhere. This article discusses the conceptual basis of remote work, which is made possible through the continuous development of ICT. The aim of this study is to identify the attitudes of IT employees in the Polish ITC sector towards remote work. Based on surveys carried out among people employed in the Polish ICT sector, this article depicts the benefits and challenges of remote work, as well as incentives and possible contraindications in managing remote work. Research studies on the advantages and disadvantages of remote work are still a subject of a vivid discussion, and the results obtained by different scholars are ambiguous. This article highlights the results of the survey that employees working in the ICT sector have more remote worker opportunities than in other sectors, and also proves that in different companies there are various arrangements for remote work for different departments or occupations. As effective and efficient cooperation of dispersed employees performing remote work becomes necessary for the success of projects, it is important to study the consequences of remote work.

Keywords: *remote work, telework, work from a distance, attitude, Poland, virtual work, work from home.*

1. Introduction

The growing importance of information and telecommunication technologies (ICT) has profoundly changed the nature of work. As globalization is becoming more and more important for the economic activity of all organizations (Acs & Preston, 1997), the development of the IT sector in the last decades

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has made remote work easier, faster and more productive (Hertel, Geister, & Konradt, 2005). In addition, new forms of work (Arvidsson & Colleoni, 2012; Frayssé & O’Neil, 2015; Huws, 2003; Holts, 2018), new activities that have the characteristics of work (Webster & Randle, 2016) or new forms of production that require human work have emerged (Fuchs & Fisher, 2015). Along with the development of ICT, decentralization of work, the unification of work processes, and the increasing employment of knowledge workers, many employees have gained the possibility of flexible work at any time, from anywhere (Blount, 2015), regularly or occasionally (Baruch, 2003; Gajendran & Harrison, 2007; Nilles, 1994). Organizations are now facing important and unprecedented challenges in an extremely dynamic, ever-changing and complex environment (Rezgui, 2007). In response to the opportunities offered by ICT, many organizations have introduced virtual teams that cooperate with each other through remote communication regardless of geographic, time, cultural and organizational boundaries (Bell & Kozlowski, 2002; Cascio, 2000). Virtual teams, and the ability to perform remote work, using ICT, enable work at any time of the day or night, at any place capable of connecting people and information, regardless of their location (Prokurat, 2016). In this article, remote work refers to the form of work in which ICT is used for communication between employees (Garrett & Danziger, 2006), regardless of whether their organizations formally use virtual teams or remote work solutions. The aim of this study is to identify the attitudes of IT employees in the ITC sector towards remote work. Understanding remote work requires more research because the management of a virtual team differs in many respects from the management of a regular team. Remote work has numerous disadvantages and advantages (Bailey & Kurland, 2002; Cascio, 2000; Di Martino & Wirth, 1990; Duxbury & Neufeld, 1999; Duxbury, Higgins, & Neufeld, 1998; Fritz, Higa, & Narasimhan, 1994; Haddon & Lewis, 1994; Handy & Mokhtarian, 1995; Kurland & Bailey, 1999; Mokhtarian, 1998). If we take into account the fact that many employees stay away from their offices even up to half the time (Global Workplace Analytics, 2017), then remote work becomes a key feature of the modern labor market, the market of work 2.0 (Prokurat & Świerżewski, 2013; Prokurat, 2013).

2. Literature and theoretical background for remote work discussion

There are a number of terms used to define remote work. The term “remote work” (Olson & Primps, 1984; Hardill & Green, 2003; Gerke, 2006) is sometimes also referred to as: “teleworking”, or “telecommuting” (Nilles, 1975; Sanchez, 2007; Orhan, 2014), “digital work” (Burston, Dyer-Witthford, & Hearn, 2010; Cardon & Casilli, 2015; Fuchs & Sevignani, 2013; Pfeiffer, 2014; Scholz, 2013), “virtual work” (Huws, 2003; Jackson, 2002; Robey,

Schwaig, & Jin, 2003; Hoefling, 2001), “offsite work” (Fisher & Fisher, 2001), “online work” (Caraway, 2010), “cyber-work” (Hauser, 2000) and “mobile work” (Andriessen & Vartiainen, 2005, Brodt & Verburg, 2007), “work from home” (Huws & O’Regan, 2001; Martino, 2001), “working at a distance” (Fisher & Fisher, 2001), “dispersed work” (Hildreth, 2004), or even “flexible work” (Sanchez, 2007). These terms describe basic practices, whose features of remote work overlap to a large extent, but are not always identical (Gálvez, Martínez, & Pérez, 2012). In addition, there is a term of “e-work” used by the European Commission (Eichmann, 2002).

