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NETWORK, INNOVATION, AND COMPETENCE-BASED ECONOMY

Edited by

Anna Ujwary-Gil
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Introduction

The inspiration for this monograph is the progress in information and IT technologies observed over several decades and the accompanying development of digital competences. The collected results of the research work are grouped into three distinct chapters, which, at the same time, have a common denominator in research perspectives. Network-based economy, innovation-based economy, and competence-based economy are primarily analyzed in relation to technological changes in the ICT area. Each of these perspectives ultimately leads towards Economy 4.0 due to the progressing digital revolution, called the fourth industrial revolution. The contemporary importance of networks, innovations and managerial competences in the economy is analyzed primarily in connection with technological progress.

The issue of networks in economic life has been developing for over 30 years. The role of the network in achieving a competitive advantage is unquestioned, while research issues are still being developed. This technological perspective is the most important context for network research today. Contemporary business models are developed based on a skillfully built inter-organizational network and a consciously used intra-organizational network. This applies to both commercial organizations and public entities. These issues are reflected in articles contained in this monograph, in particular in the first chapter. Various research conducted in organizations proves the increasing awareness of the importance of social life by managers and leaders, as well as the increase in the ability to build networks using information and ICT. Research on networks, which allows an understanding of the phenomenon of network formation, leads to the creation of methods and tools supporting network management. Modern network researchers, especially in the field of management sciences, point out that understanding the nature of the network and the possibilities of interacting with the network will determine the competitive position of the organization. This awareness and the complexity of the network are a constant motivation to develop knowledge and use its application character.

The concept of an innovation-based economy is included in the second chapter and is also related to technological progress in the field of

communication. The studies presented relate to the degree of innovation, skillful differentiation of innovation and imitation, the effectiveness of project financing, and the implementation of innovation. An important contribution to building knowledge on innovation comes from research conducted in individual sectors or regions, where a new, important perspective is gained, and specific, sometimes unique determinants of creating innovation are pointed out. References to regional and sectoral conditions can be found in individual subchapters. The research conclusions drawn have a cognitive and practical value for both researchers and management practitioners.

In the third chapter of the monograph, studies that make an important contribution to building or verifying knowledge about the competence-based economy are grouped together. The research refers to the most important management problems and barriers to the development of organizations related to employees' competences. Reference was made to many research currents in management, e.g. to empower employees, build the image of the employer, and the concept of sustainable development. Due to their long history of development, they would seem to be running out, while researchers prove that in contemporary commercial and non-commercial organizations deficits in managerial competencies are still identified. This applies to both human management and technical competences, especially digital. Therefore, research indicating the reasons for a lack of competence, in an era of strong popularization of these issues, seems to be interesting.

The purpose of this monograph was to present current research results and their importance in developing knowledge about the economy based on networks, innovations, and competences. A lot of research was conducted from the perspective of changes in technological progress and the challenges of Economy 4.0. The new possibilities brought by the digital revolution in the field of building and managing networks and developing network-based business models cannot be underestimated. It should be expected that future innovations will be developed mainly thanks to digital progress and will be determined by the digital competences of managers and leaders. Modern research also shows that new generations of employees will compete primarily in the use of modern technological solutions such as data acquisition and processing, analyzes and simulations on large data sets (big data, science data), automation and robotization of production processes, software integration, cloud solutions, and especially the increasingly comprehensive use of the Internet. The importance of scientific research for learning about future phenomena, understanding and taming the future is invaluable. The authors and editors of the book express the hope that the research results presented in it will become an inspiration for new scientific explorations and the implementation of changes in organizations and economics.

Chapter 1.
Network-based economy

Inter-organizational and intra-organizational networks are currently an important research object in social sciences. The multidimensional interactions of the surveyed entities on the web provide important information in the study of socio-economic phenomena, both of a competitive and cooperative nature. The research results revealed in the first chapter refer to both the public and business sphere, in which relationships based on mechanisms of cooperation and competition are observed. The study of the organization's behavior in the network allows a better understanding of the importance of relationships in achieving social and economic goals, and also creates the opportunity to improve cooperation.

The first section introduces the results of network research in the public sphere. The researcher formulated the thesis that it is beneficial to use a multi-faceted approach both to measure the effectiveness of inter-organizational networks and to explain the phenomena of cooperation and competition that occur in them. The main goal of the study was a multi-criteria assessment of inter-organizational network performance, which is carried out by examining public sphere entities based on seven groups of criteria: economic, organizational, cooperation, competition, knowledge management, and organizational learning, innovation and social. Assuming that the assessment of the effectiveness of inter-organizational networks operating in the public sphere requires a multi-faceted approach, the concept presented is a new proposal at the current stage of scientific reflection. Testimonials indicate that comprehensive business network performance studies are insufficient and there are no instruments to measure it. The practical usefulness in developing a methodological proposal is associated with the possibility of using the proposed concept to evaluate various types of inter-organizational networks operating in the public sphere.

Research achievements detailed in the next section concern the benefits of competition and cooperation of local government units. The survey covered local government units from eight selected metropolitan areas in Poland. In general, the overall result of shared benefits is more favorable to competition. However, it was noted that the geographical location, distance from the metropolis, or the lack of adequate transport infrastructure have a significant impact on the perception of the benefits of cooperation or competition. In network terms, one could formulate the thesis that the density of cooperation networks between local government units decreases with a greater distance from the metropolis. Considering that the assessment of the benefits of competition was better in peripheral areas, the study makes an important contribution to identifying determinants of socio-economic development at the local and regional level. The research results should be attractive to all entities interested in building a cooperation network of local government units.

The problem of immature networks has been of interest to researchers for many years. The focus of the author of the third section is business networks. The research results contained in the chapter refer to the role of leadership in immature business networks. According to the researcher's intention, the presented case study may be a contribution to further research. The example of a business network, centered around a small consulting company that is a decision center, provides knowledge about leadership in the network. The developed collection of leadership expressions for the analyzed immature inter-organizational network (IIN) can be a starting point for research into other emerging business networks. At this stage of the research, the results obtained can be considered as initial implications in the field of INN research and at the same time can be considered as an important research contribution.

The last subsection in this part is theoretical. Based on literature studies, the author analyzed network theory and complexity theory in relation to organizational and management sciences. The researcher's original contribution is to consider the intra-organizational network as a socio-technical system. The complexity and dynamics characterized by self-organizing mechanisms and adaptation to new operating conditions were examined. A unique aspect of the research is also the combination of network theory and complexity theory in organizational research. As a consequence of the analyzes, new research questions were formulated regarding other possibilities of using methods and techniques of network analysis in identifying adaptive systems and verifying problems in the field of organization and management.

Measuring the effectiveness of inter-organizational networks in the public sphere

***Beata Barczak*[1]**

Abstract

The theoretical aim of the article is to define the concept of inter-organizational networks in the public sphere, as well as to review and critically evaluate research and concepts to measure such networks. The methodical aim is to present the author's method of the assessment of the effectiveness of inter-organizational networks in the public sphere. The practical goal is the presentation of research results. The research starting point was a general model of inter-organizational networks in the public sphere performance assessment. In particular, the researcher applied an aggregate assessment method, the essence of which is to determine the synthetic value of the organizational process and the process of organization functioning, based on merging single assessment criteria. Interpretation and data presentation were prepared with the use of categorization, scoring and ranking methods. The result of the research is the development of a multicriteria model for measuring the effectiveness of inter-organizational networks in the public sphere. The practical usefulness of the proposed methodology is connected with the possibility of using it to measure the effectiveness of inter-organizational networks in the public sphere, which may allow for easier assessment of their credibility by business partners and financial institutions. A study of the literature indicates there is a certain shortage of comprehensive research into the effectiveness of inter-organizational networks in the public sphere, as well as a lack of instruments to measure this effectiveness. Despite the existence of many efficiency assessment methods, constructed based on different approaches, these issues are still valid. The article also suggests further research opportunities in this field.

Keywords: *inter-organizational networks, public sphere, effects of cooperation, efficiency, evaluation criteria.*

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1. Introduction

Achieving efficiency by organizations increasingly means moving away from acting alone, in favor of undertaking activities jointly with other organizations, often within inter-organizational networks. A review of the literature indicates that, although the issue of the network is heavily exposed in it, as yet relatively little research has been devoted to measuring the efficiency of networks. The topic of inter-organizational cooperation is mainly undertaken on the basis of business organizations (Niemczyk, StańczykHugiet, & Jasiński, 2012; Czakon, 2012; 2017; Dyduch, 2010), while the issue of cooperation between entities operating in the public and social sectors in Polish conditions is significantly less common. The previous theoretical and research works usually address fragmentary problems connected with the effectiveness of inter-organizational structures in the public sphere. There are a few studies (Austen, 2014; Barczak, 2016), in which a comprehensive and coherent methodological concept is presented allowing for the assessment of the effectiveness of inter-organizational networks (including those operating in the public sphere), as well as the continuing scarcity of instruments measuring it. Although there are numerous available performance assessment methods, developed on the basis of different approaches, this matter is still valid. There is, therefore, a need to test the effectiveness of inter-organizational network structures operating in the public sphere, both in theoretical and empirical terms,

The basic thesis of the article is the statement that it is beneficial to apply a multi-aspect approach, both to measure the effectiveness of inter-organizational networks and to explain the phenomena of cooperation and competition that take place in them.

The theoretical objective of the article is to develop the concept of analysis and assessment of inter-organizational networks in the public sphere, to indicate the features of such networks, and to review and critically evaluate research, concepts, and approaches to measure their effectiveness. A review and systematic arrangement of the literature on the subject to define the criteria for assessing the effectiveness of such networks have identified gaps in the measurement of their effects so far. The methodical objective of the article is to present the author's method (model) of the assessment of the effectiveness of inter-organizational networks operating in the public sphere, with the indication of criteria and benchmarks. The practical objective is to implement the developed model and present the results of empirical research. The research was aimed at assessing the level of effectiveness of the examined partnerships at the network level.

The starting point for the research was the general model for assessing the effectiveness of inter-organizational networks in the public sphere. In particular,

a multi-criteria aggregate assessment was used, the essence of which is to determine the synthetic value of the organizational status and functioning of the organization, based on the integration of individual assessment criteria into one whole. Criteria and standards for assessing the effectiveness of inter-organizational networks in the public sphere were developed. Interpretation and presentation of data were carried out using categorization, scoring, and ranking methods.

2. Measuring the effectiveness of inter-organizational networks in the public sphere as presented by the references on the subject

The subject of analysis in this article is the effectiveness of inter-organizational networks in the public sphere. There are many different definitions of inter-organizational networks emphasizing different forms of relations between network participants, emphasizing the way they are connected and the level of their autonomy. The specificity of inter-organizational networks in the public sphere is mainly due to the fact that they consist of *non-profit* and *for-profit* organizations, and their public interest is their area of activity. An important role is played by additional legal, procedural and political relationships that may limit the network's ability to act flexibly, including creation, development, or resolution. The indicated aspects appear in most of the definitions of inter-organizational networks in the public sphere (O'Toole, 1997; Agranoff, 2008; Herranz, 2009). The article focuses on inter-organizational networks operating in the public sphere, understood as a group of three or more public, social or commercial organizations that are interdependent and make decisions about joint activities on an equal basis, where the network facilitates interaction between partners and exchange of resources, which allows them to achieve goals related to acting in the public interest. Therefore, the object of the research is an inter-organizational network whose aim is to work in the field of solving important social problems.

The lack of a commonly accepted definition of effectiveness means that researchers assessing the efficiency of the network often use single measures of effectiveness, and managers usually have a problem with assessing the practices of the network or, finally, their results. Effectiveness in general terms refers to the assessment of the effects of an action in the context of resources consumed in its course. In most scientific studies, both general-cognitive and specialist in various fields of economics, efficiency is usually defined as the relationship between two components: effects and inputs. In science, the concept of efficiency, which is given the meaning of praxeological efficiency, is commonly used for organization and management. The main promoters of this approach were Kotarbiński, Zieleniewski, and Krzyżanowski. The efficiency assessment,

in this case, boils down to the assessment of the degree of implementation of the adopted organizational goals. In the context of further deliberations, it seems advisable to refer to praxeological efficiency, the measures of which are efficacy, economy, and advantage (Kotarbiński, 1973). These three measures of efficiency contain more detailed criteria for assessing the effectiveness of inter-organizational networks. The efficiency of collective action, in contrast to the individual, has a common basic dimension: the synergy effect, whereby the collective action (network) is justified only in that its efficiency, economy or advantage is higher for the community than if it resulted from a simple sum of these three criteria for each of the bodies of collective action.

While reviewing the studies on network effectiveness, it can be stated that the concept itself is rarely defined as more often the authors refer to the concept of network effectiveness by indicating the measures that can be used to assess it. The most commonly cited is the definition formulated by Provan and Kenis (2008, p. 230), according to which the efficiency of the network means "*achieving positive results at the level of the network that could not be achieved if the organizations acted independently*." In other words, networks should be assessed as carriers of services that provide value to the local community in a way that could not be achieved without coordinating the activities of different organizations (Provan & Milward, 1995). Although, of course, the benefits of partner organizations are not excluded, herein efficiency is referred to the level of the network. The article defines the efficiency of the network as achieving positive results that could not be achieved if the organizations operated independently, but the results are visible both for the organizations forming the network and for the local community.

The article assumes that the assessment of the effectiveness of inter-organizational networks in the public sphere should be based on measures/criteria of efficiency relating to achieving the organization's goals in general, as part of a coherent efficiency system. The nature of non-profit and public organizations requires an approach that will capture many aspects of the activity (Forbes, 1998; Herman & Renz, 1999; Ostroff & Schmitt, 1993). Therefore, one can point to the high usefulness of Quinn and Rohrbaugh's (1983) proposals and their model of competing values, which takes into account the multifaceted nature of the efficiency construct. The model of competing values allows one to capture efficiency using different criteria.

Various approaches and concepts can be found in the literature that relate to the measurement of inter-organizational networks. A structural approach is suggested (Granovetter, 1985; Rowley, Benson, & Warner, 2004), a qualitative approach (Gomes-Casseres, 2003), an approach related to the repeatability of established relationships, an approach to diversity of resources, an approach on the impact of resources on an organization for its results (Dyer, 1997). It is

also advisable to cite selected concepts relating to measuring the effectiveness of inter-organizational networks in the public sphere.

One of the most cited concepts is the proposition of Provan and Milward (2001), in which the effectiveness should be measured at three levels: community, network and organization/participant. The authors indicate the stakeholders (and their goals) and the applicable performance criteria (Table 1.1).

Table 1.1. Criteria for assessing the effectiveness of inter-organizational networks in terms of Provan and Milward

Criteria for assessing the effectiveness of network structures		
Community level	**Network level**	**Organization/participant level**
community cost; building social capital; perception of solving the problem;	increase in the number of network participants; the range of services provided; no duplication of services; relationship strength; establishment of a network management unit; integration/coordination of services; the cost of maintaining the network; involvement of members in the network's goals;	network survival; increased legitimacy; acquiring resources; the cost of services; access to services; customer benefits.

Source: development based on Provan & Milward (2001).

A similar concept is proposed by Mandell and Keast (2008), who point out three levels on which the assessment of network effectiveness should be made: the environment, organization, and operations. The level of the environment is related to the influence of the external environment, social, economic and political forces and external stakeholders. At the same time, an assessment is made concerning to what extent the environment provides the resources needed to act, support and legitimize the activities. The level of organization refers to structural characteristics, such as problem orientation, commitment to achieving goals, intensity of connections, complexity of the goal and the scope of efforts. The operation level describes the interactions that take place among the network participants.

Other researchers propose assessing the obtained results (i.e., production), process implementation and talent development (Voets, Dooren, & van Rynck, 2008). The first assessment refers to measuring production efficiency. The authors indicate the costs associated with achieving the goals of the network, where the obvious measure may be the cost per unit or the expenditure per unit of production. The second assessment refers to such issues as responsibility, legitimization of action and consensus in action

reflected in the contract or cooperation agreement. This assessment means incurring costs associated with organizing meetings, preparing materials, and conducting evaluation of activities. The last assessment is related to the organizational and relational infrastructure and refers to building the ability to operate. It is evaluated by the number of members, the durability of the network and the quality of the relationship.

The quoted concepts for measuring inter-organizational networks in the public sphere are theoretical proposals, poorly verified in empirical research. Their common feature is that they are multidimensional approaches that relate to different levels of effectiveness measurement. Analysis of the presented approaches leads to the conclusion that they still do not disperse numerous doubts related to measuring the effectiveness of inter-organizational networks in the public sphere. For example, the applicability of individual approaches, levels or indicators depending on the characteristics of the network's operation is unclear. Doubts may also arise from the selection of assessment criteria, omitting in these cases aspects related to knowledge management, organization learning, and innovation.

The literature also deals with other issues related to the selection of a system for assessing the effectiveness of network structures (Austen, 2014):

- whether the network was created voluntarily or mandated top-down;
- the method of managing the organizational network;
- network life cycle.

The results of research by van Raaij (2006) show, for example, that to evaluate the effectiveness of voluntarily created networks (organizations independently decide to participate in the network), criteria such as legitimacy, ability to continue to operate the network, balance between achieving one's own interests and acting on things of the network may become useful. On the other hand, for networks created top-down (e.g., the network developed by public administration or scientific unit) the wrong criterion may be the issue of self-activation (Kenis & Provan, 2009).

Also, Kenis and Provan point to the form of network governance as a factor differentiating the choice of criteria and measures to measure network effectiveness. The authors distinguish three forms of network management:

- networks created voluntarily, in which the organizations forming the network make decisions jointly and manage operations within the network;
- one of the organizations forming the network performs managerial functions;
- units separated from the structure, dealing with management and coordination of operations performed by the network.

Each form, due to its characteristics, determines the suitability of the efficiency assessment criteria. For example, performance may not be appropriate for the first form where there is joint management, and the expectation of a high level of cooperation may not be appropriate when there is a leading organization (Kenis & Provan, 2009).

The last of these issues is the phase in the network life cycle. For example, Sydow's proposal (2004) can be cited, according to which the development of the network occurs in four stages: formation of the network, its legitimization, stabilization, and development. Due to the occurrence of the above stages, the effects that are achieved by the network also differ in time. Therefore, some criteria will not be appropriate for networks at certain stages of development. For example, newly emerging networks do not yet achieve their goals in terms of social effects. Thus, it will be more reasonable to assess standards reflecting the intentions of the network and to engage in building relationships, trust, and norms. On the other hand, mature networks should have effects at the network level, such as well-developed cooperation and clear management rules. In this case, network effectiveness can be measured by referring to the commitment to achieving goals, linking to other networks, and shadowing relationships (Zbierowski, 2017; Mandel & Keast, 2008).

Consolidating the above considerations, it should be emphasized that research approaches and concepts presented in the literature referring to measuring the effectiveness of inter-organizational networks (operating in the public sphere) are diverse, but their common feature is multidimensional and sometimes multi-level (multi-level) recognition of this issue. The dominating logic in multi-level research is that the wider context within which downstream processes are nested has a stronger downward impact while lower-tier variables exert weaker upward impact (Hitt, Beamish, Jackson, & Mathieu, 2007). It is difficult to indicate the best approach to measuring organizational effectiveness. In this respect, opinions differ. For example, Boyne (2002), assessing the measures used by British local government, indicates that the reports omit such dimensions of effectiveness as equality and response to customer needs. There may also be a tendency to disrupt (overestimate) the reported quantities, which makes the use of objective measures completely questionable (Austen, 2014; Bohte & Meier, 2000; Hood, 2006). Brewer (2006) emphasizes outright that all measures of effectiveness are subjective because they are socially constructed, therefore perceptual measures may have an advantage over other types of measures since they are based on the knowledge of those who know the organization best, that is its employees (including managers). Importantly, there is evidence that perceptual measures are positively correlated with objective measures of results (Brewer, 2005). Therefore, one may attempt to state that despite increasing theoretical and

empirical studies on the subject, research on network effectiveness is fraught with certain shortcomings: the concept of network effectiveness is poorly defined and under-operationalized, with few measures used in surveys, and often without explaining what exactly they measure (Kenis & Provan, 2009). The next part of the article presents a multidimensional concept of measuring the effectiveness of inter-organizational networks in the public sphere and the results of empirical research.

3. Research and methods. Assessment model of the effectiveness of inter-organizational networks in the public sphere – a proposal.

The research concept is based on a multi-aspect approach to the effectiveness of inter-organizational networks typical of public management and the phenomena of cooperation and competition that develop in networks. The basic thesis of the article is the statement that it is beneficial to apply a multi-aspect approach both to measure the effectiveness of inter-organizational networks and to explain the phenomena of cooperation and competition that take place in them. Thus, the basic (general) objective of the research is multi-criteria assessment of inter-organizational network performance, carried out in seven performance assessments: (1) economic, (2) organizational (structural), (3) cooperation, (4) competition, (5) knowledge management and organizational learning, (6) innovation, and (7) social.

The object of the research was local partnerships operating throughout Poland, whose objective is to attempt to solve important social problems. The area of operation of these networks is related to the implementation of social services intended for the general public. Partnership is commonly understood as related activities of organizations originating in various sectors, usually directed at providing social services in the local environment. Most often, this term refers to the cooperation between various partners who cooperate in a systematic, sustainable manner and use innovative methods and means to plan, design, implement and execute specific activities and initiatives focused on developing a local socio-economic environment and building a local identity among members of a given community (Sobolewski, 2007). Local partnerships are based on cooperation between the NGO sector, the public administration sector, and private enterprises. The object of the research was studying only partnerships that include at least three organizations. Such a selection of the sample was dictated by the desire to obtain information on wider relationships than the dyad. Data from 49 partnerships were analyzed. Local partnerships surveyed often did not have a formal character and were concluded in order to implement individual EU projects.

The general objective was achieved by implementing the following specific objectives:

- assessment of performance of the researched partnerships using the selected criteria (synthetic and partial) and the patterns of assessment divided into generic groups;
- categorization of the researched partnerships (classification of individual groups to the categories indicating the gradation of the validity of the calculated efficiency index).

Multi-criteria aggregate assessment, which takes into account the established patterns and assessment criteria was used to assess the researched partnerships' performance. In the case at hand, the aggregate assessment is a part of the methodology of diagnostic analysis focused on examination of cluster effectiveness (performance). In this case, multi-criteria assessment focused on transforming values of the original features so they could be standardized (Szwabowski & Deszcz, 2001). The standardized values of diagnostic variables may be subjected to the aggregation process, which results in obtaining a synthetic (aggregate) variable characterizing each object from the point of the assessed complex phenomenon. Knowledge of subject assessments makes it possible to construct their ranking, i.e. a system in which the objects are sorted from best to worst due to their synthetic variable value (Kukuła, 2000; Jędrzejczyk, Kukuła, Skrzypek, & Walkosz, 2011). According to Stabryła (2011), the essence of the aggregate assessment is to determine the synthetic value of the organizational status and functioning of the organization on the basis of merging the individual assessment criteria into one. This process constitutes a derivative of the multifaceted approach, as to merge different comparative aspects (dimensions, perspectives) into one whole, it is necessary to indicate the appropriate assessment criteria.

The general schema for assessing the effectiveness of inter-organizational networks in the public sphere determines the cycle of the research process appropriate for analytical, comparative, design and implementation research, etc. The cycle of the research process appropriate for the methodology for assessing the effectiveness of inter-organizational networks in the public sphere can be summarized in the following stages (Barczak, 2016):

1) Identification of public networks as the research subject.
2) Defining the purpose of the study and determining the research assumptions.
3) Registration and developing the characteristics of the object of study.
4) Formulation of the assessment criteria.
5) Developing the assessment standards.
6) Conducting the nominative and checking assessment.
7) Formulating the diagnostic findings and conducting a causal analysis, and comparative, dynamic and spatial studies.

The research also used methodologies and indicators used in network analysis (Scott, 2017). It is particularly important from the point of view of the adopted methodology to set criteria and assessment standards. The assessment criteria are the characteristics or parameters of an axiological (evaluative) nature. The structure of the assessment criteria should be diverse while the complementarity of individual criteria should also be observed. Systemic and quantitative selections of the evaluation criteria are made on the basis of the two steps of the research procedure (Stabryła, 2009):

- first is the selection of the assessment criteria. It involves the division of criteria into a) relevant, b) incidental and therefore not important or irrelevant;
- division of the relevant assessment criteria into generic groups (this step expresses the essence of determining the structure of the assessment criteria).

In this case, the selection of the criteria is determined by the object of the study. Determination of the values of the individual criteria was performed through assigning them the properly selected range of questions in the questionnaire used in the study. The reference values, which in this case have the stimulant and dominant character, have been adopted for particular assessment criteria. The assessment model is thus perceived as a set of assessment criteria forming a certain aggregate, which is a multi-criteria evaluative system. The list of criteria and assessment standards in particular dimensions (generic groups) is presented in Table 1.2.

Subsequently, the ranks of assessment criteria were established. The ranks were assigned to the individual assessment criteria on the basis of the three-point scale: 3 points – the dominant criteria, 2 points – the essential criteria, 1 point – the useful criteria. The method of expert reviews was used to conduct the qualification of the assessment criteria. The expert opinions are, in this case, the resultant of their own sectional opinions based on the preferential aspects (Stabryła, 2009). The group of experts consisted of coordinators of the studied partnerships (5) and external experts (10).

In the course of the research proceedings, the following methods were used for the interpretation and presentation of data: categorization, scoring, and ranking.

Table 1.2. The set of criteria used for multicriterial aggregate assessment of the studied networks

Synthetic criteria	Expert ranking	Partial criteria	Patterns
		Economic assessment	
K1. Acquisition of financial measures (funds, grants)	3	1. Employee qualifications 2. Fund acquisition barriers 3. System of information flow 4. Control system	1. Top-level employee qualifications 2. No barriers 3. Efficient information flow 4. Effective control system
		Structural assessment	
K2. Objectives and tasks	2	1. compatibility of objectives and operational conditions 2. legitimacy of objectives 3. completeness of objectives 4. level of meeting the objectives 5. adequacy of resources to objectives and tasks	1. the objectives are adjusted to the expectations of the environment and operational conditions 2. the objectives are adjusted to the adopted strategy 3. a complete set of objectives and tasks from the point of view of the conducted operation 4. assessment of the actual implementation of the objectives and tasks (no reservations) 5. there are no cases of failure to implement objectives or tasks due to the lack of resources
K3. Flexibility (dynamics)	1	1. frequency of system reconfiguration 2. variability in the number of network relationships in the time interval	1. there are high standard deviation values indicating a large numeric variability of the system in the specific period of time 2. there is high variability in the number of network relationships in the time interval
K4. Coordination	2	1. number of coordinating centers 2. circulation of coordination activities or the lack thereof 3. change of coordinating centers 4. number of connections generated by the coordination centers	1. number of centers initiating relationships is approaching n (the number of network participants) 2. there is a large circulation of authorizations in the network coordination 3. there are changes of coordination centers (changes in authorizations to coordinate) 4. there is a considerable number of relationships generated by the coordination centers
K5. Cohesion	1	1. presence or absence of communication gaps causing that the information or knowledge does not reach the individual network nodes 2. number of connections between the nodes 3. strength and nature of relationships between the entities 4. relations between active and inactive relationships	1. there are no communication gaps that prevent the information or knowledge reaching the individual network nodes 2. there is a maximum number of inter-nodal connections 3. there are relatively strong, direct, intense, frequent, and positive relations between the entities; the connections are of the permanent nature 4. at a given moment, there is a large number of entities active within the network, which exceeds the number of inactive entities
K6. Network potential	2	1. access to the disseminated resources 2. level of diversity of the units forming the network 3. usefulness of the information systems, 4. accumulation of the network resources	1. network entities have access to the sources of information held by other entities 2. there is a low or extremely high variety of network entities 3. the organization supports the following tasks with information systems: development of a new product or service, administrative services, internal communications, information processing, customer service and assistance 4. there are direct relationships formed as a result of cooperation between the company and customers, suppliers and cooperating partners
K7. Formalization	2	1. scope of formalization	1. each entity has a full set of organizational documents, a manner and a detailed description of the principles and the scopes of activities comprise the complexity of tasks

Synthetic criteria	Expert ranking	Partial criteria	Patterns
		Cooperation assessment	
K.8. Interactions based on trust and reciprocity	3	1. index of mutual benefits	1. The reciprocity index (WZ) defining the balance between the benefits provided and received by the enterprise is indicative of the following types of behavior: $WZ = \sum_{j=1}^{N} KD_{ij} + \sum_{j=1}^{N} KO_{ji}$ N – number of cooperating entities involved *KDij* – benefits provided by the entity p*i* *KOji* – benefits received by the entity WZ<0 egoistic behavior WZ=0 neutral behavior WZ>0 altruistic behavior
K. 9.Interdependence of entities in the implementation of tasks	2	1. level of dependence on a third party	1. there is a creation of privileged links with other enterprises 2. the level of dependence of companies in terms of products, services, raw materials resources and competences decreases compared to the pre-cooperation period
		Competition assessment	
K.10. Interactions based on the bargaining power:	3	1. own benefits	own benefit index KWii > 0 $(KWii) = \sum_{l=1}^{L} KzWZ_{ii}(z_{ii}) + \sum_{m=1}^{M} ZKzWZ_{ii}(z_{im})$ KzWzii – own benefits for the entity pi, independent ZKzWZii – benefits from tasks dependent on the entit L – the number of independent tasks implemented by t entity pi M – the total number of dependent tasks implemented the entity pi pi –the entity implementing the tasks zi and zm
K. 11. Independence of entities in the implementation of tasks	2	1. level of dependence on a third party	1. no privileged links with other enterprises 2. the level of dependence of companies in terms of products, services, raw materials resources and competences decreases compared to the pre-cooperation period
		Knowledge management and organizational learning assessment	
K12. Sharing knowledge	2	1. sharing knowledge with co-operators 2. sharing knowledge within the network 3. barriers of knowledge sharing	1. most of the network entities create common bases with co-operators 2. The network entities significantly acquire from the co-operators information neces for improving their operations 3. the entities assess positively the mutual exchange of information 4. the knowledge is collected and properly disseminated 5. there is no competition among employees

Synthetic criteria	Expert ranking	Partial criteria	Patterns
Knowledge management and organizational learning assessment			
K13. Solving problems in a team	2	1. mutual contacts and use of competent staff in a particular field 2. barriers impeding the use and exchange of the knowledge among employees 3. participation in the design works and quality circles 4. rewarding the results of the group work	1. there is the possibility of mutual contact and assistance 2. there are no barriers to using and exchanging the knowledge among employees 3. there is no competition, the results of the group work preferable to the results of the individual work 4. employees are encouraged to solve problems collectively and share ideas 5. employees can participate in projects 6. results of the group works are rewarded
K14. Internal communication	2	1. knowledge of the information sources 2. barriers to the information exchange 3. effectiveness of communications 4. informal information channels	1. employees know where to find the specific information sources 2. there are no barriers to prevent using and exchanging information 3. there are skills at the network level, which can be used both by the sender and by the recipient 4. informal circulation of information is controlled through maintaining open communication channels and rapid response to false information
Innovation assessment			
K15. Research and development works	1	1. changes in the scope of a business strategy 2. organizational and technical innovations 3. introduction or improvement of a product/process	Network: 1. implemented a new or significantly revised strategy 2. introduced at least one organizational or technical innovation 3. introduced or significantly improved a product/service/process
K16. Development cooperation	1	1. cooperation with science and research institutions 2. cooperation with customers and suppliers 3. seminars and scientific conferences	1. network organizations cooperate with scientific and research institutions 2. network entities undertake cooperation with customers and suppliers 3. network entities participate in seminars and scientific conferences
Social assessment			
K17. Social commitment	3	1. funds allocated for social investments 2. projects received from the social organizations/the number of the projects completed 3. financial subsidies of a charity nature as the percentage of gross profit 4. creating jobs	Network: 1. allocates the financial resources to social investments 2. implements the projects from social organizations 3. subsidizes charitable activities 4. creates new jobs
K18. Development of employee potential and interpersonal relationships	2	1. level of trust 2. ability of interpersonal cooperation 3. rewarding activities affecting employee development 4. occurrence of the task teams 5. development of professional career paths 6. participation in management 7. implementation of the competence development program	1. there is a high level of trust in the interpersonal relations in the network 2. there is the ability to cooperate 3. activities affecting the development of employees are rewarded 4. task teams are present 5. professional career paths are developed 6. there is participation in management 7. the competence development program is implemented

4. Conducting the research and result from analysis

The research was aimed at performing a control assessment which indicated the extent to which a given entity respects the established requirements (expressed by the patterns of performance assessment). The formula for the verifying assessment is expressed by the relationship of the actual state of the model (the model state) or is an equivalent reference of the actual state to the appropriate level of assessment on the evaluative scale. In order to carry out the verifying assessment, the standardized five-point assessment was adopted.[2]

For each network examined, the efficiency index (*EI*) value was determined according to the following formula:

$$IE_i = \sum_{i=1}^{n} w_i \;\; q_{ij} \tag{1}$$

where:

w_j – rank of the j-th assessment criterion,
q_{ij} – point verifying assessment in relation to the i-th network,
i =1,…, m – network,
j =1,…, n – assessment criteria.

Subsequently, the *EI* index was categorized, i.e. the value of the *EI* point qualification index was translated to the specific category. The process was carried out according to the following stages:

1) Building a value-based scale.
   In this procedure, the upper limit of the range N was adopted, which corresponds to the relative value of 100%. Subsequently, the verifying assessment was carried out, in which the standardized five-point 0-4 assessment was adopted, determining the conversion factors for the verifying assessment. The maximum weighed point value of the efficiency index is 144. This value could have been achieved by the partnership if it received value 4 for each of the 20 assessment criteria.
2) Determination of hierarchical intervals on the value-based scale. For the *EI* index, the hierarchical intervals, which are the boundaries of qualification levels, were determined. These ranges correspond to the specific categories indicating the validity gradation of the index (Table 1.3).

2 In order to carry out the evaluation, tables of calculators were prepared, specifying the level characteristics of each of the criteria on a five-point scale (0-5)

Table 1.3. Hierarchical ranges of the *EI* index

Category	Scoring
E – network with a high-efficiency index (the value of the EI index higher than 80% of the maximum value)	115-144
EA – network with a satisfactory efficiency index (the value of the EI index within the range of 61-80% of the maximum value)	91-114
EB – network with an average efficiency index (the value of the EI index within the range of 40-60% of the maximum value)	58-90
EC – a network with a low-efficiency index (the value of the EI index from 40% of the maximum value)	0-57

3) Designation of the partnership category (stage closing the categorization). At this stage, calculation of the *EI* index for each i-th partnership was performed with the assigning of the particular category thereto. Table 1.4 shows the number of partnerships assigned to the appropriate categories.

Table 1.4. Number of the distinguished partnership categories in the study of the *EI* index

Category	EI index value[3]	Number of partnerships
E	115-144	-
EA	91-114	17
EB	58-90	23
EC	0-57	-

The research demonstrated that methods of achieving high performance among the researched partnerships are characterized by an average or satisfactory level of flexibility, innovativeness, knowledge management, pro-activeness, and, finally, social commitment in the researched clusters. When analyzing Table 1.4, what is noticeable is that none of the studied partnerships was qualified as category E meaning a network of high-efficiency index, or category EC meaning a network of low-efficiency index. The largest number of partnerships (23) are networks of an average efficiency index, whereas the EA category (satisfactory level) included 17 partnerships.

The vast majority of the partnerships studied represent poorly formalized networks, often concluded for the implementation of individual EU projects. A small degree of professionalization of management was also a feature of the studied networks. Most often these were partnerships between public

3 The value of the IE index for each tested partnership was determined according to the formula (1), i.e. by multiplying the rank of the j -th criterion of the assessment (expert assessment based on a three-point scale) by the spot evaluation verifying the i-th network. Due to the limited scope of the research, the article does not present the rank values for individual criteria set by experts or the table of calculators determining the level characteristics of each criterion in a five-point scale (0-5).

and NGOs, consisting of several organizations, less often from a dozen or so entities. The basis for the operation of most partnerships was the signing of commitment declarations, instead of a formal agreement between the partners, which should be considered a barrier to achieving the desired effectiveness. The indicated features probably arise from the fact that in the Polish situation, the idea of partnerships has been used for a short time and it is difficult to talk about its universality and advancement. Most of the structural characteristics of the analyzed networks are typical for poorly formalized networks.

When it comes to obtaining external funds, the analyzed networks showed considerable efficiency and great determination. When assessing the level of orientation on competition and cooperation, notably, the phenomena associated with cooperation carry more weight than those that are specific to competition. It can, therefore, be concluded that the strategy of the partner (coopetition relations) is implemented in the strategy dimension at the level of the network. The biggest contradictions of the analyzed organizations showed in the preferred position in relation to partners (independence v interdependence), as well as the principles of cooperation (contract v relationships), as well as bargaining power v trust and reciprocity. We can conclude therefore that the desired strategy is a strategy to strengthen the skills of participants in reconciling the paradox of cooperation and competition.

From the point of view of the analyzed criteria, the perspective of knowledge management and sharing was of significant importance for the effectiveness of the partnerships studied. The inter-organizational network requires the involvement of various entities, and the success of its operation depends not only on the participants constituting it but also on the support of local entities and citizens. From a formal point of view, the boundaries of partnership can (and usually are) strictly defined, while from the point of view of knowledge management and relationship building, they blur. To activate knowledge, it is necessary to go beyond the network (Carlile, 2002). Citizens (and more broadly, the local community) are both clients of the network, located outside the formal boundaries of the partnership, and at the same time its entities from the point of view of building partnership knowledge. In the social dimension, the large involvement of participants in the studied networks is worth emphasizing. This is very much in line with the very idea of creating such partnerships and achieving their overarching goals.

Measuring the effectiveness of public networks in practice is associated with some restrictions. Importantly, the achieved results are neither final nor universal. Due to the high complexity of the model, the presented studies did not take into account the multi-level approach in network efficiency research. In this case, efficiency is analyzed at the level of the network. It would be advisable to develop a model that would also consider the level of network

environment (community, external stakeholders and the level of organization and unit, with simultaneous indication of the relationship between them) (Austen, 2014). There is also a problem whether the entire network or only the results of individual member entities should be analyzed. The latter seems particularly important, considering the fact that, for example, analyzing the whole network may be difficult (and sometimes even impossible), because networks often do not constitute a separate entity in the legal sense.

5. Conclusion with theoretical and practical implications

Assuming that the assessment of the effectiveness of inter-organizational networks operating in the public sphere requires a multi-faceted approach that reflects the complexity of their relationships, the author's concept of assessing the effectiveness of inter-organizational networks operating in the public sphere has been presented, with particular focus on criteria and benchmarks. This concept is a new proposal at the current stage of scientific reflection. References indicate that comprehensive research into business network performance is insufficient and there are no instruments to measure it. Practical usefulness in the development of the methodological proposal is connected with the possibility of using the proposed concept in the assessment of various types of inter-organizational networks operating in the public sphere, which will allow formulating diagnostic findings and causal analysis, as well as comparative, dynamic and spatial research in the analysis of inter-organizational networks.

Based on the research and analyzes carried out, the implications for theory and practice can be formulated. The implications for theory concern the following issues:

- the analysis allowed us to present a research tool that treats the effectiveness of the network in a multi-aspect approach. A set of measures allowing for a comprehensive assessment of the results achieved by inter-organizational networks operating in the public sphere was presented. When assessing the effectiveness, in addition to the material effects of the network, it is also necessary to include effects that are intangible (Mandell & Keast 2008);
- the said research, therefore, indicates the need for a complementary study of the impact of cooperation and competition phenomena on the effectiveness of inter-organizational networks. The simultaneous application of orientation and competition to the cooperation of partners in the network positively affects its results, which indicates the importance of coopetition strategies for the organization's success.

When formulating practical conclusions, the following should be emphasized:

- the fact of the benefits of measuring the effects of activities is not in doubt in itself, but the practice shows that with a low level of formalization of partnerships, the results achieved are rarely assessed and the measures used do not bring much to their effectiveness;
- the problem may be choosing a set of measures that can be useful in assessing the effectiveness of the network. The proposed criteria make use of the perception of network participants (partners), which makes them applicable even in the absence of objective data;
- assessment of the inter-organizational networks operating in the public sphere may make it easier for business partners and financial institutions to assess its credibility. Furthermore, the assessment may facilitate a decision on joining the network and answer the question when it is the right choice to join the network and when it could be an obstacle to conducting development operations;
- network efficiency assessment may vary among stakeholder groups, which means that network performance may be assessed differently by different groups and that other types of measures are important to them;
- research has shown that the simultaneous occurrence of cooperation and competition positively affects the efficiency of the network. In other words, it is beneficial if the partners are both focused on achieving the goals of their own organizations and able to achieve common goals.

In the current research, we point out the discrepancy between theory and practice in the area of public cooperation oriented on cooperation. Although inter-organizational cooperation is not a new concept in the area of the public sector, one can risk the claim that it has not yet fully reached its promising potential. However, the conclusions of the research seem to be optimistic in this respect, although it is undoubtedly necessary to undertake further research, facilitating the development of a model allowing for the assessment of the effectiveness of inter-organizational networks operating in the public sphere, as well as enriching practitioners' activities in this area.

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Benefits of competition and cooperation among local government units within Polish metropolitan areas

***Maciej Koszel*[1]**

Abstract

The aim of this paper is to identify and evaluate the significance of benefits of simultaneous competition and cooperation, which is also known as co-opetition, among local government units within Polish metropolitan areas. Own studies have covered 345 self-governments and cities in eight metropolitan areas in Poland. Responses received from 137 representatives of the highest local government unit authorities have been used for the purposes of the comparative analysis. A questionnaire survey was used to gather the empirical data. The research conducted on the problem of development of inter-municipal relations within metropolitan areas in Poland shows that the benefits of cooperation significantly outweigh the benefits of competition. Most of the municipalities and cities base their relationships on a high level of cooperation and low level of competition (partner type co-opetition). However, a higher level of socio-economic development is achieved by those units which diversify their approach by expanding the scope of co-opetition. Research results can be used by the representatives of authorities in local government units in order to form or reform the assumptions of development strategies. The co-opetition approach, as a relational strategy among local government units within Polish metropolitan areas, has been researched. Benefits of hybrid forms of shaping relations are identified, and general characteristics of co-opetition proposed. The problem of co-opetition in the public sector (local government units) has been researched for the first time in scientific literature. Further, wider and more detailed research on co-opetition issues is required.

Keywords: *competition, cooperation, co-opetition, metropolitan areas, relational resources.*

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1. Introduction

Dynamic development of metropolitan areas (MA) in Poland in the last 25 years (Zuzańska-Żyśko, 2016), as well as in the whole world (Ianuale, Schiavon, & Capobianco, 2015; Jałowiecki, 2011; Nowak, 2010), contributes to the accumulation of high quality resources: physical resources, human and organizational resources, that can be considered as a source of competitive advantage (Barney, 1990; Mierzejewska, 2010; Parysek, 2013; World Economic Forum, 2014). Nowadays, it is also believed that relational resources are relevant in that context (Witman, Hunt, & Arnett, 2009). From the point of view of local government units within metropolitan areas, relational resources are associated with socio-economic and functional relationships (Komornicki, Korcelli, Siłka, Śleszyński, & Świątek, 2013). In the case of metropolitan areas it is more desirable to establish and realize common objectives. Especially when there are rational premises, mainly connected with the problem of public utility services – tasks entrusted to local government units in Poland. (Dz.U. 1990 No 16, pos. 95) One of the possible solutions is the cooperation within metropolitan areas. It is particularly important in the case of those units which struggle with many relevant developmental problems – limitation of these problems, or even complete elimination, can become a main objective of cities and municipalities strategies as well as whole metropolitan areas. Polish law ensures different forms of cooperation between local government units while, on the other hand, particular the business of individual self-governments contributes in practice to competitive behaviour (Swianiewicz, Gendźwiłł, Krukowska, Lackowska, & Picej, 2016).

The increasing role of self-government projects, especially at a regional level, contributes to a more developed cooperation between local government units. The EU's present financial perspective focuses on regional strategies, policies and programmes – more than 40% of total funds can be potentially used by voivodeship self-government units in Poland. The most important needs are associated with the functioning of metropolitan areas – investments of both a tangible (e.g. infrastructure) and intangible character (e.g. investment in human capital). Does increasing the importance of cooperation between local government units contribute to a decrease in the importance of competition between self-governments? Own research conducted in 2016 shows that the phenomenon of co-opetition (simultaneous competition and cooperation) is common and the connections between co-opetition's approach and the level of socio-economic development (sustainable dimension) are relevant. For those units which diversify (a high level of competition and cooperation at the same time), their inter-municipal relations reach higher levels of sustainable development. This article deals with the problem of shaping inter-organizational

relationships within Polish metropolitan areas among local government units. The problem of co-opetition among self-government units, and in general in the public sector, has not been thoroughly examined in the present literature. There is a lack of research and articles that deal with the issues of co-opetition – cooperation among competitors. The issues of co-opetition are the main object of studies in the field of business management (companies' relational strategies) (Dagnino & Padula, 2002; Bouncken, Gast, Kraus, & Bogers, 2015).

The main objective of this article is to identify and evaluate the benefits of competition and cooperation among local government units within metropolitan areas in Poland. The basic question is what kind of relationship is more advantageous – competition or cooperation – in the creation of benefits for the municipalities. Representatives of local self-government authorities were asked about their opinion in this field of interests. A traditional questionnaire and CAWI was conducted on a group of 345 self-government units in eight Polish metropolitan areas (rate a return from the research=39.7%). The results obtained contribute to further research into the functioning of metropolitan areas and shaping of inter-municipal relationships among self-governments.

2. Literature background

2.1. Relations among local government units

Local government units and their authorities decide more and more often to cooperate, hence this approach is beneficial for them. Partnerships, agreements and associations are the most popular forms of cooperation that deal with common strategic objectives of whole regions – metropolitan areas (Dolnicki, 2012). The number of formal agreements increases steadily – more and more self-governments decide to collaborate with their neighbours (Porawski, 2013).

Cooperation between self-government units within metropolitan areas are conducted to achieve results that would not be feasible within the autonomous activities of individual municipalities. The characteristics of metropolitan areas show a very strong relationship within them. The integration of actions in the form of strategic programmes accelerates the socio-economic development, not only of individual municipalities, but also the whole metropolitan area. The diversity and, above all, the complementarity of functions performed by particular municipalities of the metropolitan area makes them one of the most attractive areas for: 1) the new investors and their investment (greenfield and brownfield), 2) the new residents, and 3) tourism development. Potential residents expect a relatively high standard of living (access to high quality services, high quality infrastructure, career opportunities, access to cultural

institutions, education and sports). Companies are interested in a suitable climate for running and developing their business (specialized infrastructure, absorptive markets, qualified human capital, closeness of subcontractors). Tourists, another group of metropolitan areas stakeholders, expect a high quality of touristic attractions with considerable potential (Koszel, 2016).

Awareness of the common interest of local government units within metropolitan area is crucial from the point of view of pursuing a targeted policy of shaping appropriate conditions conducive to attracting potential, new investors. This is reflected in enhancing the internal capacity of municipalities through the development and acquisition of key resources. The benefits generated by locating a new business in a municipality do not only affect the local government units but the whole region as well. Municipalities of the metropolitan area create very intense and tight relations between them. The group of participants is not limited to self-government units themselves. It is important to point out the significant role played by 1) businesses, 2) local organizations and institutions, and increasingly 3) the local community itself. The social participation of the inhabitants, expressed through their expectations of quality of life, is becoming more and more important nowadays (Koszel, 2016).

The Act on Commune Self-government (Dz. U. 1990, art. 9, No. 16, pos. 95) foresees that municipalities, in order to carry out their tasks, may conclude agreements with other organizations, including NGO's. The Act on Commune Self-government provides three basic, permanent forms of cooperation between municipalities (Kieres, 1991). These are:

- intentional communal (municipal) partnerships created for the purpose of joint performance of public tasks – performance of public services, including water supply and sewerage services, heat and power generation and distribution, waste management, public transport, (Dz.U. 1990, art. 64-73, No. 16 pos. 95);
- municipal agreements –entrusting one of the municipalities that are party to the agreement to public tasks, (Dz.U. 1998, art. 74-75, No. 91 pos. 578);
- associations of municipalities created to defend common interests, (Dz.U. 1998, art. 85, No. 91, pos. 576).

More detailed descriptions of the forms of formal cooperation self-government units are presented in Table 1.5.

Table 1.5. Forms of formal cooperation between self-government units in Poland

The level of self-government	Local self-government	County self-government	Voivodeship self-government
Local self-governemtn	Self-government partnership Municipal agreement Self-government association Commercial company Local action group Local tourist organization	Agreement with the local self-government Self-government association Commercial company Local action group Local tourist organization	Agreement on entrustment of public tasks of self-government from voivodship Self-government association Commercial company
County self-government		County partnership County agreement Self-government association Commercial company Local action group Local tourist organization	Agreement on entrustment of public tasks of self-government from voivodship Self-government association Commercial company
Voivodeship self-government			Association of self-government units Commercial company

What is worth noticing is that cooperation occurs usually at the level of local self-governments, because of the natural interdependence between municipalities as a result of location and common needs (especially in terms of the public utility services).

Competition, as an approach to shaping relationships between self-government units within metropolitan areas, can contribute to an increase in competitiveness – which can also be considered as attractiveness in the functioning of municipalities and cities (for different stakeholders). The model approach assumes an increase in competitiveness and, as a consequence, an improvement in the competitive position – the situation of the individual unit in comparison to its neighbours treated as direct competitors. This is possible thanks to the development of competitive advantages based on a set of valuable, rare, difficult to imitate and well-organized resources – sources of competitive advantage. The essence of cross-border competition is to compete for these resources, which may contribute to an improved strategic position – competitiveness in a narrow sense. It must be distinguished from competitive potential – access to valuable and rare resources is not always equivalent to their conscious use and management in the process of shaping local development.

The overall importance of competitiveness relates to the ability to succeed in economic competition (Kamerschen, McKenzie, & Nardinelli, 1991). Competitiveness of local self-government units is often identified with

competitive potential, competition strategy and competitive position of the municipality (Szałko, 2014). The challenges that arise in the economic, social, ecological and spatial dimensions contribute to this. Competitive are those local governments that have at their disposal resources needed to improve the standard of living and quality of life for inhabitants. What is also important is to provide conditions conducive to the development of entrepreneurship at various levels – both individual entrepreneurial attitudes and large-scale entrepreneurship (the sphere of activity of large enterprises) (Twardowski, 2014).

Góralski and Lazarski (2009) indicate that the term of competitiveness can be determined as a certain, desired condition that depends on the research goal. The concept can be specified or generalized. Competitiveness can be understood as the ability to participate in competition in the present and in the future. The authors present four factors that can be considered as key elements:

- quality of life of inhabitants;
- business conditions of enterprises;
- the ability to attract investors;
- the location of institutions and events of the national and international level.

Regional and local competitiveness can be divided into three main aspects:

- spatial, which takes place using the resources in which the area is equipped;
- economic and social, which takes place from the perspective of the behavior of users of resources of the region and the effects of their activities;
- organizational as a responsibility for local authorities, which has a significant impact on the quality of social life (Piotrowska-Trybuł, 2004).

Local governments compete among themselves for: 1) investors, 2) organization of significant events (cultural, sports, others), 3) external funding, 4) access to national and international infrastructure (motorways, airports), 5) other significant organizations and institutions that are likely to localize their headquarters in the municipality or finally 6) highly qualified human capital. It is desirable to own these specific resources hence they impact on the internal potential of the municipality. On the other hand, acquisition of these factors may contribute to the improvement of the current competitive position. This may effect the occurrence of the disparities within metropolitan area – among local self-governments – and the polarization of relations (central-peripheral disparities).

The region, the metropolitan area or the municipality is competitive when it can:

- generate a high level of employment, with a low unemployment rate;
- increase the labor productivity;

- improve the standard of living conditions for the community;
- succeed in economic competition – against its competitors;
- adopt to the constantly changing environmental conditions;
- absorb and generate innovations;
- create and use strategic resources (Przygocki, 2005).

The wider scope of competitiveness factors of local government units is shown in Table 1.6 – the presented results come mostly from Polish literature dealing with the problem of regional and local development.

There is a wide range of factors that local government units compete for. Such a situation can result in fierce rivalry among self-governments. It should be emphasized, however, that this rivalry concerns primarily those resources that can be characterized by a high level of mobility. An approach whereby municipalities compete and cooperate simultaneously is getting more and more attention in scientific literature (Zineldin, 2004; Bengtsson, 2010; Gnyavali & Park, 2011; Chiambaretto & Dumez, 2016; Stentoft, Mikkelsen, & Ingstrup, 2018).

Nowadays, interorganizational relation strategies are explained on the basis of theory of co-opetition (Bengtsoon & Kock, 2014). It is also possible to use its main assumptions in the field of the functioning of local government units within metropolitan areas. Co-opetition assumes a simultaneous competition and cooperation between independent organizations. The intensity of the relation, their number, spatial range and time horizon are the most important features of co-opetition (Cygler, Aluchna, Marciszewska, Witek-Hajduk, & Materna 2013). For the purposes of the thesis it is assumed that co-opetition is a commonly occurring phenomenon within metropolitan areas in Poland among local government units, but varies depending on: specific metropolitan area, type of local government unit, number of inhabitants, location.