Historically, “remote work” comes from the term “teleworking,” which gained popularity in the 80s and 90s. Teleworking was first introduced to academic discourse and used to define remote work by an American sociologist Jack Nilles in 1973. As the term suggests, this word accentuates shortening or even eliminating commuting time, which was and to a large extent still is a problem in big cities. Teleworking was initially perceived only as a time-saver in view of the spectrum of time-consuming physical travel. However its organization, as well as the way of its performing and supervision, required a different approach to management, including time management or strategic management (Kowalski & Swanson, 2005). Jack Nilles defines teleworking in a narrow sense – transferring work to a person and in a broader sense – replacing all work-related needs with the help of ICT (Nilles, 2007). Huws and O’Regan (2001) also suggest that it is possible to distinguish the broader and narrower sense of teleworking based on the employment relationship and the workplace. In the narrow sense, teleworking is work done by an employee for an organization – work that from an individual perspective is performed from home, remotely or in a mobile way. The broader meaning of teleworking also includes freelancers and companies that use ICT to provide their services or work results. Currently, the term “teleworking” has not so much gone out of fashion in academic debates, but there have appeared more terms defining the same or a similar phenomenon, which resulted in a diffused definition of the discussed problem. Polish law in Art. 67 of the Labor Code defines that remote work is “work performed regularly outside the workplace, which must be provided with the help of information technology, and the employee and employer are to be able to contact each other at any time” (Kodeks Pracy, 2018). In this article, we would rather use a more complete definition given by the International Labor Organization, where remote work is described as: “ (...) a form of work in which (a) work is performed in a location remote from central office or production facilities, thus separating the worker from personal contact with co-workers there; and (b) new technology enables this separation by facilitating communication” (ILO, 2001; Martino, 2001).

In remote work the employees work remotely from home or another place, different from the company's location, using information and communication technologies (Huws, Korte & Robinson, 1990; Bell & Kozlowski, 2002), enabling the exchange of e-mail, software for the organization of video conferences, virtual desktops or cloud solutions for remote access to files with which work is performed. It seems that the term "remote work" should be used only for work performed regularly outside the recognized employer's workplace for at least one day in the workweek, in contrast to "flexible work" where employees can have an influence on or choose their working hours. Although working from a location outside of the company's operational center can indeed provide employees with certain flexibility, the scope of solutions in the field of remote work is much more extensive.

3. General overview of the Polish ICT sector

Enterprises in Poland that want to become market leaders or maintain their market position must adapt and keep up with the rapidly growing technology. This obliges Polish companies to quickly digitize, which raises the demand for specialist knowledge in the field of ICT. The Polish ICT market in 2017 reached a value of approximately USD 11.2 billion, while in 2018 – USD 12 billion (IDC, 2017; IDC 2018). The high dynamic of the ICT sector is reflected in its value of production, which increased by 20.57% in 2010-2016 (PARP, 2017).

Polish companies operating in the ICT sector usually choose one of two ways of market development. The first is the sale of infrastructure and the processing of government orders. This path is apparent in the case of domestic giants and Polish IT listed companies. The second is the production of games (e.g., Wiedzmin 3), customized software along with leasing people and teams and outsourcing. This segment is growing rapidly (more than linearly) due to the lack of programmers in Western Europe (European Commission Report, 2017). As far as the European Union market is concerned, the Polish ICT sector constitutes 7.6% of the European community market, which gives Poland fifth place in the EU in terms of the number of companies in this sector (European Commission Report, 2017). The most frequently provided ICT services can be assigned to the category of Application Lifestyle Management, i.e. software design, development, and implementation. These include the development of software that is rendered by 82% of entities providing IT services and software maintenance, which is provided by 79% of entities.

Employment in the ICT sector in Poland has reached 430 thousand people and the industry produces about 8% of GDP (PARP, 2017). In 2017, the number of employees in the sector grew at an average rate of 6% per year, and the turnover of the entire sector is growing by almost 9% annually.

Expenditures on ICT services in Poland are constantly growing and the vast majority of companies are recording employment growth and are planning further increases in this area. Polish companies provide ICT services to clients from all over the world, but the vast majority, up to 80%, concentrate on clients from Western Europe, and 74% on Polish clients (ABSL, 2015).

Actual market conditions are also a great challenge for human resource management. Increasing flexibility requires innovative team management, which is based on trust, effective communication and accurate identification of HR potential. Remote work is one of the factors that can decide whether a given company will acquire an employee. ICT companies undoubtedly belong to the group of knowledge-based organizations, i.e. organizations that acquire and implement knowledge in organizational structures, products, processes, and practices. Software development organizations are knowledge-based organizations that are problem-oriented and based on cooperation, as opposed to, for example, those based on competition. Knowledge organizations are often based on a network structure, and knowledge management plays an integrating role here. The main capital of such organizations is experience and knowledge, which is acquired through sharing knowledge among employees. ICT enterprises in Poland are flexible in terms of setting wages, optimizing labor costs and the ability to quickly change the number of employees. Flexibility also means that contracts do not have to contain a provision concerning the obligation to provide work in a set place and time. Non-standard forms of employment, such as civil law contracts or contracts with sole proprietors (B2B) only to provide services to one company are widespread in ICT. They are both a means of transferring from employer to employee the need to ensure state regulations of mandatory social security for an employee, as well as avoiding protective provisions of the labor law and bearing high labor costs. On the other hand, for many well-paid specialists, flexible employment is a way to optimize taxes, avoid the higher tax thresholds and earn more money. Specialists employed on a contract basis can count on earnings up to 20% more than on a full-time basis. Highly specialized employees with extensive knowledge, potential, and skills, value employment for an indefinite period, but are happy to choose B2B contracts and civil law contracts due to the high level of autonomy and flexibility. Study conducted in Poland shows that 68% of respondents, who indicated work on the basis of a B2B contract, find motivation in a more attractive remuneration, 59% – flexibility of working time, and 42% – the possibility of working remotely (Hays, 2018). In the case of the ICT industry in Poland, in B2B contracts, it is common practice to offer a wide range of non-wage incentives that may become a substitute for social benefits (e.g. private medical care). Although non-working forms of employment (e.g. B2B) should by definition not include such elements as paid

holidays or accept sick leave, companies compete for specialists and offer such elements as non-wage incentives, regardless of the type of contract. This high competitiveness of companies in the struggle for an employee makes the B2B cooperation model attractive for employers because of its flexibility, and civil law contracts or regular contracts become confusingly similar to an employment relationship, especially if such contracts include a non-competition clause or prohibition to provide services for another entity.

4. Research approach and methods

Research presented in this article is the outcome of a pilot study in 2018 that was designed to identify the attitudes of IT employees in the ITC sector towards remote work. It seems obvious that typical IT remote work in the ICT sector, in large cities, using the latest technologies, will be more frequent and more dispersed than in other sectors of the economy. Nevertheless, this is the main hypothesis of this work. The hypothesis is tested through a high-level comparison of the average remote work dispersion in EU (Eurofund 2017; Eurofund & ILO 2017) with a pilot quantitative survey-based study that was undertaken in 2018 in Poland. The study was conducted using the CAWI method of non-random sampling assignment among a group of 96 Polish respondents. The study group consisted of employees of the IT Departments in the ICT sector in the number of 96 people aged 20-41 ($n = 96$). From the study, we can summarize that the work experience of respondents in the IT / ICT sector ranged from 1 year to 20 years: 1-2 years of experience – 28.1%, 3-5 years of experience – 46.8%, 6-9 years of experience – 14.5%, 10-20 years of experience – 10.4%. Employment size of company that respondents work for/in: 1-10 people – 8.3%; 10-60 people – 40.7%; 60-500 people – 35.4%; 500 people and more – 15.6%. The form of employment that respondents declared that they used to work: B2B - 44.8%; full-time employment based on Labor Code - 37.7%; civil contracts for specific work – 17.5%. Among all respondents 42.7% declare that they work as programmers in companies dealing with software development and support, therefore respondents are truly IT specialists by knowledge.

5. Results and discussion

This research shows that, in IT companies of the Polish ICT sector in/for which the respondents work, a high-level estimation of possibilities of working remotely are declared positively by an average of 69% of respondents. It demonstrates that the IT / ICT sector is much more remote work-oriented than other sectors as the EU average, for employees who mainly work from home,

mobile workers and those doing occasional phone calls and emails outside of the employers' premises, is 18% (Eurofund 2017; Eurofund & ILO 2017). This proves the hypothesis to be true (Figure 4.3).