The overriding principle of the functioning of local government units and whole metropolitan areas is their sustainable development (Mierzejewska, 2010). Sustainable development is a constitutional rule which assumes fair satisfaction of local community needs that respects the balance and harmony between economic, social, ecological and spatial orders. It is important to satisfy the needs of the current generation without the limitation of that possibility from the point of view of future generations. The assumption of balance and harmony is connected with the parity principle – realization of objectives of the sustainable development aspects cannot interfere and limit the potential of other aspects. What is more, such a development should be characterized by the durability and effectiveness of local government units as well as local community and other stakeholders. These criteria can be considered as superior in the context of evaluation of actions taken under sustainable development of self-government units and metropolitan areas (Thorz, 2009).

Table 1.6. Competitiveness factors of local government units

Factors	Examples
Location rent	proximity of international transport routes central location – high transport accessibility proximity of transport nodes – seaports, airports, railway nodes, traffic cords near the border location
Economic factors	diverse sectoral structure of the economy the level of internal and external relations between enterprises the high share of service sector in the economy entrepreneurship development foreign direct investment situation in the labor market
Demographic factors	age and sex structure population growth in the region, county, municipality
Human capital	highly qualified and educated human capital the prone to lifelong learning the knowledge and competencies
Social capital	the tendency of people to associate participation in electoral decisions in the state, region, municipality sense of local and regional ties and identity
Innovations	presence of research and development institutions and higher education institutions ability to produce and absorb innovation stakeholders relations in region
The quality of environment and the tourism development	landscape differentiation high quality of soil, water and air richness of forests, the presence of protected natural sites (valuable ecosystems) biodiversity the presence of a high standard tourism infrastructure and its use
Cultural factors	cultivating traditions, customs, beliefs
Business environment	presence of business environment institutions organizing trade fairs, especially international ones
Technical infrastructure	expansion and diversification of the transport network investments in „environmental" infrastructure (water supply, sewerage, waste water treatment plants)
Social infrastructure	efficient education system efficient service of healthcare network
Self-government activity	the tendency of associations in special purpose relationships cooperation between cities, municipalities, regions territorial marketing availability of public institutions strong leadership
National situation	economy and social situation political climate adopted model of regional policy, sectoral policies, state finances
Internatioanl factors	state obligations under contracts and membership of international organizations ability to use foreign funds level of economic internationalization

3. Methodology of conducted research

The research tool used to evaluate the benefits of competition and interregional cooperation in Polish metropolitan areas was a survey. The study was of a qualitative nature. Both the traditional survey questionnaire and the electronic questionnaire (CAWI, Computer-Assisted Web Interview) were used. The study covered representatives of the highest self-government authorities of municipalities and cities – mayors, city presidents or their deputies, or specialized organizational units dealing with strategic planning and local development. Questionnaires were sent to 345 local government units within the following Polish metropolitan areas: Gdańsk MA, Katowice MA, Kraków MA, Lódź MA, Poznań MA, Szczecin MA, Warszawa MA and Wrocław MA. The selection of units was a deliberate one – the study covered all the units in metropolitan areas in Poland.

The spatial extent of metropolitan areas was determined on the basis of the delimitation carried out by voivodeship spatial planning offices for the purposes of elaborating voivodeship spatial plans and development strategies.

The survey questionnaire comprised a total of seven question blocks covering the following issues: 1) the role of local self-government in the region, 2) the approach to resource management, 3) the formation of inter-municipal relations, 4) inter-municipal competition, 5) inter-municipal cooperation, 6) benefits of inter-municipal competition, and 7) benefits of inter-municipal cooperation. For the purpose of this article only results related to the issue of competition and cooperation benefits will be presented.

The evaluation of the benefits of competition and inter-municipal cooperation was carried out by examining the opinion of the representatives of the highest self-government authorities. The research questions used a five-step response scale, in which the variants were: 1 – I strongly disagree, 2 – I disagree, 3 – I agree 4 – I strongly agree 0 – I have no opinion. For formal reasons, only aggregate results (answers structure) are presented in the article.

A total of 137 units took part in the survey at the turn of 2015 and 2016 – the return rate was 39.71%. The highest number of municipalities that took part in the research come from Gdańsk Metropolitan Area (25 units – 18.2% of all), Poznań Metropolitan Area (25 units – 18.2% of all) and Kraków Metropolitan Area (25 units – 18.2% of all). There were 20 self-governments from Warszawa MA (14.6% of all), 13 from Łódź MA (9.5%), 11 from Szczecin MA (8.0%), 9 from Katowice MA (6.6%) and 9 from Wrocław MA (6.6%). Most of the self-governments that participated in the research represent a rural type of municipality (52.6% of total), are located in the second zone (55.5% of total) and have between 10 to 25 thousand inhabitants (32.8% of total). A detailed structure of researched units is provided in Table 1.7.

Table 1.7. Structure of researched units [%]

	Number of inhabitants						Location			Type		
	above 100 thous.	50-100 thous.	25-50 thous.	10-25 thous.	5-10 thous.	below 5 thous.	peripheral	second	central	rural	urban-rural	urban
Gdańsk	8.0	0.0	24.0	32.0	24.0	12.0	4.0	64.0	32.0	64.0	8.0	28.0
Katowice	66.7	33.3	0.0	0.0	0.0	0.0	0.0	44.4	55.6	0.0	0.0	100.0
Kraków	4.0	0.0	12.0	40.0	44.0	0.0	16.0	60.0	24.0	64.0	32.0	4.0
Łódź	7.7	7.7	7.7	23.1	53.8	0.0	15.4	61.5	23.1	53.8	23.1	23.1
Poznań	4.0	4.0	16.0	52.0	24.0	0.0	20.0	48.0	32.0	56.0	28.0	16.0
Szczecin	9.1	9.1	27.3	18.2	9.1	27.3	9.1	36.4	54.5	36.4	36.4	27.3
Warszawa	5.0	0.0	30.0	35.0	25.0	5.0	20.0	60.0	20.0	45.0	35.0	20.0
Wrocław	11.1	0.0	11.1	22.2	33.3	22.2	22.2	55.6	22.2	66.7	11.1	22.2
Total	10.2	4.4	17.5	32.8	28.5	6.6	13.9	55.5	30.7	52.6	23.4	24.1

Before the presentation of detailed results on the benefits of competition and inter-municipal cooperation, reference should be made to the identification of the types of co-opetition – simultaneous competition and cooperation between municipalities within metropolitan areas. It was decided for the purpose of the research to use assumptions made on the field of the functioning of companies and characterized in scientific literature (Lado, Boyd, & Hanlon, 1997; Luo, 2004; Cygler & others, 2013). The considerations of the authors concentrate

on the fundamental typologies based on the criteria of level of competition and cooperation. Typology established on these criteria distinguishes four types of co-opetition (to be more precise – types of "co-opetitors"): "integrator", "partner", "warrior", "solitary". Obtained results analysis shows that "partner" type was identified in 57 examples of local government units. "Partner" type of co-opetition is characterized by a low level of competition and a high level of cooperation. In the case of 55 self-government units the "integrator" type of co-opetition was identified (a high level of competition and cooperation). 16 units were identified as a "solitary" type of co-opetition (a low level of competition and cooperation), and 9 units was identified as "warrior" type of co-opetition (a high level of competition and a low level of cooperation) – Figure 1.1.

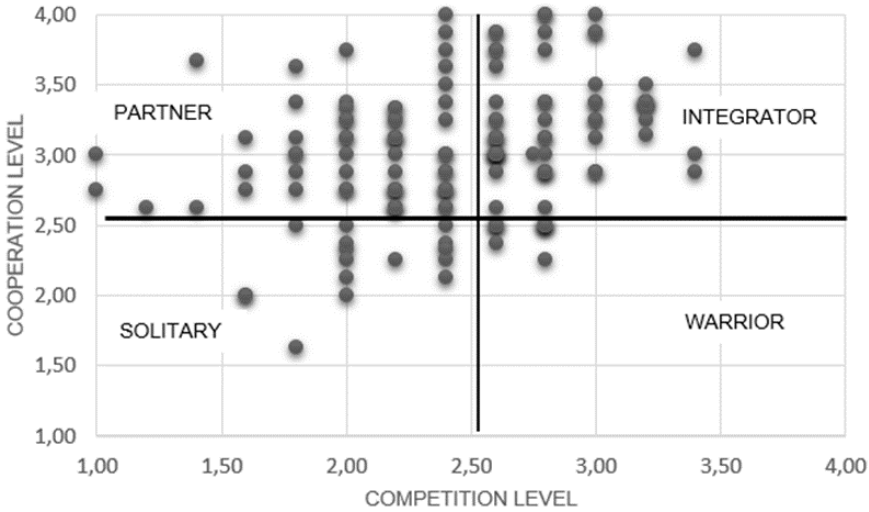

Figure 1.1. Types of co-opetition among local government units in Polish metropolitan areas

The main aim of this article was to identify and evaluate the most important benefits of both competition and cooperation among local government units within Polish metropolitan areas. On the basis of own research conducted in 2016 (Koszel, 2016) a list of benefits was identified. Competition and cooperation benefits are as follows:

- achievement of the strategic goals of the municipality;
- socio-economic development;
- increased competitiveness of the municipality;
- attraction of new investors;
- attraction of new residents;

- development of local tourism;
- improved quality of municipal services;
- improved quality of life;
- increased efficiency of the municipality.

In addition, the specific benefits for the researched approaches have been identified. In the case of competition they are:

- better strategic position;
- improved internal potential;
- protection of the valuable resources;
- increased resources.

In the case of inter-municipal cooperation, its specific benefits are:

- increased cohesion of the region;
- lower socio-economic disparities;
- lower costs of municipal activities;
- access to previously inaccessible resources.

In order to assess the benefits of cooperation and cross-border competition in Polish metropolitan areas, respondents were asked two questions, which presented the findings on the benefits – separately for the competition and cooperation. The first nine statements were identical in both cases. Subsequent statements referred to the specific benefits of competition and cooperation. There is also an open variant – "other, please specify". Because of the low number of responses in the "other, please specify" answer, these results are not included in the interpretation and discussion of the results. Figure 1.2 shows the comparative assessment of the benefits of competition and inter-municipal cooperation (same statements). The overall average for the surveyed population in all nine cases is higher for the benefits of inter-municipal cooperation. In all cases, the significance of individual benefits was indicated (mean score over 2.50 indicating that respondents "I agree" or "I strongly agree".

4. Research results

First, evaluation of common benefits for both competition and cooperation among local government units within Polish metropolitan areas will be presented and interpreted. It was decided to present the structure of answers separately for benefits of competition and cooperation. Table 1.8 presents the results (structure of answers) related to the benefits of competition, whereas Figure 1.2 consists of a graphical illustration of the results obtained.

In all of the cases (benefits indicated), local authorities representatives declared mostly agreement (between 43.1% and 62.8% of total; mean value – 56.2%) or strong agreement (between 8.8% and 24.1%; mean value – 17.5%) with the statements given.

Table 1.8. Benefits of competition – structure of results [%]

Benefit	I have no opinion	I strongly disagree	I disagree	I agree	I strongly agree
Increased resources	4.4	1.5	20.4	59.9	13.9
Protection of valuable resources	4.4	0.7	13.9	62.8	18.2
Improved internal potential	5.1	0.7	16.8	58.4	19.0
Better strategic position	4.4	1.5	14.6	59.1	20.4
Higher efficiency of municipal projects	5.1	2.2	18.2	58.4	16.1
Better life quality	10.2	2.9	19.7	49.6	17.5
Improved quality of municipal services	6.6	1.5	16.1	56.2	19.7
Development of local tourism	4.4	1.5	12.4	59.9	21.9
New inhabitants	4.4	3.6	19.0	55.5	17.5
New investors	5.1	1.5	8.0	61.3	24.1
Competitiveness	6.6	1.5	15.3	57.7	19.0
Socio-economic development	12.4	4.4	31.4	43.1	8.8
Achievement of strategic objectives	19.0	2.9	18.2	48.9	10.9

Source: own work based on own research.

However, there are slight differences among answers received – each variant. Declarations of disagreement and strong disagreement were less often chosen – mean value, respectively: 17.2% and 2.0%. What is noteworthy is that in three cases the "I have no opinion" answer exceeds the limit of 10.0%, those are benefits of: better life quality (10.2%), socio-economic development (12.4%) and achievement of strategic objectives (19.9%).

The most important benefit of competition according to the research is that it enables one to gain a better strategic position (85.4% of all answers). Competition among local government units within metropolitan areas in Poland results also in better life quality (81.8% of all answers), socio-economic development (81.0% of all answers) and an increase in the number of new investors (79.6% of all answers). Against this, the least important benefit of competition is the protectionism of valuable resources (intangible resources such as know-how for instance): only 51.8% of all respondents agree or strongly agree with such a statement and 31.4% of all disagree (the highest value).

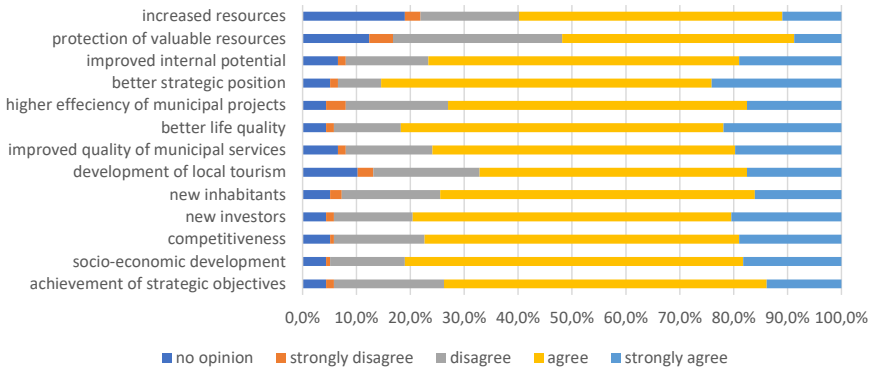

Figure 1.2. Benefits of competition among local government units within Polish metropolitan areas – structure of answers [%]

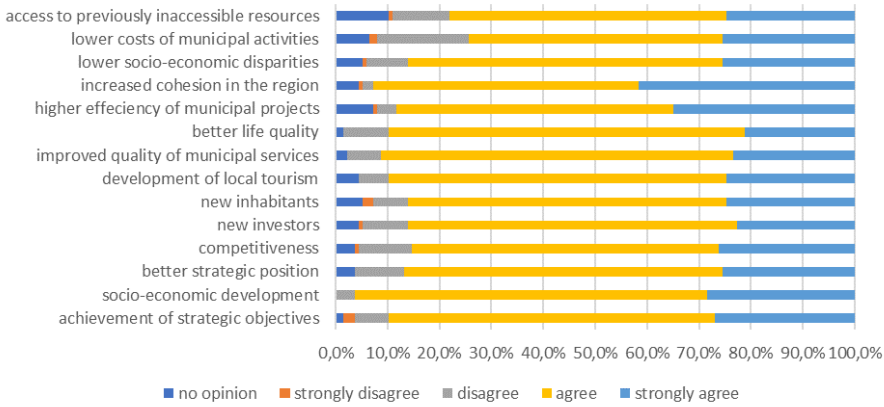

Figure 1.3. Benefits of cooperation among local government units within Polish metropolitan areas – structure of answers

Table 1.9 presents the structure of answers related to the benefits of cooperation. Local authority representatives were asked if they agree/disagree with specific statements, it was also possible to have no opinion as in the previous case. Figure 1.3 stands for a graphic visualization of the obtained results.

Table 1.9. Benefits of cooperation – structure of results [%]

Benefit	I have no opinion	I strongly disagree	I disagree	I agree	I strongly agree
Access to previously inaccessible resources	1.5	2.2	6.6	62.8	27.0
Lower costs of municipal activities	0.0	0.0	3.6	67.9	28.5
Lower socio-economic disparities	3.6	0.0	9.5	61.3	25.5
Increased cohesion in the region	3.6	0.7	10.2	59.1	26.3
Higher efficiency of municipal projects	4.4	0.7	8.8	63.5	22.6
Better life quality	5.1	2.2	6.6	61.3	24.8
Improved quality of municipal services	4.4	0.0	5.8	65.0	24.8
Development of local tourism	2.2	0.0	6.6	67.9	23.4
New inhabitants	1.5	0.0	8.8	68.6	21.2
New investors	7.3	0.7	3.6	53.3	35.0
Competitiveness	4.4	0.7	2.2	51.1	41.6
Better strategic position	5.1	0.7	8.0	60.6	25.5
Socio-economic development	6.6	1.5	17.5	48.9	25.5
Achievement of strategic objectives	10.2	0.7	10.9	53.3	24.8

Source: own work based on own research.

In the case of the benefits of cooperation respondents were more determined in their answers. The answers "I agree" and "I strongly agree" stands for respectively (mean values) 60.3% (minimum at 48.9%, maximum value at 68.9%) and 26.9% (minimum value at 21.2%, maximum value at 41.6%).

Only in two cases does the sum of positive answers ("I agree" or "I strongly agree") not reach the level of 80.0%. Those are the following benefits of cooperation: access to previously inaccessible resources (78.1% of total) and lower costs of municipal activities (self-government own tasks) – 74.5%. In the case of these two, the overall level of disagreement was also at the highest level and it was respectively 11.7% and 19.0% of total answers. According to the chart presented in Figure 1.3, the most important benefit of cooperation among local governments units within Polish metropolitan areas is the socio-economic development of self-governments that collaborate (96.4% of total). What are also important for local authorities are the following: increased cohesion in region (92.7% of total), improved quality of municipal services (91.2% of total). Only in one case did the level of lack of opinion exceeds the limit of 10.0% – once again it was access to the previously inaccessible

resources (11.7%). According to this it can be stated that self-governments rather protect their resources (mostly intangible as for instance know-how). On the other hand, in some municipalities those resources are limited, because of limited human resources, and that might be considered as a main reason of such as situation.

In general, the overall score of common benefits (benefits that occur in both competition and cooperation) are higher in the case of competition. Representatives of self-governments within metropolitan areas easily notice both of types of benefits; however the impact of cooperation is more obvious for them. What is also worth noticing is the geographical dispersion of results – more benefits of cooperation are declared by the representatives from the central zone (close to the metropolis), while the periphery municipalities state that there are relatively more benefits of competition. Local government units located in the metropolitan area outskirts rather have a lack of possibilities to collaborate because of the distance – lack of effective transportation infrastructure and in general a weak bond with the metropolis.

5. Conclusion

The research on the problem of development of inter-municipal relations within metropolitan areas in Poland shows that the benefits of cooperation significantly outweigh the benefits of competition. Although most municipalities and cities base their relationships on a high level of cooperation and a low level of competition (partner type of co-opetition), a higher level of socio-economic development is achieved by individuals who "diversify" their approach by extending the scope of co-operation. An intensification of competition equates to a strengthening of competitive potential. Similar conclusions are emerging with regard to the benefits of cooperation and competition – the "higher" level of benefit is achieved by "integrators". Definitely worse in terms of socio-economic development level are the municipalities and cities that focus on competition ("warriors"). As with the "solitary" type, the benefits of competition and cooperation are limited. It should be pointed out that these are mainly rural communities, small, located in peripheral parts of the metropolitan area, in areas where formal inter-communal cooperation is not yet developed. The final conclusion is related to the need for research and ongoing monitoring of the situation, as both the determinants of cooperation and inter-municipal competition within metropolitan areas are dynamically changing.

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Strategic leadership in immature inter-organizational networks – a case study of a small consulting company

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Abstract

This article concerns the subject of leadership in inter-organizational networks, in detail – the specificity of leadership in immature inter-organizational networks (IIN). The considered research problem refers to the possibility of identifying determinants of the leadership style most adequate to the functioning conditions of an immature business network. This will be expressed by seeking answers to the 7 groups of research questions. The main goal of this article can be defined as an attempt to determine the actual, and the possibly most crucial, collection of leadership manifestations within an IIN (i.e., a network located in one of the initial development phases), based on the example of a business network concentrated around a small consulting company – referred to as the X company – that is at its decision-making center. The author focused on the qualitative approach. Extensive literature studies were realized and the case study method of a selected company belonging to the IIN was utilized. The participatory observation was used due to the author's long-term cooperation with the described company. As a main result, leadership manifestations – crucial for further development of the analyzed IIN – were identified. This collection can be treated as a basic benchmark for other business nets to be studied. At least one of these distinctions is controversial, and therefore it is advisable to examine the legitimacy of its consideration on a wider research group. Practical implications concern the possibility of using the obtained results to introduce specific guidelines in the form of key leadership manifestations by managers or leaders in IIN. The systems that can be considered as IIN are relatively rarely subjected to research within the adopted optics. Such systems can be considered as intermediate objects between traditional organizations oriented on competition and developed network interaction systems with characteristic.

Keywords: *network leadership, immature inter-organizational network, leadership manifestations.*

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1. Introduction

Assuming high dynamics and differentiation of both inter-organizational networks as modern forms of business activity, as well as network leadership, the author of this article focuses on the leadership phenomenon within immature inter-organizational networks. It is worth clarifying that the immaturity of an analyzed inter-organizational network can be considered as the early phase in its organization's lifecycle, as well as a relatively not much-advanced form of network development level.

The level of knowledge concerning the subject of leadership in immature inter-organizational networks (considering the evolution of the leadership style and distinguishing features of this phenomenon) can be presently specified as rather low. The author of this article focused on precisely defining the goal of the research process, which was intended to be achieved by answering 7 groups of research questions (presented later). The main goal of this article can be thus defined as an attempt to determine the actual, and the possibly most crucial, collection of leadership manifestations within an immature inter-organizational network (i.e., a network located in one of the initial development phases), based on the example of a business network concentrated around a small consulting company (the X company) that is at its decision-making center.

The conducted considerations concern a chosen immature inter-organizational network whose key entities are active in the consulting industry. The network consists mainly of small entities concentrated around the X company – cooperating with each other in a strategic perspective (long-term cooperation with the implementation of common goals) within selected business projects. In addition, the cooperation periodically includes a team of independent external experts, selected by the network leaders for specific works, depending on the current demand. The presented network management system is highly dynamic in its nature.

The article creates the valuable possibility for comparing – primarily by leaders operating in contemporary inter-organizational business network systems – their styles, behaviors and implemented concepts for the future development of represented networks with presented results of the conducted research process. The author follows the qualitative research approach, using a case study as the main research method. Qualitative methods, being the domain of the interpretive approach in management, can be regarded as especially dedicated to solving undiscovered research problems (Jeszka, 2013), to which the ongoing considerations can be included. Concurrently, it is worth emphasizing that the presented considerations should be treated as an introduction to more extensive future research (also including quantitative methods).

2. Literature background

The author of the article has made a critical review of selected literature on the subject of inter-organizational networks, as well as the phenomenon of leadership, with particular emphasis on strategic leadership. The literature presents various concepts concerning various styles and types of leadership in the contemporary market environment (Drewniak, Goździewska-Nowicka, Posadzińska, & Voss, 2017; Baczewska-Ciupak, 2013; Korzyński, 2018; Paliszkiewicz, 2019; Karaszewski & Skrzypczyńska, 2016; Pfeffer, 2017). They cannot be de facto comprehensively mentioned, due to the huge number of definitions of the studied phenomena. However, it is the strategic leadership in this case that will be considered as the crucial concept for the conducted research.

Strategic leadership can be determined as the impact on the organization's strategic behavior, which contributes to its survival and success (Ansoff, 1985). In detail, this type of leadership can be defined as creating a competitive advantage due to the most effective management of the process of building a strategy aimed at increasing the efficiency of the enterprise, which should result in an increase in value for the owners (Hill & Gareth, 2013). The elements that create strategic leadership are also processes related to the creation of visions, cognitive skills of the leader, the possibility of combining various sources of information and opinions, planning and anticipatory effectiveness, and revolutionary thinking (Dubrin, 2007). This category can also be considered as a specific combination of various abilities necessary to achieve the organizational effectiveness of modern enterprises, which include adaptive, absorptive, and social skills (Piórkowska, 2017). Strategic leadership is one of the key factors for ensuring the effectiveness of network cooperation within current market conditions. It is worth emphasizing that strategic leadership is considered in this article to be according to the visionary and organic approaches (Avery, 2009). It means, that this phenomenon can be interpreted as a specific mix of influence exerted by a leader, who inspires subordinates to perform desired activities, as well as situations when leaders can naturally emerge among members of a certain team or group.

Interorganizational networks are presently research objects subjected to intensive exploration, mainly due to the need to obtain a wider recognition of their functioning mechanisms and greater awareness of their diversity. Most leadership studies, however, concern classically understood organizations – independent entities competing for resources in a specific business environment. Many of the researchers also focus on inter-organizational arrangements – most often already significantly developed, multi-faceted, connected by a network of relations (Czakon, 2012; Gadár & Abonyi, 2019).

Leadership in the context of the developed network is lately also the subject of empirical studies (Hao, Feng, & Ye, 2017; White, Currie, & Lockett, 2016; Leithwood & Azah, 2016), in contrast to studies focusing on the study of strategic leadership in immature inter-organizational networks, i.e. at the very beginning or in the first phases of building a specific co-operation system. Such systems can naturally be located between traditional organizations and developed networks.

While attempting to define an immature inter-organizational network, the author used the proposal of J. Niemczyk, who distinguished five successive levels of inter-organizational networks development – based on their use of increasingly complex types of economic rent in conjunction with the risks associated with these processes. Simplifying, an immature network can also be considered as composed of few actors localized within not a dense network of relations. A maximally dense network of relations will be understood through the prism of finite relational possibilities of individual entities building the network at a given moment, assuming that network density is the ratio of the number of all actual connections to the theoretically possible maximum number of relationships (Zdziarski, 2012). Consequently, a rare network of relations concerning immature inter-organizational networks will be built of a small number of actors – entities located in the network environment and affecting its development. Over time and the continuous creation of new network relationships, network density will grow. The positions of particular nodes, especially those occupying central positions, will be clearly noticeable in such conditions. In conclusion, according to the author of this article, the key features of an immature inter-organizational network can be indicated as follows:

- a relatively small number of entities;
- low or very low network density;
- the dominant role of one of the network nodes – the existence of a central node (strong centralization – basically no separate relationships between other nodes);
- relatively simple relations between the central node and other nodes (single relations regarding only a certain part of the overall activity in a given project/ task/ venture).

Exploring the above-mentioned research gap, the author decided to identify the main reasons for the formation of network systems in order to know the crucial motives of potential and current leaders of immature inter-organizational networks, encouraging them to further develop these systems towards higher levels of the network. In this approach, the antecedences of strategic cooperation become important, including primarily those in the form of an inter-organizational network. The analysis of circumstances preceding the creation of an inter-organizational network was carried out, among others,

by W. Czakon, according to which the main antecedences of the network are: a) existing networks, b) leadership, c) social capital and d) competition. In the case of a dyad, the author emphasizes a) the importance of strategic alignment, b) resources and c) trust, versus organizational antecedences: a) strategy, b) effectiveness, c) learning and d) perception (Czakon, 2016). Such a distinction of the reasons for the emergence of individual strategic systems indicates the leading antecedences, but not mutually exclusive.

A detailed analysis of the network advantages (Stańczyk-Hugiet & Sus, 2012) indicates the implementation of a strategic intention, implemented in the form of synergy. The range of advantages of inter-organizational networks is additionally emphasized by the proposal on the inseparable treatment of individual antecedences. Both striving for the complementarity of individual benefits, as well as minimizing the risks associated with functioning in network systems (Stańczyk-Hugiet & Sus, 2012) are the tasks of the network leader. Strategic leadership in inter-organizational networks implements the main tasks of the network, which is to maintain strategic proximity, in different dimensions (Table 1.10).

Table 1.10. Success factors of cooperation and dimensions of closeness

Determinants of cooperation success according to Bryant	Key dimension of closeness
continuous verification and analysis of inter-organizational ties	social closeness (relational)
technological convergence allowing for the exchange of experience and understanding	cognitive closeness (technological)
matching organizational processes conducive to cooperation	organizational closeness
appropriate organizational structures that provide organizational opportunities for cooperation	organizational closeness
cultural convergence, construction of shared values	institutional closeness (cultural)

Source: Klimas (2013).

Therefore, strategic leadership in inter-organizational networks places considerations in the area of strategic management micro-trend, which emphasizes the role of the human factor in strategy development (Sus, 2017). Regardless of the type of inter-organizational network – the network leader's tasks consist in creating social closeness (active participation in verifying and analyzing inter-organizational links), technological (seeking to exchange knowledge and experiences), organizational (initiating cooperative systems and active influence in managing relationship networks) and cultural (active activity in the process of building common values).

One of the basic reasons for creating network systems are the possibilities associated with the elimination of business risk, minimized as a result of exchange and transfer of knowledge, as well as other resources, including material ones, or increasing the reputation and credibility of the company entangled in the network. An interesting conclusion, which results from the research is the change in the perception of risk for the occasion (Motylska-Kuźma, Mercik, & Sus, 2019). It turns out that the possibilities of risk minimization are understood by respondents as an opportunity. By transferring this conclusion to the ground of network systems (both in developing and maturity stages), one can risk the thesis that one of the reasons for participating in inter-organizational networks is the ability to identify or even generate business opportunities. An opportunity in the context of network systems will be a situation that can occur in the close and distant environment of the network, but also in its internal environment, whose diagnosis depends on people involved in the functioning of the network. The use of opportunities has a strategic dimension – it concerns the strategic activity of the company, but due to its fleeting nature it cannot be included in the strategic plan (Sus, 2019).

Strategic leadership thus becomes an extremely important factor determining the success of the network, and the activities of a strategic leader involve using the presented factors of network success and skillfully finding themselves among the diversity of these factors. In the analyzed case – the recognition of opportunities, and then its use is a direct result of the leader's activity, and strategic leadership in immature inter-organizational networks is the object of research, which has not been yet subjected to precise empirical exploration.

2.1. Preliminary model of strategic leadership in immature inter-organizational networks (IIN)

As a result of the extended literature analysis, a set of strategic leadership features was identified for the immature inter-organizational networks (IIN), and then research questions were formulated within their scope. The research was based on the methodology of qualitative research described in further parts of the article. In order to build a model of strategic leadership in immature inter-organizational networks, the manifestations of strategic leadership were used (based on: Czakon, 2012; Goldsmith, Greenberg, Robertson, & Hu-Chan, 2007; Harvard Business Review, 2018; Jackson & Morgan, 1982; Ant, 2010; Silvia & McGuire, 2010):

1) Creation of network participants' activity – understood as the number of reactions undertaken by entities within IIN – in particular under the influence of network leaders, and also considered primarily in the

context of collegial actions (by all network participants) in relation to individual activities.

2) Construction of trust, loyalty, and credibility between the participants of IIN – the sphere of the leader's actions, thanks to which it is possible to limit the formal requirements and additional contractual and legal protections, characteristic for complex systems with a high level of distrust.
3) Creation of a communication system between participants in IIN – decisions of network leaders regarding the types, quality, and frequency of using information channels between network participants.
4) The use of emotional intelligence in IIN – leadership skills related to recognizing and understanding the intentions, needs and emotional states of other network participants, especially when they do not have the traditional tools of formal authority.
5) Introduction of formalization in IIN – understood as the application of pre-established rules of business, respect of common provisions, determination, and enforcement of behavior patterns and standards, as well as an obligatory framework for all members of the network, and also management of possible conflicts within the network.
6) Ensuring decision-making autonomy and delegating tasks among the participants of IIN – in the sense of the willingness to delegate responsibilities and possibilities to act independently for the benefit of the entire network, including supporting the development of young people showing talent by engaging them in responsible and demanding tasks.
7) Control of IIN – building, maintaining and applying by the leaders: specific procedures and monitoring tools, in particular, related to the use of modern systems and technologies.

The above-mentioned manifestations form the basis for the concept of measuring strategic leadership in immature inter-organizational networks. This model does not describe the existing reality completely – without detailed research. It is not possible to include all the factors conditioning strategic leadership within such systems. Nevertheless, it characterizes a selected fragment of reality, being the foundation for further exploration. In the context of such dimensions of strategic leadership, the following research questions were formulated:

1) What is the role of the network leader in generating the activity of participants of IIN? Is his role crucial in the discussed aspect, or are entities able to generate their activity due to the accepted goals of the network?
2) What role does the network leader play in the process of building trust and credibility in IIN? How can a network leader influence the level of mutual trust of participants in IIN?

3) What leadership activities contribute to the optimization of communication processes in IIN? Can the network leader influence the elimination of communication barriers?
4) How can the IIN leader use emotional intelligence to develop the network? Does the level of emotional intelligence occurring in the process of building relationships between participants of IIN affect the specific activities of the network leader?
5) How does the formalization of IIN affect the functioning and roles of the network leader? Can formalization processes block the actions of a strategic leader, or do they allow a broader and more significant impact of the network leader's actions on the other participants?
6) What is the optimal decision-making autonomy and willingness to delegate tasks in IIN? Are lower decision-making autonomy and lower willingness to delegate tasks key success factors for effective strategic leadership in IIN?
7) How do control activities carried out in IIN affect the possibilities of achieving effective leadership influence? Do the controls carry out by the leader in IIN inhibit or generate greater opportunities for the development of the system?

The formulated questions were treated as the basis for interviews with representatives of the X company analyzed in this article. Answers given to individual questions were to contribute to creating a general picture of leadership in the IIN.

3. Research approach and methods

The article uses a research process based on a case study, and more specifically the so-called important case study. The purpose of this type of case study is not to build a specific theory, but to present a particular person, company, community, etc. It is essentially implemented for a better understanding of the case. The choice of the case is based not on the fact that it represents other similar cases, but because it illustrates a particular feature or problem. This case is interesting in itself because of its uniqueness (Stake, 1994). The case study is a research method using quality techniques that aim to faithfully describe reality. In contrast to quantitative research aimed at finding causal determination (cause and effect) and generalizing results on the entire population. Qualitative research allows building holistic knowledge – concerning phenomena in their natural context, as well as looking for solutions from the point of view of an individual in similar situations. Quantitative research only takes into account what is typical, while qualitative methods allow studying often highly variable phenomena in the organization and its environment (Kostera, 2003).

Qualitative research works best for exploratory research – focused on less-known phenomena. They are also used to study the hidden or little-understood aspects of phenomena that are well recognized and researched or to get a new look at something considered known. Qualitative research does not allow for statistical generalization, but it provides rich material about the mechanisms determining the effectiveness of strategic leadership in the network. A definite disadvantage of case studies is the lack of representativeness (Czakon, 2012), as well as their time-consuming, high implementation costs, high subjectivity of assessments, sometimes the researcher's influence, relatively small share of "hard", measurable data, much unnecessary, useless information obtained during the study, as well as some simplification of the results (Matejun, 2011). Qualitative research, however, brings closer to the identification of the characteristics of the studied phenomenon and showing its uniqueness (Chełpa, 2003).

The choice of the case study as a research procedure was also dictated by the fact that in the case of complex research facilities, which are usually networks, the researcher's direct participation is required. For this reason, as a research tool, participatory observation was selected in the analyzed case (focusing on the constant participation in events or groups that are currently observed), as well as standardized free interviews – conducted on the basis of the so-called research questionnaire, which is a list of questions asked to the respondent (Konecki, 2000). The participant observation technique was selected due to the fact that the author has been cooperating for 4 years as an external expert, carrying out tasks related to market and marketing analysis, which is a significant substantive input for the development of projects and business reports for industry-differentiated clients. In turn, standardized interviews were conducted with representatives of the X company (Managing Partners). The basis for the interviews were the research questions formulated earlier, regarding the identified manifestations of strategic leadership in IIN.

4. Case study of the chosen immature inter-organizational network – discussion and results

The strategic cooperation network described in this article is focused around a small company from the consulting industry, referred to as the X company. It was chosen as a research object according to the previously mentioned key features of an immature inter-organizational network. The business network built around the X company – which is its central, dominant node – has presently not so many permanent members, it is characterized by a low level of density (there are only relations between the X company and other members of this network). Moreover, all relations between the X company

and other nodes are usually very clearly defined, and they concern only a part of separately realized projects.

This company is registered in Warsaw and operates primarily for entities located in Poland, whose business is very often conducted in Europe (mainly the European Union) or often on a global scale. The basic team at the X company is currently composed of 2 persons – acting as equal partners – exactly as Managing Partners. They perform various strategic functions in the described network, that can be compared to the role of network facilitator (which is combining certain aspect of the following roles: moderator, expert in process management, trainer and coach), who acts within network circumstances, basing on specific competencies in order to develop trust, which allows the facilitation of inter-organizational co-operation (Franz, Kaletka, Pelka, & Sarcina, 2018).

Last year, 2018, was particularly important for the X company as it decided to dispense with its formal, physical office – and introduced virtualization in a sense. Currently, the functioning of the X company is therefore based entirely on intangible assets – primarily on the brand, on competencies, and on existing and extended relationship networks (both interpersonal and inter-organizational). The author of the article has been involved in the activity of the described network for about 4 years as an external expert.

The analyzed immature inter-organizational network is a centralized type network, which was clearly confirmed in the interviews with the leaders of the X company, which is a clear decision-making center for the studied cooperation system. What is important is that the structure of the network is dynamic, changing, and adapting to subsequent business projects undertaken by the company. The division of the network into centralized and decentralized is one of the most popular in the subject literature (Niemczyk, 2006; Czakon, 2012; Chrisidu-Budnik, 2012). The dimension of centralization of inter-organizational networks can be analyzed in the context of the position occupied by a specific node in the network, but also as a measure of the concentration of ties located around a given node (Czakon, 2012). In this study, centralized networks are understood as those having a decisional center. In turn, in decentralized networks, such a center does not exist. This means that network participants occupy similar positions, and the relationships between them create comparable strength and decision-making capabilities. According to the author of this article, the leadership influence will be particularly noticeable in centralized inter-organizational networks, in the case of which one of the entities creating them plays a superior role in relation to other network participants. This entity – constituting a peculiar decision-making center – will stand out with its unique potential for leadership influence, primarily due to the possibility of initiating and activating activities of other entities of the network system (Organa, 2013). In connection with the above, the selection of

the analyzed network case was made deliberately with the intention of checking the impact of a high level of centralization on the conducted considerations.

Importantly, each project (the X company is able to implement several projects at the same time) receives a separate, relatively loose organizational structure. Some project microstructures are often created with a designated project manager, with clearly defined roles and tasks to be performed, usually carried out by external experts, which can be thus periodically treated as employees of the X company. The discussed immaturely, centralized inter-organizational network includes, therefore – in addition to the company itself – several groups of other participants who are coordinated by previously mentioned Managing Partners. They are above all:

- supporting partners – over a dozen law firms – many projects implemented by the company X are initiated directly by supporting partners (basically law firms) that represent their clients, i.e., acting as an intermediary, they initiate a relationship with the X company, and consequently – formal business orders;
- potential subcontractors:
    - a specialized company (employing about 5 people) closely cooperating with the X company, whose employees deal with specific areas in the field of consulting, in particular in the field of finance and business analysis;
    - property appraisers – often running a sole proprietorship, thus appearing as separate economic entities in the described network;
    - freelancers – dozens of experienced external experts specializing in specific scientific and business areas (including finance, strategic management, economic expertise), who are selected on the basis of their expert knowledge, necessary to implement specific projects implemented by the X company.

A great role in the presented inter-organizational network, which is still at an early stage of development, act such factors as full of trust and efficient communication. For example – the mentioned law firms (supporting partners) treat the X company as a highly reliable business partner, providing direct contact to its clients. In the case of hypothetical failures, they risk to a large extent straining their market reputation. Trust is one of the main factors both in the selection of partners, as well as in the context of building further business relationships. The inter-organizational network around the X company has been developing over the years on the basis of interpersonal relations established by each of the Managing Partners. They were able to establish and maintain long-term business relationships with financial directors and CEOs of Polish listed companies, many of whom directly used the services of the X company. On the basis of positive opinions, information about the activities of the discussed company was disseminated by various communication channels

(mainly direct and telephone conversations, e-mails) among subsequent members of the above-mentioned, informal, interpersonal business network. Providing information, and in effect, the company's reputation to subsequent nodes of the relational network created in this way, contributed significantly to the significant increase in the number of orders received, which in turn enabled the stable development of the conducted activity. The company X functions, therefore, within the conditions of a carefully created inter-organizational network, built on the foundation of an informal interpersonal network, the basis of which in turn is trust and its efficient transfer based on effective communication between current and potential new participants of this network. This conclusion is part of the general assumption of the particular importance of trust in interpersonal networks (Hakanen & Häkkinen, 2015).

Considered trust and efficient communication processes enable the free exchange of knowledge in the discussed network, which is an extremely important process for network leaders, enabling continuous learning. In this respect, the X company together with the IIN created around it resembles a learning organization, which is able to learn constantly, assuming that its members are aware of occurring changes and strategic goals, self-motivated, as well as willing to exchange their knowledge with others (Sulich, 2015).

The use of emotional intelligence by network leaders, defined as a proper understanding of the needs, intentions, doubts, and suggestions of both – other participants in the described network around the X company, as well as current and potential customers, turned out to be a particularly important aspect of the network's operation that emerged during the conducted interviews. Constant contact (daily, obligatory telephone calls or e-mail information during the course of a given project) in order to properly recognize mutual needs has been established as one of the overriding principles of the described network activity. In the initial stages of the projects, direct contact is preferred to use and identify all possible forms of communication – special observation concerns the involvement, the way of transferring knowledge, activity, and expression of people involved in a given activity.

The following aspects of strategic leadership were considered as slightly less important (based on the conducted interviews and obtaining answers to the formulated research questions): the creation of network participants' activity, as well as the control of the IIN. Both aspects, according to network leaders' opinions gained an average level of importance. The indicated creation of activity is of significance to a certain extent, because the Managing Partners of the X company always finally determine the direction and scope of development for a given project and make key decisions in this area. Control is an important element deciding on stability, however, shifting the role to trust, acting in a properly shaped environment built on the basis of trust reduces the

need for continuous control (the importance of control is subdued due to the high level of trust).

IIN's decision-making autonomy and delegating tasks is even less important – its significance was defined as low. As mentioned above, key decisions are made by the leaders of the described centralized network. According to the author of the article, this aspect is more important in decentralized networks, where each participant obligatorily possess a certain decision-making autonomy.

Summarizing the responses to the previously formulated research questions that were obtained during interviews with both Managing Partners, a set of crucial leadership manifestations for the X company was elaborated, and is presented in Table 1.11.

Table 1.11. List of crucial leadership manifestations for the analyzed immature inter-organizational network (IIN)

Leadership manifestations (LM no. 1-7)	**Importance**	**Crucial aspects for the analyzed IIN concentrated around the X company**
LM no. 1 Creation of IIN participants' activity	Moderate	network leaders act as network coordinators or even so-called network facilitators (Franz, Kaletka, Pelka, & Sarcina, 2018, p. 5), they order tasks, motivate to work, control project schedules and put together individual actions performed by particular network members the role of the leader is crucial for generating the activity of the entire network, they initiate, control and finalize all activities within this aspect
LM no. 2 Construction of trust, loyalty and credibility between the participants of the IIN	**High**	**the roles of the leaders of the described network in the area of creating an atmosphere of trust and mutual understanding are declared to be crucial comparing to all other activities undertaken within this system** **leaders deliberately choose network participants for specific activities, adjust their competence levels and constantly monitor the performance of work, and in the event of potential problems, they intervene immediately; such mechanisms allow to the creation of an appropriate atmosphere and minimize the risk of possible conflicts**
LM no. 3 Creation of a communication system between participants in the IIN	**High**	**the basic principle for optimizing communication (both internal and external) in the described network is the maximization of its intensity – leaders maintain constant (daily) contact with network participants involved in a certain project** **leaders try to eliminate possible communication barriers, however, with the currently used technology, you can always use a different communication channel**

Leadership manifestations (LM no. 1-7)	Importance	Crucial aspects for the analyzed IIN concentrated around the X company
LM no. 4 The use of emotional intelligence in the IIN	**High**	**leaders try to listen to the needs and intentions of the other members of the network (as well as clients) and implement their suggestions, direct meetings are organized as often as possible, which allows the use of all means of expression** **leaders – from the beginning of the X company activities and in parallel the described network functioning – try to create an organizational culture based on relationships and understanding of mutual intentions**
LM no. 5 Introduction of formalization in the IIN	*Controversial*	*leaders of the X company claim, that in the described IIN the formalization should be considered as a factor of very low importance – the whole network is very dynamic and particular projects are being conducted individual; however, according to the author of the article, it should be recognized that at the strategic level formalization actually occurs to a small degree, but at the operational level its importance increases* *according to the leaders of the X company, high level of formalization would unnecessarily block some activities, especially at those early stages of network development, which might cause some schedule delays*
LM no. 6 Ensuring decision-making autonomy and delegating tasks among the participants of the IIN	Low	in the characterized network key decisions are made by the Managing Partners of the X company, which constitutes the optimal system due to the concentration of information and coordination of activities at a specified time schedule; the limitation of decision-making autonomy is purposeful and accepted by the participants of the system due to the benefits achieved (mainly faster realization of projects) such factors as lower decision-making autonomy and lower leaders' propensity to delegate tasks can, in fact, act as the catalyzers for the growth of network at its early stages of development – in the described case
LM no. 7 Control of the IIN	Moderate	in the described system of cooperation, leaders in a natural way control the activities of other participants – which results from the organization of work most often in the form of separate projects involving each time a certain set of network participants; because of the specificity of cooperation, participants do not report any objections to this system and they do not report any objections to this system and subordinate themselves to the mentioned control concentrated control activities of leaders stabilize and order the described network system, while the other participants may focus on substantive work

Source: own elaboration based on Harvard Business Review (2018); Silvia & McGuire (2010); Goldsmith et al. (2007); Czakon (2012); Jackson & Morgan (1982); Mrówka (2010).

Importantly, some doubts of the author of this article, as well as the respondents, have arisen around the legitimacy of considering one of the

abovementioned distinguishing factors of strategic leadership, namely - 5) introduction of formalization in an immature inter-organizational network (IIN). According to the author, in the case of this network, the formalization is periodic and applies to individual cases of designed project microstructures. It also fits into the company's strategy as a certain principle for the organization of business operations. On the other hand, the network described in the holistic approach is a dynamic entity, each project requires the involvement of slightly different resources – the teams' composition, the time needed to complete the task, organization of work, etc. These conditions largely preclude the possibility of introducing a significant formalization of the network at the strategic level. The leaders of this network argue that formalization is minimal. However, according to the article's author at the operational level, this category can be perceived as of higher importance.

This observed discrepancy allows making a recommendation for a more detailed examination of this category on the basis of other examples. It can be assumed that formalization is selective in the described case. One should, therefore, consider whether it is justified to include it in the set of key manifestations of strategic leadership in immature inter-organizational networks. Determining this fact, however, requires further research.

5. Conclusions – directions for further research

The main goal of this article was formulated as an attempt to determine the actual and the possibly most crucial collection of leadership manifestations within an immature inter-organizational network, based on the example of a business network concentrated around a small consulting company that is at its decision-making center. The author claims that it was successful to identify such a preliminary collection based on the literature study. Moreover, it was possible to identify certain leadership manifestations and to transfer them onto the market situation of the considered company.

Subjective assessments of respondents indicate the following leadership manifestations (mentioned previously in Table 1.11) as especially important for the current prosperity and the further development of the analyzed immature inter-organizational network (IIN):

- leadership manifestation no. 2 – Construction of trust, loyalty, and credibility between the participants of the IIN;
- leadership manifestation no. 3 – Creation of a communication system between participants in the IIN;
- leadership manifestation no. 4 – The use of emotional intelligence in the IIN.

Other leadership manifestations were assessed at a moderate (no. 1 and no. 7) or low level (no. 6) of importance. However, one of the considered manifestations, no. 5 – Introduction of formalization in the IIN – is controversial.

There was no consistency in the opinion of the respondents and the author of the article regarding the occurrence of this manifestation of leadership in the described network, especially due to its dynamic nature. It seems that in mature networks, a specific level of formalization determines the manner of exercising strategic leadership (ensuring order, formalization of the decision-making process). In immature networks, formal agreements or network contracts may still not occur at all. In the discussed case, formal agreements between network participants usually occur, although this is not the norm. In connection with the above, it is recommended to examine the proposed set of strategic leadership manifestations in the next 10 cases of network systems, which can be included in the IIN group. Obtained results may, in turn, be used to develop tools for implementing quantitative statistical surveys.

Therefore recommendations or proposals for leaders of organizations that are participants of immature inter-organizational networks can be formulated. In particular, they concern the possibility of comparing the proposed set of key leadership manifestations with the situation in a given network, which allows a better understanding of the specificity of the analyzed phenomenon in the considered cooperation systems.

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Biographical note

Michał Organa, Ph.D., is an assistant professor at the Department of Strategy and Management Methods (Wrocław University of Economics). His research interests are focused on the issues of different forms of leadership within inter-organizational networks, especially with the distinction of centralized and decentralized networks. Lately, his publications also include the issues related to the exploitation of opportunities by network leaders, as well as the dynamism of strategy and strategy dynamics strongly influencing the network development process. In the business sphere, he specializes primarily in strategic and marketing analyzes including the valuation of intangible assets. He has developed or co-authored several reports related to the strategic and marketing analysis of enterprises from various industries as well as product and sales strategies.

Network theory and complexity theory in the context of organization and management sciences

Anna Ujwary-Gil[1]

Abstract

The paper presents network theory and complexity theory in the context of organization and management sciences. Both theories today are of great interest among researchers whose purpose is to explain and understand the complexity of the organization's functioning and management through the lens of the network of relationships between the components of a given system. The main idea is to consider the organization as a socio-technical system linked by a network of relationships, interactions, and interdependencies (network theory) and as a self-organizing, complex adaptive system (complexity theory). A narrative review was used to capture the theoretical context, with the possibility of formulating research questions that can lead to further empirical research. The paper indicates the possibilities of interpreting organization and management in terms of these two theories, which until now have not been combined with each other (or in very individual cases), although they have a large, complementary explanatory potential for both organization and management.

***Keywords**: network theory, complexity theory, organization science, management science, organization, management.*

1. Introduction

Research in the field of network theory and complexity theory is interdisciplinary and concerns many disciplines. In the case of network theory, it has been used in the mathematical analysis of social network, qualitative methodology used in social sciences and complex networks studied in the framework of statistical physics and complexity theory. The first works on network theory in the field of organization and management sciences are related to such authors as Tichy and Fombrun (1979) as well as Tichy, Tushman, and Fombrun

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(1979). The contemporary network approach to organization and management is found, for example, in works on managing intangible resources in an IT sector organization (Ujwary-Gil, forthcoming), information modeling for the purposes of creating an inter-organizational support network (Durugbo, 2015), management of regional sport tourism networks from the perspective of egocentric network analysis (Wäsche, 2015), performance (Agbim, 2019), or broadly understood management of healthcare and healthcare organizations (Merrill et al., 2008; Valente, 2010).

In turn, complexity theory has mainly developed in physics, biological, chemical and economic sciences. The application of complexity theory assumptions in organization and management sciences is largely associated with such authors and works as Anderson (1999), Stacey, (1995), Griffin, Shaw, and Stacey (1998) or Griffin, Shaw, and Stacey (1999). The precursor of the complexity associated with organization and strategy was Simon (1962), who considered the use of an analytical and computer tool to study complex systems, laying the foundations of management theory. Social systems (organizations, industries) are characterized by non-linear relationships and complex interactions that evolve dynamically over time. This perception of organizations has increased the interest in applying complexity theory to a number of areas in the field of organization and management sciences, such as virtual organizations (Papastefanou, 2010), learning organization (Chiva, Grandio, & Alegre, 2010), public management (Eppel & Rhodes, 2018), strategic management (Basile, Kaufmann, & Savastano, 2018), and change management (Lauser, 2010).

A review of literature sources using global databases (mainly Web of Science and Scopus), focused on searching for works in the field of network theory and complexity theory in the context of organization and management, did not show works that would combine these two theoretical approaches together. The exception is the work recently published by McGee and Jones (2019), which refers to the modeling of policy subsystems using social network analysis. Of course, there are many works that present network theory or complexity theory in connection with organization and management. However, there is no work that would show at least similarities, treating these two theories complementarily. The paper fills this gap and aims to answer the question of whether network theory and complexity theory associated with it, can be a source of practical implications in terms of organization interpretation and management.

2. Research approach

The paper is a theoretical review, aimed at presenting network theory and complexity theory through the prism of organization and management sciences.

The narrative review was used as the basic research method. A relatively small number of scientific papers devoted simultaneously to network theory and complexity theory in analyzing organization and management supports the choice of this method, which makes it possible to draw conclusions relating to both empirical and theoretical research, taking into account a certain degree of freedom and using a critical approach to analysis (Gancarczyk & Bohatkiewicz, 2018; Green, Johnson, & Adams, 2006; Takeuchi & Chen, 2013; van Knippenberg, 2012). The narrative review allows one to capture qualitative differences between studies, combine different concepts and indicate the context of the problem, which is the advantage of this method over the systematic review (Jones, 2004; Sisson & Ryan, 2017). Its supporters (e.g., Ferrari, 2015) also suggest that the narrative review goes beyond the synthesis of previous research, makes a new contribution in the form of original inference, and identifies areas for further research or concept development.

To understand the essence of network theory and complexity theory, the focus was mainly on sources indexed in two global databases: Web of Science and Scopus, which had the phrase "network theory," "complexity theory," "network" or "complexity" in the title. The publications (articles, books) indexed in the period 1900-2018 (dictated by the time period included in the Web of Science database) were taken into account. Only single cases of papers from 2019 are included. The multi-stage process of source selection, including keywords and the appearance of phrases in the abstract, is not enough. Additional analysis is required to exclude documents that treat this topic in a trivial or marginal way (Coombes & Nicholson, 2013). It is for this reason, choosing a phrase in the source title leads to a greater probability that the article/book will relate to the selected research area. Sources are reflected in the References section.