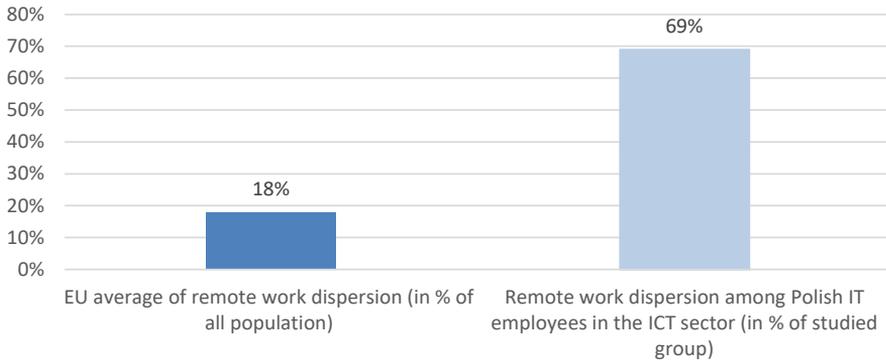


Figure 4.3. Remote work dispersion. Comparison between the EU average and IT employees in Polish ITC sector

Source: own elaboration, based on research outcomes, EU average of remote work opportunities from Eurofund (2017) and Eurofund & ILO (2017).

Remote work opportunities mentioned by the respondents do not always mean de facto remote work: among all respondents from IT/ICT 26% declare continuous remote work, compared to the EU average of 2.6% who work from home as a percentage of the total employment (Eurofund, 2017; Eurofund & ILO, 2017). While 5.2% of respondents to this research declare remote work from 20 days to 30 days a month, 8.4% from 10 days to 20 days a month, and 19.8% 5-10 days per month. Form of employment also matters. The respondents consider the form of B2B employment as more favorable to remote work (77.5%), probably as it is more flexible than an employment contract together with civil law contracts (64.6%). However, there are different arrangements for remote work for different departments or occupations in each declared company in which the respondents work in/for. Among all the employed people it is the programmers who can count on the highest flexibility of the opportunities that remote work gives in comparison to other employees – it can be even higher when programmers are working on a B2B contract (87.5%), than under a contract of employment and civil law contracts (76.1%).

Among other findings is the consent for remote work which, according to the surveyed persons, does not depend on the employees' age or experience. This might be related to the declared opinion of respondents, that remote

work is not well perceived by only 18.8% of managers, bosses, and clients in the IT / ICT sector in Poland. 65.6% of respondents employed in the IT / ICT sector declared that they would not accept a job offer in a company that does not offer remote work, which indicates that it is an important factor affecting the attractiveness of a given workplace in the IT / ICT industry. Although, it shows general managerial acceptance for remote work offered to IT employees, 64.6% of all respondents feel that when they work remotely, the flow of information in the company is not as effective as in situations when they work in the company's office.

Remote work of respondents is controlled in many ways. The most common is the monitoring of progress with the help of project and task management tools, with which an employee can mark tasks as being in progress or done (51%). In addition, 46% of respondents declare that their working time is monitored. In the case of 26% of respondents their working time is not monitored, but they have to declare it. 32% of respondents send statuses, i.e. short reports on the status of their tasks. 3.1% respondents stated that their work is not controlled, or they have such an impression (the answers do not add up to 100%).

The basis for the successful cooperation in applying remote work is trust – not compulsion – and supervision, and thus – in accordance with the theory of Douglas McGregor – a cooperative culture (McGregor, 1960). This is possible, to a large extent, primarily in the ICT sector, where, according to the results of the study, the level of reluctance to remote work is low. Despite this, remote work requires the development of a work organization and monitoring and communication system, which will create incentives for the employees and the entire organization (Macky, Gardner, & Forsyth, 2008). The conducted study showed that such systems differ depending on the company.