This article, based on narrative, aims to capture a broader theoretical context with the possibility of formulating research questions that can lead to further systematic reviews of literature and empirical research. The theoretical perspective was based on an interdisciplinary search for literature, including scientific work in the field of network theory and complexity theory on the canvas of organization and management sciences. Theoretical and empirical research was reviewed to analyze these two approaches to theory in relation to organization and management. The research procedure ends with an indication of restrictions, directions and questions for further research.

3. Network theory

Network theory is one of the disciplines of network science and has become a platform for active exploration of interdisciplinary research areas because

relationship networks are visible in almost every area of human and non-human activity. In this theory, elements of graph theory (Foulds, 2012), the associated matrix algebra (Abadir & Magnus, 2005) and network statistics (Brinkmeier & Schank, 2005) are also visible. Network theory is oriented, among others, at learning and studying the complex structures and behaviors that take place between organizations, called social networks, which distinguish the intentionality (human agency) of network actors compared to other networks (Robins, 2015). Complex structures of emerging dependencies between the studied actors and obtained results, based on relationship structures, characterize network theory. Network theory perceives the totality and the results of interrelationships in opposition to reductionism, which has decomposed complex systems in a way that makes it possible to learn about separate and individual nodes and connections. As noted by Parkhe, Wasserman, and Ralston (2006), network theory shifts the focus from the atomistic explanation of phenomena and independent cases to the relationship between dependent system factors.

The network is described by its structure, which is formed by nodes and connections, dynamics, and behaviors. Network models constitute representations of a given phenomenon within the network concept using network data and observations that are not independent of each other. However, abstracting a network to form a model and its representation requires basic elements, which include nodes that can take any kind of animate and inanimate form; connection (dyad) and recognition of the network structure. The conceptualization of the organization as a network in which there is a combination of individual socio-technical elements, consequently forming the system, is the fundamental premise of organizational network theory. Understanding the complexity of the system, understood as a whole composed of a set of elements working together as part of the mechanism or connected networks, is therefore not possible without a deeper penetration of the network of relationships and connections that make up a given system (Barabási, 2016). The socio-technical system itself includes technical elements such as processes, tasks, techniques, knowledge, and resources used in creating and proposing values. Whereas, social elements include people, attitudes, behaviors, as well as organizational norms, principles, and culture.

Understanding the roots and characteristics of networks that bond network elements into various complex systems has become the main goal of network theory. The structure and position in the network as well as its function (e.g., distribution, flow) play a key role and examine how the structure of the network interacts with a given process (e.g., distribution of resources or information flow). The general thesis of network theory is the assumption that the actor's position in the network determines his/

her limitations and opportunities in the context of his/her achievements, behaviors or beliefs. At the group level, what happens in a group of actors is a function of the structure of connections between them.

Two concepts have become popular in network theory: the strength of weak ties (Granovetter, 1983; Granovetter, 1973) and structural holes (Burt, 2009), in which the structure and position in the network and the explanation of the relationship between the structure and results of the network play a key role. For example, the stronger the ties between a pair of people in an organization, the greater the chance for weaker links with the same third parties. Strong ties in the same social group, however, do not favor the exchange of new knowledge, access to new information, and the latest innovative trends. There may be a risk of redundant relationships and duplication of the same activities, as well as sending the same information or knowledge that is not conducive to creating value. Hence, Granovetter draws attention to bridging connections, weak ties, which are a potential source of new information and knowledge.

The second concept is Burt's structural holes (2009). It mainly refers to the shape of the actor's ego network and the pattern of relations in at least two unrelated social networks. Hence, it is beneficial for the ego to connect with many other networks whose actors have no relationship with the given networks. Then it means a larger number of so-called structural holes. In the context of this redundancy, an ego network with many structural holes is likely to receive more new information.

The theory of networks in which social networks play a dominant role is called the social network theory (Kilduff & Tsai, 2003; Wasserman & Faust, 1994). It explains the interpersonal mechanisms and social structures that exist between interacting individuals (groups, departments within an organization, and between organizations). It allows one to determine how a person's, group's, or organization's relationships affect beliefs or behavior. Kilduff and Tsai (2003) diagnosed three areas from which social network theory derives its assumptions:

- imported theories and concepts (mathematics, especially graph theory; social psychology: equilibrium theory and social comparison theory);
- native concepts (heterophilia: strength of weak ties, structural holes; structural roles: structural equivalence, structural cohesion, role equivalence);
- organization theories (resource dependency theory; situational theory, population ecology theory; transaction cost theory, knowledge-based view).

Social network theory indicates a network of individual and collective relations understood as a resource that is exchangeable for other goods or services. Contextual influences of social ties and networks on participants'

activities are a central mechanism by which networks provide participants with structural resources and benefits, creating social capital (Granovetter, 1985). This mechanism is called embeddedness (Moran, 2005). Because entities in organizational contexts are closely embedded in a network of interpersonal relationships, their activities are inevitably subject to the consequences of network embeddedness. The embeddedness means the history of interaction between network members that leads to the routine and stabilization of network connections. The embeddedness results from personal ties and is a function of configuring the entire network. It takes two forms: relational and structural embeddedness.

In strategic management and organization theory, the occurrence of networks as a new model for testing competitiveness and value creation has given rise to the consideration of the network paradigm (e.g., Borgatti & Foster, 2003). The components of this paradigm are three reference theories (Czakon, 2011): sociological theory of social networks, resource theory, where the network is understood as a strategic resource, and the theory of transaction costs as a way of coordinating cooperation. Emirbayer and Goodwin (1994) identified three paradigms of the social network that researchers refer to: structural determinism, structural instrumentalism, and structural constructionism. In structural determinism, there is no room for human agency and free will, culture, actor beliefs, values that could play a role in social processes, and historical change. People are seen as biological organisms, and the social phenomenon is a property of the social network (organization). In turn, structural instrumentalism allows agency as a rational choice, instrumental activity stimulated by material benefits and maximization of benefits. In structural constructionism, similar to instrumentalism, there is causality in social changes, and actors are motivated by non-material (values, norms, obligations arising from the cultural rootedness of the individual in a given community count). These three paradigms de facto define the relationship between culture, agency and social structure.

Organization management can be characterized as the science of managing relationships in networks to achieve organizational goals such as high performance and value creation. In organization and management, network theory is used to understand various research problems related to the formation of dependency networks in project management (Mok, Shen, & Yang, 2017; Ruiz-Martin & Poza, 2015); human resource management (Soltis, Brass, & Lepak, 2018); professional achievements and promotions (Burt, 1992); multilevel organizations (Moliterno & Mahony, 2011) and many others.

There is extensive literature regarding the use of network techniques in organization and management. The use of a network approach can be observed in the context of knowledge management. Tsai (2002) analyzed

formal and informal coordination mechanisms affecting knowledge sharing in a large organization that has many cooperating and/or competing parts. Sharing knowledge between individual units can increase overall organizational possibilities through collective learning and synergistic benefits resulting from the process of information exchange, know-how and local knowledge. Knowledge is asymmetrically distributed in various units within an organization. Without effective coordination, knowledge is not evenly distributed throughout the organization, hence reducing constraints resulting from hierarchy and centralization can increase inter-individual social relationships, leading to an internal flow of knowledge. Indirect transfer of knowledge within an organization in the Currie and White studies (2012) is characterized by a professional hierarchy. Professional affiliation and power differentiate the impact resulting from the mediation of knowledge at individual and group levels in the organization. Social structures can be considered at any level of the organizational hierarchy. The development of knowledge is reflected in both formal and informal organizational procedures that create social relationships which go beyond the professional hierarchy. Thanks to this, the transfer of knowledge becomes more widespread. Social network analysis and structural models are used to identify alternative mechanisms of influence (Meyer, 1994), such as interactions (contact) and norms determining group cohesion, occupying structurally equivalent positions or roles. The relative effectiveness of these different structural configurations in predicting similarity in perception and attitudes about the organization is assessed. These mechanisms are analyzed in the perspective of the process of social information processing in the organization.

The above, a brief overview of research interests, indicates a diverse use of the network approach in organizational research and management, creating the foundations for building network theory. Some of the articles were empirical or theoretical. In empirical studies, authors most often used centrality metrics, and at the level of the entire network -density and centralization. They also used structural gaps and clique analysis as part of the network structure.

4. Complexity theory

Complexity theory in an organizational context assumes that organizations are created by complex networks of relationships that respond dynamically to external pressures and contexts. Complexity occurs through relationships in networks in which individuals influence others, who in turn influence others in the network. This theory describes the interactive processes between individuals in a dynamic network, in particular, collaboration, decentralized decision making, initiative, or leadership (Arena & Uhl-Bien, 2016).

Complexity theory embodies a non-linear system-oriented perspective that attempts to conceptualize and understand organization systems at many levels (micro, meso, macro), fully recognizing the dynamic relationships and influences that operate within and between aspects of these levels of systems in time and space. This has implications for both organization and management resulting from the non-linearity of interdependent elements. This means that an organization cannot be studied or understood in terms of its isolated components or what the organization does in isolation (Anderson, 1999).

There is some kind of pressure in the organization caused by these influences and interactions causing changes in the organization or the network. Complexity theory provides a framework for understanding the basic behavior of interdependent entities in the network because it is a study of the dynamic symbiotic and adaptive interactions of entities affected by internal and external forces. There are dynamics acting on the actors in the network (Gear, Eppel, & Koziol-Mclain, 2018). First, the network does not need external influences to create order in the network; rather interactions in network create order. Secondly, when the network evolves or interacts, there is a tendency to destabilize. This destabilization causes a new and changed organization. Finally, the future is unknown. Network interactions are influenced by other network interactions that are random and complex, causing even more complex and unpredictable interactions.

Complexity theory is needed in situations where there is environmental variability, complex dynamics, and uncertainty, which is the domain of most socio-technical systems, including organizations. One of the most basic elements of this theory is the importance of interaction between individuals and between complex adaptive systems (McElroy, 2003), understood as groups (aggregates) having adaptability (Uhl-Bien, Marion, & McKelvey, 2007). The required complexity can be seen by measuring the adaptive voltage in the system, looking at the diversity of responses compared to the diversity of the stimulus. Element simulation can predict intentional and accidental changes, looking at the network as a complex adaptive system where learning occurs through interaction and change (Carley & Gasser, 1999). Complexity theory is now seen as a valuable source of insight into understanding the functioning of humanities, the nature, and role of learning in such organizations (Chiva et al., 2010).

Interaction is an important part of the network that is subject to moderation. It can be part of positive (enhancing actors) or negative feedback (suppressing effects). The interaction between the actors is not equal; not all actors have the same impact on others or the network. In addition, the complex dynamics occurring in the organization are due to the interaction between diverse actors, since heterogeneity between nodes encourages learning. Interaction can involve

the flow of information that is interdependent on the degree to which people share information based on interdependent tasks. Interactions are limited. For example, a given (human) actor cannot behave in a certain way without violating someone else's preferences or needs. Dynamics are putting pressure on the system to find solutions for its interactive, interdependent problems. Interaction and interdependence are, therefore, factors driving the dynamics of the socio-technical system in which interacting social and technical elements play a dominant role (Ujwary-Gil, forthcoming). Resources are also inherently limited, while decisions on resource allocation, and too much or too little delivery, can have a dramatic impact on the system. Because actors affect networks and networks affect systems, so too does the environment affect systems, networks, and actors in networks (Mitleton-Kelly, 2003). By using this understanding of actors, one actor with many connections with other actors, crossing the boundaries of the network, can have a much greater impact on the system than an actor with only a few connections.

The theory of complexity becomes helpful in understanding the complexity of the studied socio-technical system and its interactions, which lead to non-linear results, self-organization and evolution – all of which, however, makes an understanding of the complex system impossible (Cilliers, 2000). However, the theory of complexity may be appropriate to study the activities of an organization and management, because organizations develop and change as a result of the interaction of actors; such a change is referred to as evolution (Salem, 2002). An important point about the relationship between complexity and organizational change is that the theory of complexity is not trying to assess whether a given change is positive or negative; it simply illustrates how and why change occurs.

Newman (2010) stated that a complex system is one that consists of many interacting parts, often called agents, which show collective behavior that does not result from the trivial behavior of individual parts. A complex system is one that shows a high degree of systemic interdependence, which, among other things, leads to non-linearity, creating a new order and other surprising dynamics. The following properties of complex systems exist: 1) the interaction of many different elements or parts; 2) non-linearity in which the system's inputs and outputs are not proportional, a change in X does not always result in a predictable change in Y; 3) connectivity between components of a complex system is usually high or dense (connection structures define the system more and the meaning of the system lies in the flow through the network); 4) autonomy and adaptation indicate the lack of top-down centralized control to coordinate the entire system. In complex systems, components have some autonomy due to the ability to adapt to local conditions. Bulutlar & Kamaşak (2014) listed three features of complex

systems: 1) the whole is greater than the sum of the parts, therefore dividing the whole does not facilitate its understanding; 2) understanding of all input data does not necessarily predict the results generated by complex systems; 3) the behavior of complex organizations that are on the brink of chaos is neither predictable nor unpredictable.

4.1. Complex adaptive systems and self-organization

Complex systems organize themselves from within, reacting together and adapting to external stimuli relative to the system boundary (e.g., organization). The term complex adaptive system (CAS) (Gell-Mann, 1995) is often used as a metaphor to counteract the more mechanistic description of organizations as machines (Morgan, 1996). Complex adaptive systems generally refer to open dynamic systems that are able to self-organize their structural configuration by exchanging information, energy, and other resources in their environment. They can transform these resources to support operations (Larson, 2016) and are self-organizing systems that have little or no direct control over these systems. Thanks to organic interactions within and between systems that constantly occur when system components learn to adapt to external forces, these systems are also dynamic. Complex adaptive systems tend to transform into new states as systems learn to adapt to the new environment; this is called "appearance" in the literature of complexity. The behavior of a complex adaptive system depends on the openness of the organization to the environment in the design of the organization, technology, culture and strategy (Papastefanou, 2010).

The theory of complexity shares some concepts of organization and management theory, including self-organization, emergence, and adaptation (Mitchell, 2009). Self-organization is a process in which elements of the system spontaneously communicate with each other and cooperate in coordinated joint behavior (Stacey, 1995). Thanks to self-organization, the group's behavior emerges from the collective interaction of all people. The principles of self-organization generate a new approach to management because the emphasis is on adapting to rapid and continuous change. The consequence of this is shifting key management issues from maintaining control to supporting the emergence of new management principles based on interdependencies between agents (actors). Management has been designed as a trigger for the behavior of a complex adaptive system, and thus as an orchestrator for agents (actors), their functions, activities, capabilities, and resources. In this approach, managerial roles are emphasized, not positions in the hierarchy. The emphasis on management has shifted from structures to people. The theory of complexity emphasizes the holistic

approach to management, in which managers see the relationship between the organization and the environment, and information flows are used to coordinate the whole (Papastefanou, 2010).

All complex adaptive systems consist of, and are maintained by, the flow of energy (e.g., information, knowledge) and resources from the environment. Emerging structural configurations or relationship patterns make it possible to achieve the goal while achieving the goals recreates the configuration. Therefore, a high level of interactivity is necessary for coordination that takes place in extensive communication networks. Through interaction, knowledge is acquired, created or shared, and information is disseminated to ensure productivity and efficiency (Ujwary-Gil, 2019). Self-organization does not create structures in the traditional sense. Rather, it leads to communication networks that increase interaction and can be hierarchical. Therefore, the organization is based on patterns of relations between actors. Who communicates with whom largely depends on the tasks being carried out. Relationship patterns arise as a result of synergies created between actors or agents perceived as system components. Synergy improves the flow of tacit knowledge, which culminates in a result greater than the sum of its parts.

5. Common areas of network and complexity theory in organization and management

Combining network theory with the theory of complexity is a way of modeling complex socio-technical (adaptive) systems and their evolution depending on the types of interactions occurring between actors (agents) (see Figure 1.4). Network theory, with which the theory of complexity is more closely related, examines the properties of a node network and the functions of its connections with other nodes (e.g., organizations as departmental and human networks; industries as organization networks). Network models often try to capture the essence of interaction between multiple agents in a system. Economic and social systems, from individual organizations to the global economy, all involve many actors interacting in a complex way. These interactions are iterative, in the sense that the results of one period become the starting point of the next, which causes path dependence. The relationship between the theory of complexity and network theory becomes apparent when we consider that nodes in the system can be people in a department, departments in an organization, or organizations in a society or business ecosystem. A relationship can identify social and economic entities as nodes in the system and associate these nodes with each other in terms of variables such as prices, income or investment decisions. Thanks to the network approach to organizational and management analysis, it is possible to identify patterns,

clusters, and relationships through data sets related to human behavior. As part of the theory of complexity, identified patterns, clusters and interactions become the subject of in-depth research. Morela and Ramanujama (1999) attempted to apply the theory of complexity to the theory of organization. To the theory of system complexity, the authors included the concepts of the evolution of the organization as a biological organism and the analysis of the social network, especially the combination of graph theory with the study of self-organization in the network.

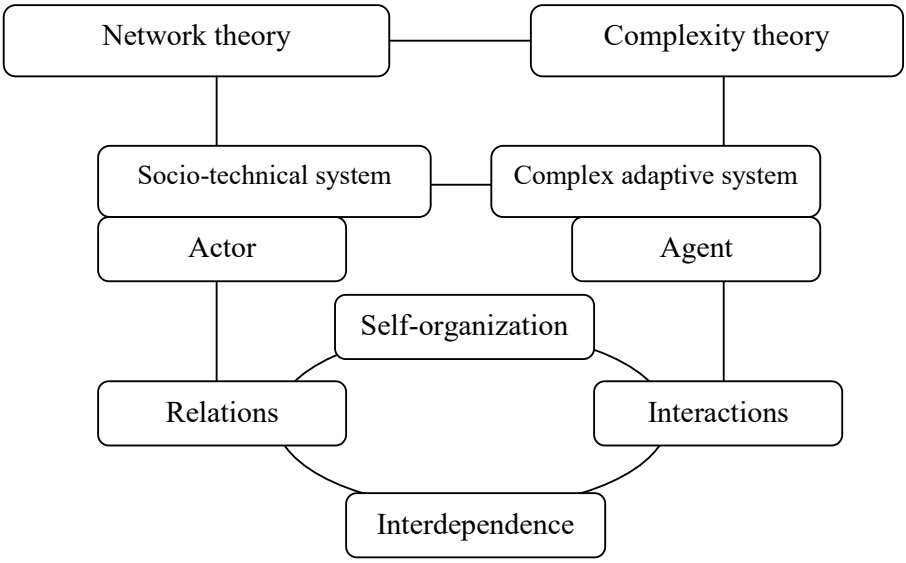

Figure 1.4. Network theory and complex theory – common areas

Both theoretical approaches to the system (organization) are based on common elements of the description of the complexity of the organization and management. These include (along with many others):

- system elements (actors/agents) that can be animate and inanimate (e.g., organizations, people, information, knowledge, resources, activities, business processes);
- non-linearity characterizing the actor/agent interaction created by the unpredictable reactions of the actor/agent to the actions of others. Non-linearity and positive feedback loops are the basic characteristics of organizational life (Stacey, 1995). The organisation's interactions with each other and with other entities in their environment, such as consumers, employees, government and financial institutions are strategic in the sense that the decisions of one actor take into account

and anticipate the reactions of others, and thus reflect identified interdependencies;

- self-organization as the spontaneous appearance of new relationships, forms, and behavior patterns resulting from repeated interactions of actors/agents in time;
- the emergence of new system properties or levels of a complex organization generated by the self-organization of agents;
- a complex adaptive system as endogenous, non-linear dynamism created through interactions between various factors (internal and external), which enables adaptation and spontaneous, unpredictable self-organization.

6. Limitations and directions for further research

The article is one of the first attempts to link network theory with the theory of complexity on the basis of theoretical considerations related to the science of organization and management. It certainly requires a more detailed exploration of literature sources, perhaps including more indexing databases. The choice of the Web of Science and Scopus databases was primarily dictated by the selection of high quality, peer-reviewed references. This article focuses mainly on the basic elements of network theory and complexity theory, which are particularly evident in these two approaches. And these are: the system (organization as a socio-technical system and a complex adaptive system), system elements, actors/agents, relationships, interactions, interdependencies, and self-organization. It can be assumed that these theories can be a source of practical implications in terms of organization interpretation and management. Particular emphasis should be placed on the use of social network analysis (organizational, dynamic) not only for identifying dependency networks, but for empirical verification of a complex system, which is the organization (micro-level), inter-organizational relationships (meso-level), or the business ecosystem (macro-level) and processes taking place in them.

New types of models in organizational and management sciences require the combination of empirical observation with simulation-based on computing agents. Network theory and complexity theory creates promising directions for the development of such models and instruments that will help managers predict results based on changes in network configuration (adding/removing nodes (relationships) in the system). In a similar way, managers can indirectly influence the appearance of adaptive behavior by changing the distribution of agents in the network. The theory of organization and management does not yet have sophisticated tools that would allow the analysis of the behavior of complex adaptive systems or new techniques for modeling non-linear behavior.

Morçöl (2013) identifies networks and complex systems by claiming that systems are networks and networks are systems, which can promote conceptual and methodical borrowing. Networks, with the ability to map actors based on their relationships, provide a new way of theorizing and modeling many actors, and analyzing their impact depending on their interrelationships. An organization is a complex adaptive system in which management must reduce complexity while enhancing information diversity. According to this approach, in a turbulent environment, it must develop various competencies, especially in the field of innovation, to create or maintain relationships with various stakeholders.

The directions of future research, therefore, favor the formulation of new research questions:

- How can network theory methods and techniques be used to operationalize a complex adaptive system?
- In what new research areas could both network theory and complexity theory, be used as a source of interpretation, as well as empirical verification of organization and management problems?

7. Conclusion

Network theory and complexity theory are some of the most interesting approaches to organization and management. They are also a great example of the interdisciplinary nature of science, as well as a source of interpenetration of concepts and methods for understanding the same fragment of reality. The prospects for the development of both network theory and complexity theory in the context of organization and management are promising, especially if we consider the scenarios of creating new models and instruments for their operationalization, whether thanks to sophisticated network techniques and algorithms or using artificial intelligence solutions. The aim of the paper was to review related elements of network theory and complexity theory in explaining organization and management using a narrative review. Two research questions were formulated for further exploration. The article may be an inspiration to undertake more in-depth research in this area in the future.

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Biographical note

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Chapter 2.
Innovation-based economy

Innovation is invariably perceived as an indispensable factor in economic development, which is implemented by economic entities, more or less supported by other entities and systemic solutions. Innovation results primarily from the competences of the organizations and their ability to create and develop new products as well as their willingness to take risks. Risk is primarily imposed on private entities, less protected by the state. At the same time, private entities operating in conditions of fierce competition seem to be the most determined to create and implement innovations. It is known, however, that the innovativeness of an enterprise is determined by many factors and is also exposed to many barriers. Therefore, it is necessary to explore these issues and build knowledge that can be applied in practice by both interested economic entities and leaders of socio-economic life, such as representatives of authorities, local government units, academic centers and other entities supporting the development of innovation. This chapter of the monograph includes research on business innovation, forms of support, as well as industry experience in this field.

The first section presents the results of research on the level of innovation of enterprises by voivodships and their degree of diversification. The research also covered the number and types of innovations, sources of financing implemented innovations, as well as expenditure on research and development in individual voivodships. The results of the research indicate a large diversity within voivodships. Attention was also paid to the relatively low level of native innovation compared to other European countries. EU funds are mostly used to purchase foreign technologies and innovative solutions. The author of the study analyzes many other aspects of developing innovation in Polish enterprises, which may also be an inspiration for further research.

The subject of research contained in the second subsection is activity supporting the development of innovation. The aim of the study was to determine the impact of business support organizations on the implementation of product and process innovations in industry. The usefulness of the conducted

research is expressed in expanding knowledge on supporting innovation in the economy of the Pomeranian Voivodeship. The use of econometric tools in Polish research practice is noteworthy. The analysis of research material uses logit modeling, where the probability is expressed on the basis of opportunities (in this case enterprises) that used the services of business support organizations and enterprises.

The next subsection refers to the dilemma formulated by researchers, as to whether companies operating in the agricultural machinery sector use mature imitations or innovations. The productivity strategies of Polish producers were examined in order to determine in which categories the efficiency tools used are perceived. An important result of the research was the conclusion about the need to change the way of thinking about enterprise development and the role of the tools used to increase efficiency. Research initiated in the agricultural machinery sector may be an inspiration for similar analyzes in other production areas.

Economy 4.0 has become a research perspective for another group of researchers presenting the results of their work in the fourth and fifth subchapters. In the presented case study of a large chocolate producer, mechanisms of implementation of the assumptions of the fourth industrial revolution are presented. A particularly important aspect of the research is the reasons for implementing technological innovations. The research results confirm one of the most important premises for the technological development of production processes support, i.e. increasing problems with labor supply. The next section contains the results of research carried out in the recreational sector. In the author's assumption, the consequences of the fourth industrial revolution are also noticeable in this sector. The author focuses his attention on the factors that inspire the creation of new economic initiatives in this area. The development of information and IT technologies and competences is an important reference point in research.

The last subsection is devoted to financing innovative projects from EU funds. Using examples of projects implemented in the SME sector in Częstochowa, the researcher refers to the reasons for the failure to develop innovation. One of the indicators of purposeful use of EU funds was securing copyright and property rights. An important manifestation of the problem was the indication that only 10% of entrepreneurs who received funding had secured their rights at the Patent Office. As a result, the researcher asks the question of whether a condition of the co-financing should focus on assessing the ability of entities to implement projects that will be permanently associated with the company and will contribute to an increase in its innovation. In the face of various conditions related to the use of public aid in developing innovation, it is necessary to pose such research questions and to seek answers to them.

Diversification of the innovation level in enterprises in Poland

***Katarzyna Chudy-Laskowska*[1]**

Abstract

The aim of the research is to analyze the level of innovation of enterprises in the provinces in Poland and to check what the degree of its diversification is. The research uses data from the Central Statistical Office's database regarding innovation in enterprises in Poland. They concern the amount and type of innovations introduced. The analysis is carried out using statistical and taxonomic methods. The expenditure on research and development in the analyzed provinces is also taken into account. The results show which provinces are characterized by a high level of innovation in enterprises, in which provinces the expenditure on research and development are greatest and whether this is related to the level of innovation. Differences in the level of innovativeness in enterprises are examined and the ranking of provinces on innovation are presented. The results of the research show the provinces where the level of innovation in enterprises is the lowest. This allows the appropriate streams of funds to be directed to the provinces that most need financial support. The originality of the research is based on the comprehensive and broad approach to diagnosis and comparison of results in provincial terms in Poland.

***Keywords**: innovations, enterprises, innovativeness, research and development, provinces.*

1. Introduction

Nowadays, in the developed countries, industry based on raw materials and materials plays a less and less important role, and the role of knowledge-based industry and information is growing. Companies operating in a given area are the driving force of regions and model their development. (Subrahmanya, 2015, Hong & Jung, 2012).

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The determinant of the competitive potential of the economy is, above all, an ability to develop regions where innovation is created and scientific, technical or organizational progress is used while limiting activities within the traditional economic structure. Therefore, the creation of modern solutions or areas of activity requires appropriate macroeconomic policy in their support, including better use of available development potential, investing in human capital (training and education), establishing research-related parks connected with business, development of consulting services, creating the necessary technical infrastructure or promoting innovative ideas. The process of monitoring the innovativeness of economies and the evaluation of instruments that support the process of creating, absorbing and commercializing innovations is of particular importance at this point (Kałowski & Wysocki, 2015).

The aim of the article is to show the diversity of provinces in Poland in terms of innovativeness of enterprises and the indication of provinces where the level of innovation is the largest and those in which innovation is negligible. This allows the identification of areas where support is needed in innovative activities through financial assistance, establishing cooperation, and investing in human capital.

2. Literature background

2.1. Innovation

Innovation is an ambiguous concept, difficult to define strictly, but attempts are made to define it on various levels. Most often it is associated with entrepreneurship. Various approaches to this issue are found in the literature. According to Schumpeter (Schumpeter, 1960), economic development begins only when someone unexpectedly puts into practice a new combination of means of production, and this situation can occur in five cases: the launch of a new commodity or a new kind of already known commodity, the use of a new method of production or sale of a given commodity, opening a new market, acquiring a new source of raw materials or semi-finished products, and the introduction of a new organizational form of an industry. Schumpeter describes all of these cases as the forms of manifestation of the phenomenon, which he first defines as new combinations, then as undertakings and ultimately as innovations. Implementation of innovation by an entrepreneur is a special function, the privilege of a fairly narrow group of people who have the right features – higher than the normal qualities of mind and will. Their behavior may influence social history, shape a new model of life and new value systems (Glapiński, 2012; Sleuwaegen & Boiardi, 2014).

In marketing terms, innovation is an idea, a product, or an element of technology developed, implemented and presented to clients who perceive it as new or innovative (Kotler, 1999).

The most commonly cited definition of innovation is proposed by the Organization for Economic Cooperation and Development – OECD, which divides innovations into four types (Francis & Bessant, 2005; Tidd, Bessant & Pavitt, 2005), namely:

- product – related to the creation of an innovative product or a significant improvement of an already existing product on the market;
- process – the implementation of a new or improved production method;
- organizational – the implementation of new management methods aimed at improving work organization and/or relations with the environment;
- marketing – the implementation of a new marketing method related to key changes within the structure, packaging, distribution, pricing strategy, or promotion.

Innovation is recognized as one of the most important factors affecting the competitiveness of regions. This was reflected in the EU cohesion policy implemented in the past (2007-2013) and current (2014-2020) programming period. However, the approach to the way innovation was introduced in the regions has changed. At present, it is moving away from the simple division of regions, into a division of strong ones that are capable of creating innovation, and weak ones that show only the ability to adapt innovations (Grosse, 2013). This means reducing the role of external factors in creating innovation, in favor of endogenous factors that give a greater guarantee of a more permanent, though perhaps slower and less spectacular, development of indigenous innovations. This way of implementing regions' innovation is based on the concept of smart specialization (Markowski, 2013).

2.2. Measurement of innovation

Companies use measurements and measures to make sure people spend time on really important matters (Peters & Waterman, 2000). The multiplicity and diversity of factors affecting innovation exclude the use of one universal meter. It is necessary to use a set of indicators reflecting various dimensions of the innovative activity of the economy (Kasperkiewicz, 2011). An innovative index of innovation is used to measure innovation in EU countries, which is calculated as an arithmetic mean weighted by many innovativeness features for all Community countries. The measurement results are published in the annual reports of the European Commission.

The indicators regarding innovation can be divided into three groups: investment, resultant, and innovation ones based on mixed measures (Wielgórka & Idasiak, 2017). Input indices are defined as the amount of expenditure incurred on research and development activities. The disadvantage of this group of indicators is the fact that the perception of innovation is limited only to the research areas, thus omitting innovations created by other favorable factors (Global Competitiveness Report, 2016). The resultant measures of innovation present the effects of expenditure incurred on research and development activities, by measuring the number of publications, the number of doctoral students, patent applications, obtained patents, and innovative products. The strength of result indicators is the perception that expenditures on research and development are not always synonymous with the creation of innovation (Shavinina, 2003). Innovation indices are created on the basis of synthetic measures, which aim at increasing comparability between countries. They are based on input and output indicators. The most popular are European Innovation Scoreboard (EIS) and Global Innovation Index (Global Innovation Index, GII). A list of measures and their distribution was proposed in the book titled *Through Innovation for Growth* (Anthony, Johnson, Sinfield & Altman, 2010).

The **input** measures include:
• financial resources for innovation;
• human resources involved in innovation;
• separately protected resources separated by innovations not related to the core business;
• time invested by close leadership in innovation leading to new growth;
• number of patent applications filed.

The process and supervision measures include:
• speed of the innovative process;
• the scope of the idea formulation process;
• balancing the innovation portfolio;
• current growth gap;
• separate processes, tools and measures for various types of economic opportunities.

The resultant measures include:
• number of new products or services introduced to the market;
• the percentage share of new products in the revenues obtained from the main categories;
• percentage of new customers (or new circumstances of using the product) in total profits;
• share of new product categories in profits;
• profitability of investments in innovation.

Innovation should be a feature of every enterprise, and it is assumed that an innovative company is one that conducts a wide range of research and development (or purchases R&D projects, allocates high financial expenditure for this activity, implements new scientific and technical solutions, has a large share of new products and services, and constantly introduces innovations to the market (Jasiński, 2014). An innovative company is the one that during the period under review (usually three years) has introduced at least one technical innovation (a new or significantly improved product, or a new or significantly improved technological process (The Oslo Manual, 2008). An enterprise conducting innovative activity is a category used in the analysis of the results of innovation research conducted by the Central Statistical Office. It means a company which in the first reporting year carried out innovative activities, i.e. it incurred investments for this activity (CSO). An enterprise that wants to be innovative must have creative employees who generate new thoughts and are not afraid of introducing new ideas.

2.3. Barriers of innovation

Innovation encounters various resistance in an enterprise, coming both from the inside of the company and its surroundings. These are technical, organizational, legal, economic, informational, cultural, motivational, and awareness barriers. They may result from such reasons as ossification of organizational structures and stereotypes of thinking (bureaucratic barriers), lack of adequate financial resources (economic barriers), and employee behavior (psychological barriers). They hinder the creation and implementation of innovations, weaken their effects and often determine their success (Wasiluk, 2002). In the case of Polish enterprises, weaknesses in the financial system are mentioned among the main barriers to limited interest in innovations. These are primarily: insufficient own resources, underdevelopment, and weaknesses in the functioning of the financial system, and the lack of innovation structure (Madrid-Guijarro, Garcia, & Auken, 2009; Božić & Rajh, 2016).

2.4. Poland in the background of the European Union

The innovative position of Poland in the European Union is generally weak and unstable. The share of the value of the Total Innovation Index, in the average value of the indicator for the EU-28, forms the basis for the division of countries associated in four groups. These are:

- innovation leaders – for whom SII values exceed 120% of the EU average;
- innovation followers – 90-120%;

- moderate innovators – 50-90%;
- modest innovators – less than 50% (Wich, 2017).

In the ranking from 2018, Poland occupied the 25th position, which is the fourth from the end, and when compared to the 2016 report the position of Poland has decreased by two places. It is currently in the group of moderate innovators but is short of falling into the last group.

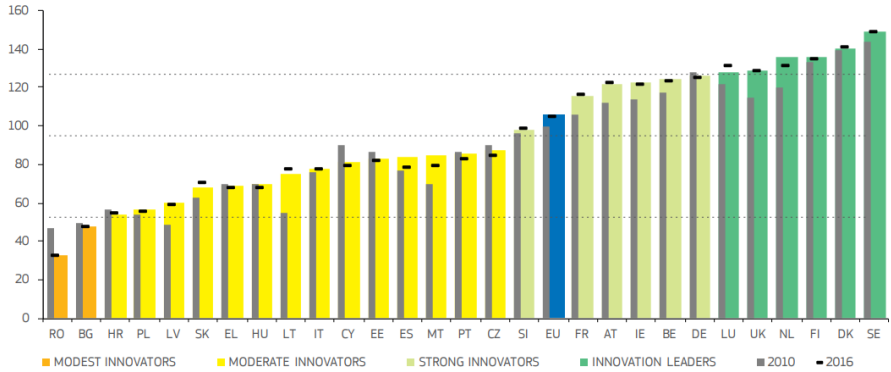

Figure 2.1. Ranking of EU countries in terms of innovation

Source: European Innovation Scoreboard (2018, p.7).

3. Research approach and methods

Measurement of enterprises' innovation is exposed to various pitfalls and mistakes in the assessment. Investigators should beware of three measuring pitfalls: too short a list of measures, supporting conservative innovation and paying more attention to inputs than results (Anthony, Johnson, Sinfield, & Altman, 2010). Therefore, a list of seventeen indicators was adopted to diagnose innovation. Initially, the list was longer, but after the analysis of variability and correlation, these features were finally selected for the research. Data for the research was taken from the Central Statistical Office of the Local Data Bank from the Science and Technology department. Data include 2017.

One of the taxonomic hierarchical methods was used for the study. It leads to the separation of a complete hierarchy of clusters with a monotonically increasing coefficient of their similarity. The higher-order groups obtained contain disjoint groups of lower levels. In agglomeration methods, each unit is initially a separate group, and then in a sequential manner, the number of existing groups is successively reduced by combining them into higher-order groups. The procedure ends when one group including all units of the set

is received. The advantage of hierarchical methods is the ability to present classification results in a compact graphic form using the connection tree (dendrogram), which illustrates successive combinations of increasingly higher-order groups (Grabiński, 1992).

For the analysis, the Ward method was used, where the clustering distance is expressed by the difference between sums of squares of deviations of distances between individuals and the center of gravity of the groups to which these points belong (Ostasiewicz, 1999).

In addition to the multidimensional analysis, it is also important to analyze the structure of each of the separated clusters. Through its application, it is possible to obtain information about which features have decided to create individual clusters. In this context, the effective method is the arithmetic means, consisting of the following steps:

- calculations for the entire arithmetic mean arithmetic output matrix of subsequent features (X);
- calculation of group arithmetic means – for highlighted clusters (Xn);
- determining the structure indicators of each cluster as quotients Xn / X. Quotas that are greater than unity testify to the dominance of a particular feature in concentration (Chudy-Laskowska & Wierzbińska, 2011).

4. Discussion and results

Four indicators from the input group were adopted for the research and the remaining ones belong to the group of result measures. Table 2.1 presents the characteristics of the indicators adopted for the tests. Input indices are characterized by right-sided asymmetry, so in most provinces, they take values below average. All are also characterized by large variations in the studied group.

All input indicators have the highest values in the Mazowieckie Province, while the lowest values in the case of investment outlays in enterprises per one inhabitant and internal R&D personnel – employees per one thousand. Professionally active people are in the Świętokrzyskie Province. The Warmińsko-Mazurskie Province is characterized by the lowest value of expenditure on innovative activity, which falls and one professionally active person and the Podlaskie Province has the smallest internal expenditure on R&D in the enterprise sector.

The share of innovation-active enterprises is also the highest in the Mazowieckie Province and the lowest in the Opolskie Province. The result indicators responsible for filing inventions and patents take the highest values again in the Mazowieckie Province. The lowest in the case of submitting

inventions in UPRP per 1 million inhabitants has the Warmińsko-Mazurskie Province and the least granted patents by the Patent Office per 1 million inhabitants are in the Podlasie Province.

Another group of result indicators is the percentage share of new or significantly improved products and processes in service and production enterprises. In service enterprises, the highest share in the case of new or significantly improved products occurs in the Podkarpackie Province and the lowest in Opole. For new or significantly improved processes, the highest share value is in the Mazowieckie Province, and the lowest is Opole. In production enterprises, the share of new or significantly improved processes is highest in Opole and the smallest in Lubuskie. In the case of new or significantly improved processes, the maximum value is in Opole and the minimum in Lubuskie.

Table 2.1. Basic descriptive statistics of indicators accepted for research

	Indicator	$(\bar{x} \pm \sigma)$	Me	Min	Max	V_z
X_1	Capital expenditure in enterprises per capita	(3653,3±1448)	3108.5	1936.0	7271.0	39.6
X_2	Expenditure on innovative activity per one professionally active person	(1847,2±1317)	1645.4	507.9	5424.1	71.3
X_3	Internal expenditure on R&D in the enterprise sector	(829,5±1359)	364.8	78.5	5587.6	163.8
X_4	Internal R&D staff (working per thousand active people)	(5,5±3,6)	4.7	1.6	15.5	64.6
X_5	Share of innovation-active enterprises [%]	(9,7±4,0)	9.6	2.7	16.9	41.6
X_6	Notifications of inventions in the Patent Office for 1 million inhabitants	(93,9±23,8)	94.9	55.1	133.1	25.3
X_7	Patents granted by the Patent Office for 1 million inhabitants	(62,0±28,1)	64.2	20.7	116.1	45.3
X_8	PU - new or significantly improved products [%]	(4,6±1,8)	4.8	2.0	8.3	38.3
X_9	PU - new or significantly improved processes [%]	(7,0±2,6)	7.1	1.3	11.6	36.6
X_{10}	PP - new or significantly improved products [%]	(11,9±2,0)	12.0	7.4	15.0	16.9
X_{11}	PP - new or significantly improved processes [%]	(15,1±1,8)	14.9	12.1	19.1	11.9
X_{12}	New or significantly improved products (10-49) [%]	(6,6±2,5)	6.3	1.7	10.6	37.8
X_{13}	New or significantly improved products (50-249) [%]	(21,3±2,9)	20.7	17.2	27.5	13.6
X_{14}	New or significantly improved products (250 and more) [%]	(45,7±5,7)	44.2	37.7	60.5	12.4
X_{15}	New or significantly improved processes (10-49) [%]	(8,8±2,2)	8.7	5.3	14.1	25.3
X_{16}	New or significantly improved processes (50-249) [%]	(26,6±2,5)	26.5	23.0	31.9	9.4
X_{17}	New or significantly improved processes (250 and more) [%]	(53,2±6,9)	52.6	41.5	71.1	12.9

Source: author's own study based on the data from CSO.

The latest result indicators refer to new or significantly improved products and processes broken down by enterprise size. The percentage of small enterprises in new or significantly improved products is highest in the Lubelskie Province and the smallest in the Lubuskie Province. Regarding processes, the highest value is in the Opolskie Province and the lowest in Podlasie. In large enterprises, the highest share for new or significantly improved products is in the Małopolskie Province and the lowest in Lublin. In the case of processes, the best is Podkarpackie, and the worst is the Zachodniopomorskie. In the largest enterprises, the share of new or significantly improved products is in

Podlasie and the smallest in Warmińsko-Mazurskie, and for processes the highest percentage is in Podlasie and the smallest in Warmińsko-Mazurskie.

Figure 2.2 presents the average levels of result indicators regarding the percentage of enterprises in the creation of new or significantly improved products or processes. It can be concluded that the larger the company, the percentage of indicators under consideration increases. It is also visible that in each category, the share of enterprises introducing process innovations is higher.

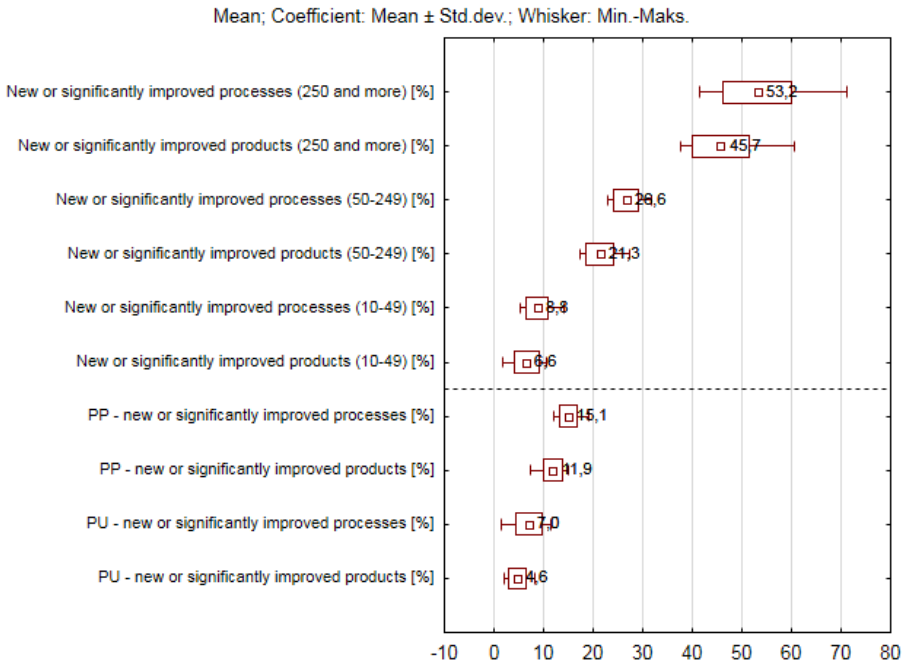

Figure 2.2. Average percentages of enterprises in creating new or improved products and processes

Source: author's own study based on the data from CSO.

It was checked whether the differences in percentages in particular categories of indicators are statistically significant due to the type of activity (service-production) and whether there are differences in percentages of enterprises introducing new or improved processes and products within small, large and medium-sized enterprises. The results are shown in Tables 2.2 and 2.3.

Table 2.2. The results of the U-Mann-Whitney test. Tested indicators in relation to the type of business (service – production)

Indicator	p
New or significantly improved products	.0000***
New or significantly improved processes	.0000***

Source: author's own study based on the data from CSO.

In each case, the test showed a statistically significant difference in the levels of the indicators examined. The percentage of new or improved products in the enterprises running the production activity was higher (Figure 2.2). In each category (small, medium and large), the share of enterprises that introduced new or significantly improved processes was larger.

Table 2.3. The results of the U-Mann-Whitney test. The indicators examined in relation to the type of innovation

Indicator	p
New or significantly improved products and processes (10-49)	.0136*
New or significantly improved products (50-249)	.0001***
New or significantly improved products (250 and more)	.0021***

Source: author's own study based on the data from CSO.

The correlation between input and output indices was also examined using Spearman's rank correlation. Indicators were statistically significantly marked with asterisks: The significance level α=.05 was assumed for the research. It is assumed that: when $p < .05$ there is a statistically significant relationship (marked with *); $p < .01$ this is a highly significant dependency (**); $p < .001$ there is a very high statistically significant relationship (***). The matrix shows that the investments are related to the patent applications in the Patent Office and the number of patents granted, as well as the percentage of service enterprises that have introduced new or significantly improved products and processes. The dependencies are positive, which means that the more investments, the higher the resulting ratios. The highest dependence of 0.74 was recorded in the case of internal expenditure on R&D in the enterprise sector and patents granted by the Patent Office per million inhabitants. High ratios are also found in the case of the Index responsible for internal R&D personnel (counted in working people per thousand people) and applications for inventions in the Patent Office per million inhabitants and patents granted by the Patent Office per million inhabitants (Figure 2.3).

Table 2.4. Spearman's rank correlation coefficients between input and output indices

	X1	X2	X3	X4
X_6	0.43	0.54*	0.63**	0.71**
X_7	0.64**	0.66**	0.74**	0.71**
X_8	0.41	0.66**	0.62*	0.69**
X_9	0.50	0.72**	0.72**	0.68**
X_{10}	0.17	0.03	0.13	0.25
X_{11}	0.32	0.22	0.29	0.33
X_{12}	0.14	0.03	0.05	0.00
X_{13}	0.04	0.13	0.08	0.26
X_{14}	0.12	0.14	0.15	0.45
X_{15}	0.36	0.33	0.20	0.12
X_{16}	0.12	0.15	0.36	0.51*
X_{17}	-0.05	-0.01	0.09	0.24

Source: author's own study based on the data from CSO.

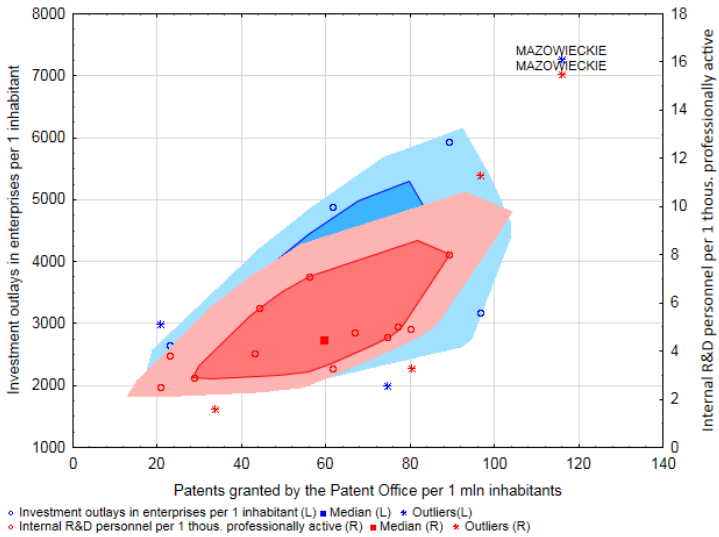

Figure 2.3. Bag chart between selected input and output indicators: patents granted by the Patent Office per 1 million inhabitants and internal R&D personnel and investment outlays in enterprises per 1 million inhabitants

After analyzing the data, a grouping was carried out to identify provinces similar to each other in terms of innovation, taking into account the input and result indicators. The research shows that four groups of provinces, similar to each other in terms of innovation, were created. The results of grouping are shown in the diagram (Figure 2.4). Group "a" is one-element and it is the Małopolskie Province. Three provinces entered the "b" group: Podlasie, Podkarpackie and Małopolskie The third group of "c" are the provinces: Świętokrzyskie, Opolskie, Lubuskie, Warmińsko – Mazurskie and Kujawsko – Pomorskie. The last group "d" is the most numerous, covering seven provinces: Lubelskie, Zachodniopomorskie, Wielkopolskie, Śląskie, Łódzkie, Pomorskie, and Dolnośląskie.

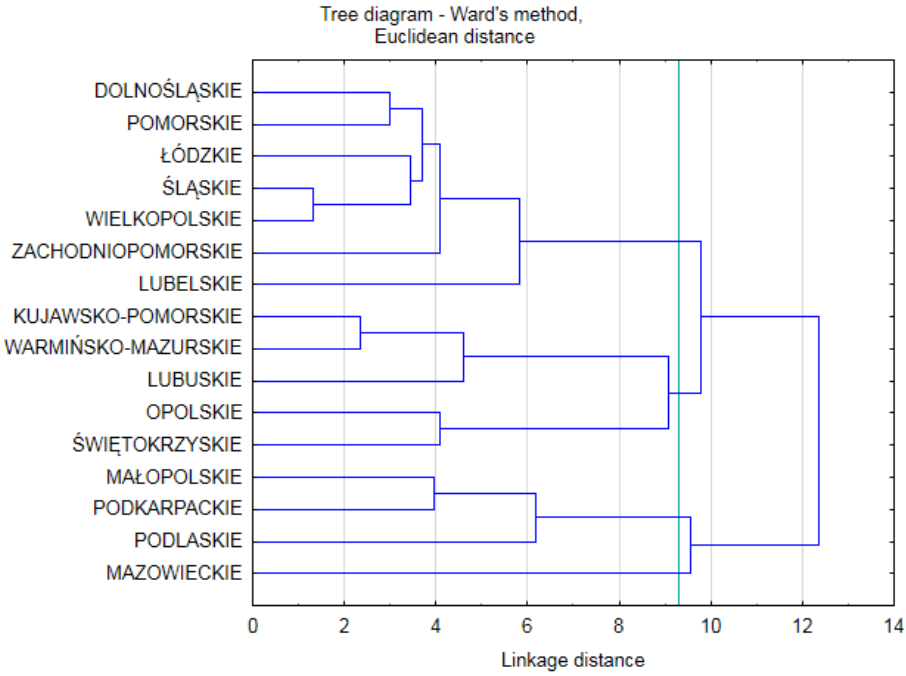

Figure 2.4. Tree diagram – division of provinces in terms of innovation

Source: author's own study based on the data from CSO.

The Mazowieckie province has the best indices of innovation, which has separated it from other provinces. The input indicators are several times higher compared to other groups. The highest values are assumed by the internal expenditure on R&D in the enterprise sector, expenditure on innovative activity per one active person, and the largest share of personnel working in

R&D per thousand professionally active people. The result indicators are also at the highest level, with the exception of the participation of small enterprises introducing new or significantly improved processes. The applications for inventions per million inhabitants and patents granted by the Patent Office per million inhabitants are definitely marked (Figure 2.5).

The worst in terms of innovation is the "c" group which includes the following provinces: Świętokrzyskie, Opolskie, Lubuskie, Warmińsko-Mazurskie, and Kujawsko-Pomorskie. All input and output indicators are below the average for Poland, with the exception of the share of small enterprises that introduce new or significantly improved processes. The lowest level has the indicator responsible for internal R&D expenditure in the enterprise sector. In comparison to such low expenditure, the result ratios are slightly higher, but they do not match the national average.

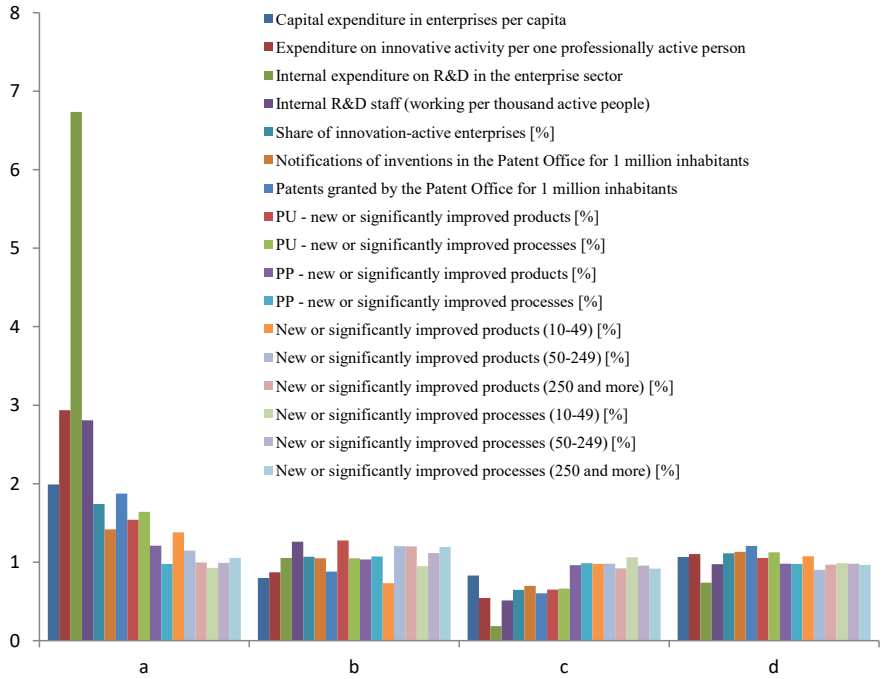

Figure 2.5. Group means of the examined indicators in individual clusters "a", "b", "c" and "d"

Source: author's own study based on the data from CSO.