The results of the survey suggest that the perceived autonomy of work is essential for employees and suggest that remote work is clearly desired by the respondents. This was confirmed by another study, which took into account all Poles, and showed that as many as 81% of all working Poles would like to decide upon the time of performing their work, and 57% would like to work remotely (Kantar, 2017). This is quite important because the literature indicates that employees who were denied the possibility of teleworking showed lower motivation compared to employees who performed remote work (Caillier, 2012). As for the incentives addressed to employees, the literature notes increased job satisfaction and a better work-life balance (Ward & Shabba, 2001; Heneman & Greenberger, 2002; Ballenstedt, 2013), and stress reduction (Sanchez, Perez-Perez, Vela-Jimenez, & de-Luis Carnicer, 2008), among others due to avoiding office politics and gossip (Ellison, 2004; Fønner & Roloff, 2010; Cooper & Kurland, 2002). Disadvantages of remote work may concern the blurring of boundaries between paid and unpaid work, consumption and production, work

and leisure, entertainment or work (Comor, 2010; Kücklich, 2005; Morini & Fumagalli, 2010; Ritzer & Jurgenson, 2010). Another problem is the potential isolation from colleagues and the organization (Ahmadi, Helms & Ross, 2000; Golden 2006). The impact of remote work on work performance is also debatable. Some scholars are claiming that remote work foster productivity (Siha & Monroe, 2006), while others are proving that outcomes are quite the opposite (Gajendran & Harrison, 2007; Golden, Veiga & Dino, 2008). Respondents of the study emphasized that the flow of information in the company was not as effective as in situations when they worked in the company's office. Therefore, the creation of remote jobs is not always suitable for all types of employment and types of work, and should be individually assessed by organizations in terms of the sense of any findings, having in mind various benefits and challenges for the employer, employee and society (summarized in Table 4.7) (Baruch and Yuen, 2000; Morgan, 2004; Watad & Will, 2003; Prokurat 2016).

Table 4.7. Benefits and challenges of remote work

Benefits for the employer	Benefits for the employee	Benefits for society
Greater efficiency of the company Lower operating costs (e.g., light, water, phone, internet) Lower labor costs Reduced bureaucracy Reduction of costs of facilities Improvements in the recruitment of candidates Staff retention Decentralized processes Reduction of absenteeism and rotation Commitment to the organization	Time savings Flexibility in terms of work planning Facilitation of work-life balance Implementation of professional aspirations in harmony with personal needs Increased work satisfaction Decrease in costs of displacement Decrease in costs of work clothing Savings and improvement of food More autonomy Decreased stress	Reduction of pollution. Pro-ecology approach Less congestion in cities Social and labor inclusion of people with disabilities Different mobility patterns inside cities Different energy consumption patterns
Challenges for the employer	Challenges for the employee	Challenges for society
Problems with the assessment of the effectiveness (productivity) of remote work Lack of communication affecting the efficiency of operations Clear procedures Compensation & Benefits Work coordination Lack of commitment of remote workers with the organization. Effective management and leadership of teleworkers Information security of the organization Technical support Legal issues Security issues	A sense of isolation Instability of employment Segmentation of employees Reduced stability of benefits Extended working hours Expenses previously paid by employer are now paid by employees Conflicts between work and private life Limited career development Limitation of promotions Unrealistic expectations of performance Lack of suitable workspaces Psychological impacts Security issues Potential issues with health accidents	Transfer of consumption to homes and public spaces near homes Less customers in public communication and private communication sector Different mobility patterns inside cities Different energy consumption patterns

6. Conclusion

Since 1973, when the term “teleworking” was introduced for the first time, a bunch of other terms have been used to describe new ways of working. There is no doubt that the increase in the importance of digital technologies is a challenge and push us to rethink our understanding of work (Webster & Randle, 2016) and face the challenge of increasing the demand and importance of “remote work.” More and more research and reports indicate that young employees (generation Y, generation Z) are expecting a more flexible environment for their workplace and want to work remotely, at least to some extent (Prokurat, 2016). Employers are slowly aware of the fact, and what this research shows is that remote work, for at least a few days a month, is becoming the norm in the ICT market, which is why more and more companies are choosing to provide such a solution. Unfortunately, the fundamental problem is to draw conclusions about even the most basic consequences of remote work (Bailey & Kurland, 2002; McCloskey & Igarria, 1998). We need more in-depth research on what influences the adoption of remote work by organizations. Moreover, what organization cultures, types, and styles of leadership are most suitable for organizing tasks, motivating, and developing employees within the remote work environment (Baruch 2003; Heneman & Greenberger, 2002). We can speculate that if remote work was not beneficial, companies would not offer it. Organizations, even if they have the necessary resources to implement remote work, must carefully analyze whether they are ready to pick up this challenge.

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