It is difficult to determine which cluster is better between "b" and "d" because they have a completely different profile in terms of innovation. There are

three provinces in the "b" cluster: Podlasie, Podkarpackie, and Małopolskie. They are characterized by low investment expenditure in enterprises which are per capita and low expenditure on innovative activity. On the other hand, the indices of internal inputs and the share of R&D personnel are high. The result indicators regarding the share of medium-sized and large enterprises in creating new or significantly improved products and processes are the highest among all four surveyed groups. Therefore, it can be concluded that this group is in second place under innovation in Poland (Figure 2.6).

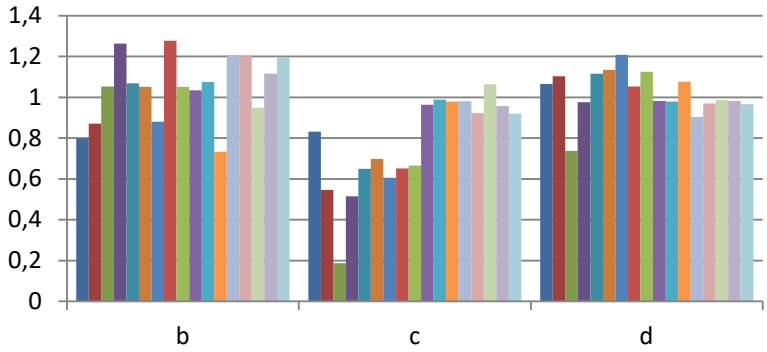

Figure 2.6. Group mean of the examined indicators in individual clusters "a," "b," "c" and "d"

Source: author's own study based on the data from CSO.

The last cluster "d" is the most numerous covering the other seven provinces. Investment expenditure and innovative activities are above the national average, but this does not translate into result indicators. The share of internal expenditure and R&D personnel per thousand professionally active people is small. The rate of patents granted by the Patent Office per million inhabitants is high. The indicator responsible for the percentage share of small enterprises introducing new or significantly improved products stands out above the average.

5. Conclusions

The innovative position of Poland against the background of the European Union countries is very weak and has deteriorated in recent years. Poland, as part of the EU structure, gained access to funds financing various types of development projects, including innovative ones. Unfortunately, this aid was

most often spent on the purchase of foreign technologies and other innovative solutions, which contributed to the weakening of indigenous stimulators of innovation, especially in the entrepreneurial sector (Wich, 2017).

When analyzing the level of innovation in Poland in the cross-section of provinces, there is a great diversity of the units surveyed. Seventeen traits, including input and result factors, were taken into account. By far the largest expenditures appear in the Mazowieckie Province, but this does not always translate into the largest result indicators. In total, the Mazowieckie Province has the highest position in the innovation ranking, which was determined by input indicators. The analysis also shows that the largest share of innovative enterprises introducing both improved products and processes is in the largest enterprises. It can be concluded that the larger the enterprise, the more innovations it creates and introduces to the market. Research also shows that new or significantly improved processes have a greater share than new or significantly improved products. In Figure 2.7, the bag chart presents the ranking of provinces in terms of innovativeness, taking into account the output and result indicators separately. The correlation of ranks shows that the higher the ranking in terms of input indicators, the higher the ranking in terms of result indicators. But there are some deviations, such as the Opolskie Province, which in terms of expenditures is in the tenth position, but in the result ranking, it is in the fourth position.

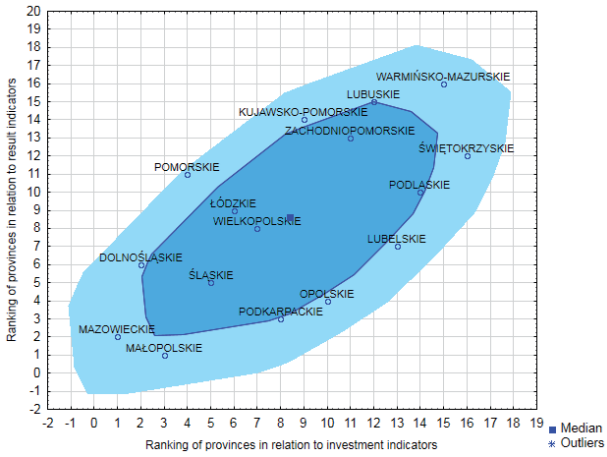

Figure 2.7. Ranking of provinces in terms of innovation based on input and output indicators

Source: author's own study based on the data from CSO.

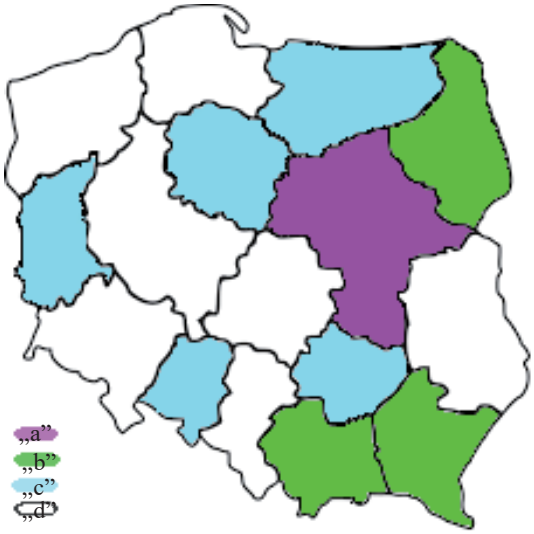

Figure 2.8. The division of provinces in Poland in terms of innovation based on cluster analysis

Source: author's own study based on the data from CSO.

So far, it has not been possible to create a single indicator that would measure the right target for innovation (Motyka, 2013; Melnarowicz, 2017), hence the diagnosis of provinces in terms of innovation has been used in a multidimensional comparative analysis, which allows studying objects characterized by many indicators. The final results of the research are presented in Figure 2.8, which illustrates the division of Poland into regions similar to each other in terms of innovation, taking into account the seventeen indicators introduced. The separated four aggregations differ from each other in the levels of innovation. The Małopolskie Province has the best position, while the provinces from the c group occupy the worst position. Comparing the b and d groups, they have a completely different character of innovation.

The results of the research that have been obtained can be used for a deeper diagnosis and analysis of the resulting clusters, indicating problem areas, i.e. provinces where the level of enterprise innovation is the lowest, in particular, the following provinces: Świętokrzyskie, Opolskie, Lubuskie, Warmińsko-Mazurskie, and Kujawsko-Pomorskie. There should be targeted help, not only financial or human resources, but also proposals for cooperation with enterprises in which innovation is at a high level.

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The importance of Business Support Organizations (BSOs) in the process of implementing product and process innovations in industry

***Jadwiga Gorączkowska*[1]**

Abstract

The aim of the study is to show the impact of Business Support Organizations (BSOs), which include innovation centers, entrepreneurship and financing institutions, on the implementation of product and process innovations, while also taking into account the degree of novelty of those implemented solutions. The research hypothesis is the statement that support organizations will increase the chances of implementing new solutions; however, their impact will show divergences related to the specificity of the services they provide. Logit modeling was used to carry out the analyses. It allows the estimation of the odds ratio, which illustrates the relationship that the given event will be in one group of elements in relation to the other one. The study analyzed the implementation of product and process innovations in 666 industrial enterprises from the Pomeranian Voivodeship, which used the services of support organizations in the years 2014-2016. Entrepreneurs, who used the services of Business Support Organizations, most often implemented process innovations that supported production activity, e.g. in the area of logistics, distribution, etc. In addition, entrepreneurs more often implemented innovations on the scale of the enterprise itself. Innovation Centers contributed to the implementation of innovations in the country and the world. The conducted analyses confirmed that Business Support Organizations bring tangible benefits to the development of the region. This is a clear signal for local government authorities to support the spread of knowledge through these institutions. The research has increased the knowledge base in the field of innovation support in the economy of the Pomeranian Voivodeship. An advanced econometric tool, not previously used in Polish literature, was utilized in this area.

Keywords: *innovation, support, technological park, incubator, technology transfer office.*

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1. Introduction

Entrepreneurs should focus on innovation-based development in order to keep up with the dynamic changes taking place in the economic environment according to Schumpeter's creative destruction. Unfortunately, creating new products and implementing new technological processes is not an easy task. Enterprises, especially micro, small and medium-sized enterprises, face barriers to innovation activity related to limited access to capital or knowledge. In the economy, the Business Support Organizations (BSOs), which include Technology Parks, Technology Incubators, Academic Business Incubators, Technology Transfer Offices, Business Angel Networks, Loan and Credit Funds, or Training and Consulting Centers, should remove the gap.

The purpose of this article is to determine the impact of the Business Support Organizations on the implementation of process and product innovations, taking into account the degree of their novelty in industrial enterprises. The research hypothesis is that these organizations will increase the chances of implementing new products; however, innovation centers will have a greater impact on the economy of the country or the world than loan and guarantee funds that have a local impact on the economy of the region. The study was conducted on a sample of 666 enterprises that were part of the Pomeranian industrial system in the years 2014-2016.

The article presents the literature background for the subject matter, describes in detail the sample and the research method, and then presents the results of the study. The last two parts of the article contain a commentary to the conducted study as well as the interpretation of the results in the context of the research of other scientists.

2. Literature background

Nowadays, there is no need to prove the importance of the role that innovation plays in the modern economy. This is evidenced by, for example, financing from the European Union for the years 2014-2020 of the Smart Growth Operational Programme, for which EUR 8.6 billion has been allocated to Poland. The innovation implementation is also supported in other programs, e.g. Infrastructure and Environment (EUR 27.4 billion) or Digital Poland (EUR 2.2 billion). Innovation allows for achieving a comparative advantage of regions and countries in international systems. In studies conducted by Etzkowitz and Leydesdorff (2002), it was proven that innovation is best created within the so-called triple helix, i.e. in cooperation between enterprises, the sphere of science and the government sphere. In this context, it is extremely important

that the tools used to stimulate development eliminated the disproportions between regions (Han, Yoo, & Kwak, 2018).

One of the tools of innovation policy is Business Support Organizations (BSOs). These are organizations that aim to support innovation and entrepreneurship, and potential profits from their activities are devoted to the implementation of statutory objectives. Business Support Organizations play a special role in supporting innovation in small and medium-sized enterprises. In studies carried out in Lesser Poland, it turned out that SMEs in innovation centers are looking for knowledge about their own innovative potential, new technologies, funding opportunities for innovation activities, and support in entering foreign markets (Gródek-Szostak, Szeląg-Sikora, Sikora & Korenko, 2017).

In Poland, support organizations are divided because of the functions they fulfill in the economy (Matusiak, 2011):

- innovation centers– are aimed at the broad promotion and incubation of innovative entrepreneurship, technology transfer and provision of pro-innovation services, activation of academic entrepreneurship and cooperation between science and business; these include technology parks, technology incubators, technology transfer offices, and academic business incubators;
- financial institutions – their aim is to limit the financial discrimination of newly created and small businesses without a credit history, providing financial services adapted to the specifics of new business ventures; in Poland, there are business angel networks, local/regional loan funds, and credit guarantee funds;
- business centers– their task is to broadly promote and incubate entrepreneurship (often in discriminated groups), provide support services to small businesses and activate the development of peripheral regions or those affected by the structural crisis; this group includes training and consulting centers.

Innovation centers are institutions whose model of operation was taken from the developed countries of Western Europe and the United States. Entities that use technology park services are characterized by greater innovation activity. Owning technology parks in regional systems is particularly beneficial for less developed regions because they achieve more benefits related to their functioning (Albahari, Barge-Gil, Perez-Canto, & Modrego, 2018). There are technology incubators and/or academic business incubators in the area of parks or high schools. Their goal is to help young entrepreneurs run their businesses in the first years of their operation in the market (usually from 3 to 5 years). These institutions are assessed differently, however, as their tenants in relation to entities located outside incubators have better growth rates, implement advanced technologies more quickly or establish cooperation

more easily (especially with universities) (Colombo & Delmastro, 2002). Technology Transfer Offices play an important role in the process of creating innovation (Barra & Zotti, 2018). However, it should be emphasized that in emerging economies, the appointment of the center does not guarantee an increase in the commercialization of university research due to limited legal and resource capacity (Belitski, Aginskaja, & Marozau, 2019).

Innovative activity can be financed from various sources. The use of commercial bank loans has limited possibilities because innovative projects are subject to considerable risk, which makes it difficult for banks to assess their success. Therefore, the financial gap began to be filled by mechanisms related to private support (business angel networks included in the group of venture capital funds) or public support (loan and guarantee funds). In the Polish economy, the investments of venture capital funds are becoming more and more important. 71% of all venture capital investments directed at Central and Eastern Europe came to Poland in 2017 (Invest Europe, 2018). Although this market is one of the better-developed ones in this part of Europe, it remains small (Mazurek-Czarnecka, 2016). This means that the gap filled by the business angel network is not fully covered. Loan and guarantee funds support entrepreneurship and innovation. Often, they offer financial resources for people from excluded groups who want to set up their own business or for entities that employ such people. They offer loans and guarantees on more favorable terms than banks. At the same time, fund recipients are enterprises with lower growth potential than business angel networks (Grimsby, 2018).

Among all business support organizations in Poland, the majority are training and consulting centers. These institutions provide services related to increasing the economic potential of the region in which they operate and improving the quality of life of the local community (Koprowska-Skalska, 2010). They support both entrepreneurship and innovation like loan and guarantee funds.

3. Research approach and methods

666 entities took part in the study of the impact of Business Support Organizations on the innovative activity of Pomeranian enterprises, whose business profile corresponds to section C of the Polish Qualification of Activities, namely Industrial processing. The study was conducted in 2017 for the years 2014-2016. Including research on innovation activity over three-year research periods is in line with the international standards for the collection and interpretation of innovation data (OECD/Eurostat, 2005).

Among the enterprises that took part in the study, micro-enterprises had the largest share in the sample. They constituted nearly half of all analyzed entities. Almost one-third of the research sample comprised small enterprises

(employing from 10 to 49 employees), while around one-sixth were medium enterprises (from 50 to 249 employees). Large enterprises constituted less than one in twenty five of the surveyed entities.

Table 2.5. Structure of the studied company in terms of size classes in 2016

Company size	Quantity of companies	Percentage
Micro	321	48.2%
Small	210	31.5%
Medium-sized	111	16.7%
Large	24	3.6%
Sum	666	100%

Source: author's own research based on survey.

Out of all the enterprises participating in the study, 293 entities used the services of Business Support Organizations in the Pomeranian Voivodeship, which constitutes 44% of the research sample. This sum is not equal to the "number of enterprises" in Table 2.7, as one company could use several support organizations.

In the surveyed region, training and consulting centers enjoyed the greatest popularity, with services used by almost 25% of the surveyed entities. Recipients of loan funds were over 16% of surveyed enterprises, and guarantee funds almost 15%. The popularity of innovation centers was much lower – a little over 5% of the surveyed entities benefited from technology park services, 3% of technology transfer centers, 2% of technology incubators, 1.5% of academic business incubators, and less than 1% of the business angel networks.

These business support organizations were independent variables in the analysis. In the selection of dependent variables, international standards for studying innovation activity were used. Among them were the implementation of new products and the implementation of new technological processes including (OECD, 2005):

- new production methods;
- new production-related processes (e.g., in the area of logistics, distribution, quality standards);
- new systems supporting business operations (e.g., IT programs in accounting).

Table 2.6. Cooperation of the studied company with Business Support Organizations in 2014-2016

Business Support Organizations	Quantity of companies	Percentage
Technology Parks	35	5.3%
Technology Incubators	12	1.8%
Academic Business Incubators	10	1.5%
Technology Transfer Offices	20	3.0%
Business Angel Networks	5	0.8%
Local and Regional Loan Funds	112	16.8%
Credit Guarantee Funds	97	14.6%
Training and Consulting Centers	154	23.1%

Source: author's own research based on survey.

In order to get a fuller picture of the impact of Business Support Organizations on the innovation activity, the analysis includes the degree of novelty of the solutions implemented. Entrepreneurs will determine whether the solutions introduced were new only for the enterprise itself, for the market in which it operates, on a national or global scale.

The questionnaire form used in the study was structured in such a way that the answers were dichotomous in nature. If the entrepreneurs introduced any of the analyzed types of innovations or used the services of the tested support organizations, they answered the question in an affirmative manner. Then, in the Excel spreadsheet, responses were given a value of 1 if they were affirmative or 0 if they were negative (no innovations were introduced in the enterprise or business services were not used).

Econometric modeling was carried out using *Statistica* software. In the case of dichotomous variables, the probability calculus can be used. Theoretically, in this case, a linear probability model can be used, which is easy to estimate using multiple regression methods. It was popular especially in the 60s and 70s of the last century (Maddala, 2006). However, the use of this function is not recommended, because the value of such a function may be negative or greater than one and, in the case of this study, these values are devoid of interpretative meaning (Stanisz, 2007). Generally speaking, logistic regression is a mathematical model that can be used to describe the influence of several variables X_1, X_2, …, X_k on the dichotomous variable Y. When all independent variables are qualitative, the logistic regression model is synonymous with the log-linear model (Świadek, 2011).

The maximum likelihood estimation (MLE) is used to estimate the parameters of models with the dichotomous variable. It uses the assumption of the form of a logistic distribution (Gruszczyński, 2009). It is based on the

fact that a vector of parameters $\alpha_{(k)}^{M}$ is sought, which guarantees the highest probability of obtaining the values observed in the sample (Welfe, 2008). In the most general categories, MLE maximizes the credibility function or its square (Stanisz, 2016).

In logit modeling, the probability is expressed on the basis of odds. The probability is expressed by the number of successes in relation to the number of attempts, and the odds express the number of successes in relation to the number of failures (Danieluk, 2010).

In this study, two groups of enterprises were compared – those that used the services of support organizations and those that did not. In this context, logit modeling offers the so-called odds ratio that allows the comparison of two observation classes. It indicates the relationship that a given event (e.g. launching a new product on the market) will be in the group of elements (e.g. in enterprises using technology transfer offices) in relation to the fact that it will also be in the second one (e.g. in a group of entities that did not use the services of centers). They are expressed by the formula (Stanisz 2007):

$$OddsRatio = \frac{p_1}{1-p_1}\frac{1-p_2}{p_2} = \frac{p_1(1-p_2)}{p_2(1-p_1)} \tag{1}$$

The values of the odds ratio are interpreted as follows:

- *OddsRatio* > 1 – in the first group, the event is more likely to occur,
- *OddsRatio* < 1 – in the first group, the event is less likely to occur,
- *OddsRatio* = 1 – in both observation classes, the event is just as likely to occur.

This article presents the odds ratios that met the statistical significance conditions at the level of p=0.01 or p=0.05 or p=0.1.

4. Results

When analyzing the impact of Business Support Organizations on the implementation of product and process innovations in Pomeranian industrial enterprises, it is noted that they significantly affect the implementation of novelties. Under the influence of support organizations, process innovations are more often implemented than product innovations. Product innovations are implemented more than twice as often in entities that use local/regional loan funds, training and consulting centers, and technology parks in relation to entities that are not recipients of the listed institutions. On the other hand,

process innovations are implemented four times more often in enterprises that have established cooperation with technology transfer offices, almost three times more often among service users of technology parks, more than twice as often among entities using loan funds and training and consulting centers, and almost twice as often among service recipients of guarantee funds.

A detailed analysis of the implemented process innovations shows that the greatest opportunities for their occurrence are increased by innovation centers. Entities using technology incubator services are 4.5 times more likely to implement new production methods. In the case of loan funds, these odds grow more than two times, guarantee funds 1.5 times, and training and consulting centers 1.8 times. Business Support Organizations contribute the most to the implementation of production systems. The odds of their implementation grew almost nine times in entities that used the services of technology incubators, almost four times the academic business incubators, over three times the technology transfer offices, over twice the technology parks. The influence of training and consulting centers was shaped at a similar level as in the case of parks. The use of guarantee funds services increased the odds of implementation by 50%. Systems supporting business operations were more than three times more often implemented by entities that used the services of training and consulting centers, and more than twice as often as the recipients of guarantee funds and technology parks. Recipients of loan funds implemented this type of innovation 1.6 times more often than entities that did not use their services.

When analyzing the spectrum of new products implemented in industrial enterprises in the Pomeranian Voivodeship, it is evident that innovation centers contribute more to the implementation of new developments on a national or global scale than an enterprise or market. In order to increase the chances of implementing product innovations in the scale of the enterprise, innovation incubators have been contributing to technological incubators, which increased them five times. In the case of loan funds, the increase was over 2.5 times, and the guarantee funds and training and consulting centers almost twice times. At the same time, the centers increased the odds of implementing new products for the market almost three times regionally and more than three times on a national scale. Novelties on a national scale were implemented more than 2 times more often by entities using the services of technology parks. Academic business incubators increase the odds of implementing new innovations on a global scale over 14 times. Enterprises that used loan fund services implemented novelties nationally 50% less often, and globally as much as 75%.

Table 2.7. Influence of Business Support Organizations on product and process innovations in the Pomeranian Voivodeship in 2014-2016

Business Support Organizations	Imple-mentation of new product	Imple-mentation of new technolo-gical processes	including:		
			manu-facturing methods	production-related systems	support systems
Technology Parks	2.08***	2.97**		2.24**	2.12***
Technology Incubators			4.49**	8.80*	
Academic Business Incubators				3.90***	
Technology Transfer Offices		4.19***		3.26**	
Business Angel Networks					
Local and Regional Loan Funds	2.43*	2.42*	2.35*		1.60***
Credit Guarantee Funds		1.78***	1.58***	1.56***	2.33*
Training and Consulting Centers	2.15*	2.23*	1.76*	2.16*	3.62*
constants			0.56*	0.19*	0.14*
chi-square	38.49	56.20	48.63	50.39	83.40
p-value	0.0000	0.0000	0.0000	0.0000	0.0000

Note: * - statistical significance 0.01; ** - statistical significance 0.05; *** - statistical significance 0.1
Source: author's own research based on survey.

Taking into account the degree of novelty of the implemented product innovations, it is noted that Business Support Organizations most often initiate the implementation of novelties in the scale of the enterprise. Loan funds increase the odds for this type of novelty to occur more than twice, while technology parks, training and consulting centers and guarantee funds almost two times.

The impact of innovation centers on the implementation of innovative processes on the scale of the market, the country and the world is greater than in the case of novelties for the enterprise. Establishing cooperation with technology incubators increases the odds of implementing new products on the market almost four times. Novelties on the national scale are 4.5 times more often implemented in entities that have used technology transfer offices and, on a global scale, from academic business incubators. The odds of implementing new processes on a global scale grow almost three times among the recipients of technology parks.

Table 2.8. Influence of Business Support Organizations on the spectrum of novelty of product innovations in the Pomeranian Voivodeship in 2014-2016

Business Support Organizations	novelty for			
	enterprise	market	country	world
Technology Parks			2.21**	
Technology Incubators	5.03*			
Academic Business Incubators				14.22*
Technology Transfer Offices	0.37***	2.74***	3.08**	
Business Angel Networks				
Local and Regional Loan Funds	2.62*		0.55***	0.26***
Credit Guarantee Funds	1.89**			
Training and Consulting Centers	1.85*			
constants	0.36*	0.09*	0.16*	0.06*
chi-square	66.21	2.53	12.61	15.67
p-value	0.0000	0.0000	0.0056	0.0004

Note: * - statistical significance 0.01; ** - statistical significance 0.05; *** - statistical significance 0.1
Source: author's own research based on survey.

Table 2.9. Influence of Business Support Organizations on the spectrum of novelty of process innovations in the Pomeranian Voivodeship in 2014-2016

Business Support Organizations	novelty for			
	enterprise	market	country	world
Technology Parks	1.93***			2.74***
Technology Incubators		3.76***		
Academic Business Incubators				4.54***
Technology Transfer Offices			4.50**	
Business Angel Networks				
Local and Regional Loan Funds	2.16*			
Credit Guarantee Funds	1.65***			
Training and Consulting Centers	1.86*			
constants	0.69*	0.05*	0.06*	0.04*
chi-square	45.03	2.11	5.01	5.83
p-value	0.0000	0.1465	0.0251	0.0543

Note: * - statistical significance 0.01; ** - statistical significance 0.05; *** - statistical significance 0.1
Source: author's own research based on survey.

5. Discussion

In the Pomeranian Voivodeship in 2014-2016, Business Support Organizations played a significant role in stimulating the implementation of product and process innovations, and it should be emphasized that under

their influence the implementation of new processes took place more often. This arrangement of results is in line with the study conducted by Cieślik and Michałek (2018). They state that in countries belonging to the Visegrad Group (V-4), process innovations in particular cause an increase in the scale of exports of enterprises, and thus an increase in their competitiveness in international markets. Researchers found no link between exports and the implementation of new products. However, they approach the assessment of this phenomenon with great caution, similarly to the author of this study, as it is difficult to clearly assess the greater impact of BSOs in the implementation of process innovations. Lower frequency of product innovations may be related to the current level of Poland's development – new technologies increase production efficiency, but at the same time, entrepreneurs may have problems with creating new products. A similar hypothesis is also put forward by the authors of the said study.

When comparing the degree of novelty of product and process innovations, it is noted that for the first type of innovation, the quotient of odds ratio meeting the conditions of statistical significance was estimated. This means that although Business Support Organizations have been less likely to contribute to the implementation of product innovations, there are more regularities in their functioning in this area. In addition, the implementation of new products and processes were more often initiated by loan funds, training and consulting centers and guarantee funds than innovation centers, however, the impact of innovation centers was stronger (estimated values of odds ratios had a higher value). The results of research conducted on a sample of 438 new ventures in European enterprises show that favorable loans granted for financing innovative projects, assistance in building innovation networks or providing information are positively linked to the development of product innovations (Antolín-López, Martínez-del-Río & Céspedes-Lorente, 2016). While services related to this may be provided by all the analyzed institutions, entrepreneurs have greater access to funds and training and consulting centers.

As a result of the conducted analyses, it can be clearly stated that in the Pomeranian Voivodeship, innovation centers contribute more to stimulating novelty in the market, country or on a global scale than loan and guarantee funds or training and consulting centers. This is undoubtedly related to the nature of services provided by Business Support Organizations and their recipients. Research conducted in Lesser Poland confirmed that entrepreneurs (especially small and medium ones) in innovation centers are looking for knowledge about their own innovation potential, new technologies, financing opportunities for innovative activity, and support in entering foreign markets (Gródek-Szostak et al., 2017). These are areas closely related to new technologies, where the implementation of novelties only on an enterprise

scale can be risky due to the presence of other entities in the market that sell analogical products. In the medium-high or high-tech manufacturing sectors, entrepreneurs are more willing to implement new products that will be competitive on the market or in the world.

6. Conclusions

In the light of the above conclusions, it can be assumed that the objective set for this study was achieved – as a result of the analyses, the direction of impact and the impact of Business Support Organizations on the introduction of product and process innovations were determined. At the same time, the research hypothesis at the beginning of the article has been positively verified, i.e. Business Support Organizations affect the introduction of product and process innovations. Entrepreneurs in the Pomeranian Voivodeship, under the influence of support institutions, more often implemented new processes than products. In addition, innovation centers contributed to the implementation of new developments in the market, country or on a global scale, and loan and guarantee funds as well as training and consulting centers at the scale of the enterprise itself.

The analyses carried out clearly indicate that the functioning of support institutions in regional transformation systems brings tangible benefits for the region's economy. This is a clear signal for local government authorities to support the spread of knowledge through these institutions. The position of enterprises in domestic and international markets is improving due to the activity of innovation centers. The role of loan and guarantee funds, as well as training and consulting centers, is also important, although the strength of their impact is lower than the innovation centers. However, due to the possibility of reaching a larger number of enterprises (more than three times more entities used their services than of the innovation centers), the odds of implementing new products in the scale of enterprises are great in the surveyed region. This can be interpreted as the first step towards knowledge-based development.

At the same time, it should be kept in mind that although the study justified the necessity for Business Support Organizations to function in regional arrangements, which services provided by the analyzed entities are the most desirable and what their form should be, were not checked. This may be a contribution to the next study, a more extensive one, in which the services provided by Business Support Organizations will be assessed and the basket of services that these entities should provide will be defined.

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The dilemma – mature imitations or innovations? Investigating the productivity strategies of Polish agricultural machinery sector manufacturers

Bogdan Nogalski[1], Przemysław Niewiadomski[2]

Abstract

The essential objective of this publication is an attempt to answer the question: are the productivity-improving tools implemented by Polish businesses in the agricultural machinery sector innovations or rather mature imitations? Meeting an objective formulated in this way requires that specific tasks are achieved, which include: (1) in the theoretical domain – analysis of the literature directly related to the research subject matter; this will be reflected in a set of desiderata characterizing imitation and innovations, identified in the literature of the subject; the authors intend to start a discussion among deliberately selected experts – who represent the sector – aimed at developing definitions determining further research activities; (2) in the project domain – compiling a research tool in the form of an evaluation sheet, which will be a resultant of studying the literature and a discussion among deliberately selected experts; identification of fields particularly sensitive from the point of view of productivity, which is a derivative of implemented solutions defined as innovations or imitations; (3) in the empirical domain – determining whether the productivity-improving tools applied by Polish businesses in the agricultural machinery sector are understood as innovations or rather mature imitations? The outcome of the research was a decision to change the paradigm in thinking about enterprise development, recognizing that innovations and imitations do not constitute a self-contained strategic objective but rather productivity-improving tools.

Keywords: *imitations, innovations, enterprise maturity, agricultural machinery sector.*

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1. Introduction

New challenges result in Polish enterprises having to take active action associated with the technological revolution. Several such trends can be distinguished. One of the most important is the new wave of digitization, which affects an increasing number of areas of life. Today, there is an ongoing discussion about the digitization of the entire manufacturing process and intellectual work. In the field of industry, new digitization is expressed by the concept of the fourth industrial revolution. It requires defining a new approach towards data, which are becoming a manufacturing raw material creating value. Another macro-trend is building a circular economy. The increasing environmental pressure and dwindling natural resources will force the closure of raw material flow and instigate the recycling of resources previously treated as waste. Another anticipated element of a great global economic revolution seems to be bioeconomy. Polish companies will also face challenges associated with low emissions. Despite great development challenges resulting from macro-trends, Polish manufacturing companies still exhibit a series of delays and internal conditions, which require intervention. The economy of the future forces manufacturing factors to produce goods of the highest added value, while simultaneously mitigating the adverse impact of the processes involving the manufacturing and application of these goods on the environment and the society, and while maintaining the abilities to increase productivity. The aim should be to improve management efficiency regarding all resources. It will be possible to achieve this thanks to the solutions within the framework of two guiding concepts: mature imitations or innovations.

The origin of this research paper is – as defined by the authors of this study – a Responsible Plan for the Development of Businesses (SORP), which determined a new model of its development in the short term. It refers to manufacturing companies, which through their management process and structure – in the conditions of appearing market opportunities – in order to generate value, are able to rapidly and smoothly activate their resources; such enterprises are characterized by leanness and flexibility, as well as social responsibility and activity. On the one hand the strategy contains the most important challenges, which a Polish manufacturer will face within the next few years, and on the other, development traps, which he/she needs to overcome, and it also specifies the activities to serve that purpose. Achieving these objectives and implementing the assumptions of the Responsible Development Plan for Businesses requires a coordination of the post-development policy and introducing tools, actions, and methods oriented on individual management subsystems.

Naming a development strategy as a Productivity Strategy is a strategic exaggeration. This is why, it was concluded that the primary developmental challenge for modern manufacturers operating within the Polish sector of agricultural machinery was to increase productivity – both of work, as well as other production factors. The productivity of specific activity was defined as a relationship between its effects and the expenditure incurred in relation to its execution. In this context, productivity is a general measure of management and administration efficiency. It is a derivative of how effectively an enterprise converts the available resources – labor, real capital, data, and environmental resources – into products attractive for domestic and foreign consumers. Therefore, the question whether the critical tools for reaching this objective – applied by Polish manufacturers in the agricultural sector – are mature imitation or rather innovations, determining the quality of the improvement and its permanent and sustainable character is even more well-grounded.

In relation to the above, the essential objective of this publication is an attempt at answering the question: *are the productivity-improving tools implemented by Polish businesses of the agricultural machinery sector innovations or rather mature imitations?* Meeting an objective formulated this way requires that specific tasks are achieved, which include:

- in the theoretical domain $Z_{[1]}$ – analysis of the literature directly related to the research subject matter; this will be reflected in a set of desiderata characterizing imitation and innovations, identified in the literature of the subject; the authors intend to start a discussion among deliberately selected experts – who represent the sector – aimed at developing definitions determining further research activities;
- in the project domain $Z_{[2]}$ – compiling a research tool in the form of an evaluation sheet, which will be a resultant of studying the literature and discussions among deliberately selected experts; identification of fields particularly sensitive from the point of view of productivity, which is a derivative of implemented solutions defined as innovations or imitations;
- in the empirical domain $Z_{[3]}$ – determining whether the productivity-improving tools applied by Polish businesses in the agricultural machinery sector are understood as innovations or rather mature imitations?

The outcome of the research was a decision to change the paradigm in thinking about enterprise development, recognizing that innovations and imitations do not constitute a self-contained strategic objective but rather productivity-improving tools.

2. Starting point – definition findings

The ongoing consideration enables one to unequivocally state that the terms *"innovations"* and *"imitations"* are multi-faceted concepts, which generates difficulties in their clear definition and interpretation. The issues with the identity of these concepts mainly (but not solely) result from the fact that the theory of management and quality sciences, just like other more specific social sciences, is still dealing with a multitude of various incompatible directions, trends, approaches, schools or representations. There are numerous definitions, and there is a lack of uniformity (Zentall, 2006). In consequence, this leads to many misunderstandings in the field of concept interpretation. Because these terms are commonly present in both the everyday thoughts, as well as various types of elaborations (i.a.: Denison, 1962; Landreth & Colander, 2005; Huebner, 2005; Drucker, 1992; Baczko, 2010; Gomułka, 2009, Barnett, 1953; Jasiński, 2011; Marciniak, 2010; Haunschild & Miner, 2007; Korn & Baum, 1999) it is important – from the perspective of the conducted studies – to determine selected definitions, compare them and confront with the opinions of practitioners. This enabled us to develop, adopt, consistently apply, and understand these concepts at all stages of the executed study.

A relationship between innovation and imitation can be noted on the grounds of the research literature (Levitt, 1976; Hurley, Chotler, 2007) and as a result of the ongoing discussion. This relationship is manifested in the strategic conditioning of organizational activity on the changes ongoing therein. Although innovations are one of the key recommendations for organization striving to materialize their market, economic-financial and social objectives, it turns out that they are more of a magic spell and an element of a current fashion than a precisely defined and easily operationalized term.

Numerous elaborations on the issue of innovativeness indicate a certain tendency among companies to go after innovative solutions, understood as a series of "new" activities. Meanwhile, the practical experience of the authors shows that a large part of the entrepreneurs approaches the issue of innovation in a generic, usually intuitive, manner. It is mostly a reactive approach. This arises from the need to implement innovations, as a direct consequence of the dynamic changes and enforcing them by the market situation.

In general, two approaches to interpreting the concept of innovations can be distinguished in the literature (Jasiński, 2006, p. 10). It introduces a division into innovations in the strict sense (identified with a narrow approach) and innovations in the broader sense (a wide context).

The narrow approach context was used in order to conduct the study, with innovation defined as the first application of an invention (Mansfield, 1968, p. 83), the first use of a new product, process, system or device (Freeman,

1982, p. 7) or a new, previously unknown manner of satisfying new needs (Kasprzyk, 1980, p. 26-27). According to the adopted definition, innovations means studying, discovering, experimenting, developing, imitating and adopting new products, new processes and resource organization methods (Reichert, Beltrame, Corso, Trevisan, & Zawiślak, 2011, p. 15-25). Innovation is the basis for acquiring competitive leverage in the market and is increasingly more often seen as a long-term strategy focused on a permanent and conscious search for new ideas, concepts, inventions, practices, analyzing research and theoretical elaborations (Pichlak, 2012, p. 34).

Meanwhile, imitation means creative diffusion; copying aimed at a better application of existing potential, i.a., work, knowledge and capital, etc. It is seen as an alternative to innovation, however with a smaller risk, safer and usually less expensive for the entrepreneur, which can materialize as meeting business targets. Imitation shall not be recognized as an innovative, revolutionary or pioneering creative act but rather a conscious utilization of what already exists or had been designed in order to reach a new value.

An enterprise must choose a model to imitate, i.e., direct imitation or mature imitation. *"Mature Imitators"* know how to imitate and effectively utilize available solutions. They are able to conduct an extensive search for available real-time management methods, tools or concepts, operate based on several business models, as well as rapidly and efficiently implement the planned projects, flexibly modifying them according to the changing ambient conditions. Therefore, they carry out "*mature imitation*", integrating copied elements with an innovative approach and the familiarity of circumstantial conditions. It is characterized by high creativity and is usually associated with incurring large capital expenditures.

Undoubtedly "*mature imitations*" can constitute a great driving force for businesses; they prove their maturity, which is why they play an important role in developing management strategies. Seeing innovative activity as the sole solution for improving the value of a company is – according to the authors – a big mistake. There is nothing wrong in imitations and they should be seen as an operational strategy (Shane, 2008, p. 24; Cieślik, 2014, p. 4-6; Quiamzade, 2007, p. 243-258).

3. Test methodology and scope

The interdisciplinarity of the addressed issues creates problems when selecting test methods used for descriptive purposes. The conducted study utilized research methods and tools already verified within other work; however, the method and tools were selected according to the adopted methodological concept.

The first study stage [B_1], involving a method of reconstructing and interpreting Polish and foreign literature of the subject, resulted in selecting subsystems, which were a set of factors oriented on improving the manufacturing system. Separating manufacturing subsystems within a company, although under certain assumptions, enables treating them as an object, originating from management treated as a complex whole. The authors believe that a manufacturing subsystem consists of management processes, manufacturing (production) process organization and its execution (Figure 2.9).

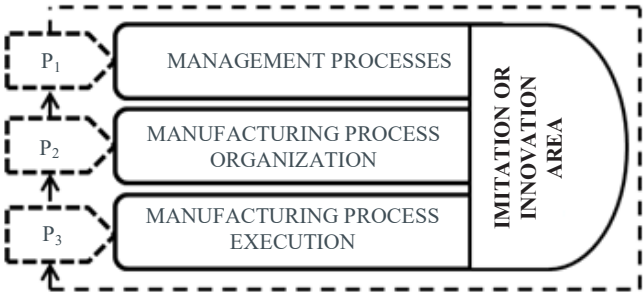

Figure 2.9. Imitations or innovations within a manufacturing subsystem

Such activity – within the project domain – enabled the compilation of a research tool in the form of an evaluation sheet, which is the resultant of exploring the literature and studying deliberately selected experts, based on the authors' 333 method[3] [B_2]. The application of the 333 method was dictated by: the ease of gathering an appropriate group of competent interlocutors; the possibilities to stimulate the group to think creatively; low cost of study implementation; the possibility to generate a large number of ideas over a short time. An important argument for using this method was a guarantee of free-thinking, elimination of a negative impact of the group, as well as pressure and domination of other people, reduction of possible tensions and quarrels in the group, as well as overcoming shyness and reluctance to express their own opinion in public owing to anonymity.

The conducted qualitative study was aimed at compiling a catalog of features – desired from the point of view of productivity, which is a derivative of implemented solutions defined as innovations or imitations. For this purpose, a team was set up consisting of 9 representatives of small (3 people), medium (5 people) and large (1 person) manufacturing companies functioning within

3 3 ideas, 3 rounds, 3 minutes.

the agricultural machinery sector. The process of selecting experts involved taking into account, mainly, their knowledge, a wide and holistic approach, independence and practical experience in the field of enterprise management. In every case, these were professionally active persons.

The basic principles of the procedure were presented to the participants prior to commencing the study. For 3 minutes, each person had the chance to write 3 desiderata on the sheet, which described the maturity of strategic business partners in supply processes of the enterprises they represented. Then, after 3 minutes, he or she gave the card to the subsequent person who added their observations. After the next 3 minutes, the card went to the hands of a subsequent expert. This way, after 3 rounds, a group of 9 experts generated 81 variables. After the end of the session, the assessment of the obtained results was summed up. The authors of the research noted all the mentioned characteristics and grouped similar ideas, which later made it possible to determine the ultimate list of 67 imitation or innovation-oriented aspects.

The scope of quantitative tests was determined based on the study results. The conducted research helped to formulate the problems and specific issues. They provided interesting information on the language "industry experts" used to describe the phenomena constituting the subject matter of the research. The authors believe this enabled them to avoid mistakes at the level of constructing questions and to adapt the wording to the potential respondents. These studies greatly helped the researchers to get closer to "economic practice," which largely facilitated proper execution of the quantitative tests and a full understanding of individual issues by the respondents. The introduction of such a number of variables significantly complicates and prevents a reliable evaluation. Therefore, it was decided to move to the next stage of research [B_3], which involved verifying the correct selection of individual imitation- or innovation-oriented domains. The study was aimed at developing a research questionnaire in the form of a list of fundamental features; it was a prerequisite to conducting the essential study [B_4].

The originally developed set of features was verified among 27 industry experts, who are classified in Table 2.10.

The experts were asked to indicate 15 characteristics of productivity, which is a derivative of implemented solutions defined as innovations or imitations, they believe to be the most important in the perspective of further research procedures. The significance was marked through arranging them (in a special table), in order from the most significant to the least important. The study involved all the invited experts. The group of people with higher education dominated among the respondents (74.07%); 18.52% of the expert held secondary education diplomas, while 7.41% had vocational education.

Table 2.10. List of experts participating in the study [B_3]

Group/Institution/Position	Number	Specialty	Share%
Owners and co-owners of manufacturing enterprises in the agricultural machines sector	13	Organization and Management, owner's supervision	48.15
Managers of manufacturing enterprises in the agricultural machines sector	7	Managing product, process and organizational innovations	25.93
Industrial Institute of Agricultural Engineering – Research Laboratory - Head	1	Modeling machine safety and assessment of conformity with requirements of EU directives and standards harmonized at the stage of concept and product designing	25.92
Department of Regional Policy, Marshal's Office of the Wielkopolska Province – Deputy Director	1	Innovative Wielkopolska, including the development plan for Wielkopolska and provincial programme projects; active participation in developing their execution conditions	
Consultant	1	Production management, including the optimization of manufacturing processes, designing and improving management systems with the use of principles and instruments of lean managements; identification and minimization of waste in the spirit of management through quality	
Consultant and author of several dozen investment projects for companies and local government units	1	Assistance schemes, participation in: PHARE, SAPARD, SPO WKP, ZPORR, INTERREG	
Coach/Practitioner	1	Transfer of technology and implementing innovative projects; organizational audits in companies operating based on innovative technologies	
Advisor/Coach/Practitioner	1	Implementing product innovations, business modeling, commercialization of knowledge and technology, development and implementation of R&D projects for enterprises and universities)	
Business Center Club expert		Management strategies, SME innovativeness, science-knowledge-business cooperation	
Total			**100%**

Source: own study based on data received from experts.

When selecting the experts, an important criterion was their direct acquaintance with the researchers. This made it possible to determine whether a respondent exhibited sufficient knowledge and experience within the field of the addressed task. Based on expert suggestions a list containing 25 fields of productivity, which is a derivative of implemented solutions defined as

innovations or imitations, was prepared. Taking into account the criterion of individual factor importance, the following solution was adopted for the essential stage of the research: the lower limit of the value range for the group of critical features was at least 20 indications. This was a procedure for defining a tool oriented at conducting the essential study [B_4], which involved interviews with 64 deliberately selected manufacturing enterprises from the agricultural machinery sector[4].

In order to conduct the evaluation, a five-grade scale was adopted (Table 2.11). The evaluation was based on the identification of 25 specific features, in regard to which the companies implement innovations or imitate solutions, existing in the environment.

Table 2.11. Evaluation level – description characteristic

Level	Descriptors	Feature
1	"Direct imitation"	Unreflective utilization of what is already existent or had been designed in order for others to achieve a new quality.
2	"Tailored imitation"	Conscious utilization of what is already or had been designed in order for others to achieve a new quality; tailoring the existing methods, concepts or solutions to the specifics of a given enterprise or specific operating conditions.
3	"Mature imitation"	Conscious utilization of what is already or had been designed, characterized by an innovative approach and familiarity with circumstantial conditions. It is based not only on imitating a leader but mainly on better research of the applicability of implemented solutions. The strategy of flexible imitation involves adapting the quality of a newly implemented solution to the target requirements. Assimilation of solutions developed by others and the simultaneous implementation of own, original creative work.
4	"Sectoral innovation"	The first application of an invention, new product, process, system or device or a new, previously unknown manner of satisfying new needs in the scale of a sector.
5	"Breakthrough innovation"	The first application of an invention, new product, process, system or device or a new, previously unknown manner of satisfying new needs in the scale of a country.

4 The condition for obtaining the reliable research results is not only the correct construction of a research tool, but also the appropriate selection of respondents. When analysing the materials obtained on the basis of interviews conducted among 64 companies, the authors exercise far-reaching caution; it is assumed that the collected statistical data reflect only the opinion of a specific group of respondents.

The essential study stage [B_4] was conducted in the period of November-December 2018. It involved direct meetings, as well as – in order to obtain a better representativeness of the studied target group and acquire answers as soon as possible – surveys were also submitted to deliberately selected business partners associated with the Zakład Produkcji Części Zamiennych i Maszyn Rolniczych *[Spare Parts and Agricultural Machinery Manufacturing Plant]* "Fortschritt" and the Przemysłowy Instytut Maszyn Rolniczych *[Industrial Institute of Agricultural Engineering]*, as a party to the study.

A modern endogenous approach, a look through the prism of skills and inventory requires taking into account various perspectives and points of view. Therefore, the evaluation shall be conducted among the management of all levels and functional areas within a company, which would enable relating to the widely understood resources (tangible and intangible, including skills). In light of the above, the study involved the owners and managers directly associated with micro – 9 persons (14.06%), small – 18 persons (28.13%), medium – 33 persons (51.56%) and large – 4 persons (6.25%) manufacturing enterprises operating in the agricultural machinery sector. Enterprise structural analysis shows that they are dominated by companies based solely on Polish capital (78%), who have been present in the market for more than 10 years (80%). More than a half of the companies participating in the study are organized in the form of a business partnership and a vast majority (82%) declare activity both on the domestic and foreign markets.

The study was participated in by 26 owners (40.63% of the total respondents) and 38 managers (59.38% of the total population). The age of the subjects varied between 25 and 74 (34.38% in the 31-40 age group, 40.63% in the 41-50 age group and 14.06% in the 51-60 age group). Among the owners, 34.62% was more than 50 years old, with 42.31% of the owners in the 41-50 age group, while 23.08% of the owners were younger than 40. In the case of the group of managers, the distribution was as follows: 7.89% was older than 50 years of age, 39.47% were in the 41-50 age group, 44.74% of the managers was 31-40 years old, while 7.89% was below the age of 30. Detailed characteristics are shown in Table 2.12.

The leading group among the respondents were people with secondary (34.38%) and higher (57.81%) education; with 53.85% of the owners holding higher education, 30.77% secondary education and 15.38% vocational education. In the case of the managers, 60.53% had higher education, 36.84% secondary education, and 2.63% graduated from vocational schools. Detailed characteristics are depicted in Table 2.13.

Table 2.12. Characteristics of the studied population by age (N=64)

	Age					
	Owners		Managers		Total	
	40.63%		59.38%		100%	
	N	**%**	**N**	**%**	**N**	**%**
up to 30	N=1	3.85	N=3	7.89	N=4	6.25
31 to 40	N=5	19.23	N=17	44.74	N=22	34.38
41 to 50	N=11	42.31	N=15	39.47	N=26	40.63
51 to 60	N=6	23.08	N=3	7.89	N=9	14.06
more than 60	N=3	11.54	N=0	-	N=3	4.69
Total:	**N=26**	**100%**	**N=38**	**100%**	**N=64**	**100%**

Source: own study based on research.

Table 2.13. Characteristics of the studied population by education (N=64)

	Education					
	Owners		Managers		Total	
	%		%		100%	
	N	**%**	**N**	**%**	**N**	**%**
Vocational	N=4	15.38	N=1	2.63	N=5	7.81
Secondary	N=8	30.77	N=14	36.84	N=22	34.38
Higher	N=14	53.85	N=23	60.53	N=37	57.81
Total	**N=26**	**100%**	**N=38**	**100%**	**N=64**	**100%**

Source: own study based on research.

The outcome of the research explanations must always be a reliable evaluation and interpretation of the facts and judgments, in order to ultimately duly justify the scientific laws, and the theorems verified and expressed in general sentences or sentences close to general (Apanowicz, 2002, p. 33). This is why the further part of the publication attempts to interpret the results and a more thorough analysis based on respondent declarations. It was necessary to describe the obtained data and interpret them.

4. Mature imitations or innovations? Results of own research

The literature of the subject in the field of management and quality sciences, we can indicate numerous publications emphasizing the importance of innovations and covering the topic of how to effectively create innovations and efficiently manage them (Krzakiewicz, Cyfert, 2016, p. 180). The authors of these publications show that imitators, if they will survive at all, will be doomed

for a grim fate and will have to settle for what the innovators leave them, whereas imitation itself is presented as a spontaneous process with no clearly specified purpose, which the innovators can easily protect themselves from by creating high entry barriers to the sector and increasing the scale of operations. Meanwhile, imitation and innovation are not mutually exclusive phenomena but should form an integrated system associated with inter-complementary characteristics and a synergy effect, which means that imitation should not be seen as a development barrier but rather as a stimulator of a properly organized management process. In the current management conditions, imitation activities relate to the increasingly wider spectrum of products, services, processes, and business models, and are becoming more rational as a result of incurred expenditures and potential profits. These realities convert imitation into an important strategic factor, which the companies cannot ignore.

A wide discussion recently ongoing in many environments, among both researchers, as well as practitioners, has given, not for the first time, rise to the question: is it possible to work out a leading business position based on imitation activities. The authors believe that the answer to this question can be the quotation below: *"The days of the great mind thinking are gone, and clever imitation is called for as an effective strategy"* (Bonabean, 2004, p. 45-54). Increasingly more companies recognize a business model, in which the imitation activity is the reference point. This statement became a starting point to formulate the following hypothesis: *the productivity-improving tools implemented by Polish businesses in the agricultural machinery sector are mostly of a mature imitation nature.*

This article, which is a voice in the discussion between theorists and practitioners searching to strike a balance between innovation and imitation, concentrates on this topic. When implementing its project within a variable environment, an enterprise should exhibit high adaptability. This implies a need to adopt new solutions, skills, standards, values, patterns, and behavior. In order to meet these requirements, a company should introduce changes, which due to the selection, hierarchization and systematization of the issues are included in 10 areas only (Table 2.14).

The increasing market competition is associated with the need to constantly accelerate the decision-making process. Symptomatic is the fact that the growth of the data flow was contributed to by the development of IT technologies, which make it possible to create systems supporting the decisions of the management staff.

Table 2.14. Imitations vs. innovations – study in the field of management processes

	DESCRIPTORS	1	2	3	4	5	Aver.
				%			
MANAGEMENT PROCESSES	Solutions supporting decision making	8.0	9.0	38.0	7.0	2.0	2.78
		12.5	14.1	59.4	10.9	3.1	
	Solutions supporting employee management	3.0	11.0	41.0	6.0	3.0	2.92
		4.7	17.2	64.1	9.4	4.7	
	Acquiring external cooperation partners.	1.0	11.0	40.0	7.0	5.0	3.06
		1.6	17.2	62.5	10.9	7.8	
	Delivery timeliness	-	9.0	40.0	9.0	6.0	3.19
		-	14.1	62.5	14.1	9.4	
	Supporting communication with customers; building trust and cooperation	-	9.0	33.0	15.0	7.0	3.31
		-	14.1	51.6	23.4	10.9	
	Lead time	1.0	9.0	30.0	14.0	10.0	3.36
		1.6	14.1	46.9	21.9	15.6	
	Efficiency of administrative actions	1.0	11.0	32.0	14.0	6.0	3.20
		1.6	17.2	50.0	21.9	9.4	
	Product policy; managing product portfolio; managing product information	-	12.0	23.0	21.0	8.0	3.39
		-	18.8	35.9	32.8	12.5	
	Delivery management, i.e.: receiving deliveries, verification (quantitative or qualitative/inspection, delivery status, remarks)	1.0	9.0	37.0	11.0	6.0	3.19
		1.6	14.1	57.8	17.2	9.4	
	After-sales policy (exchange policy, proceeding returns and complaints)	3.0	12.0	29.0	13.0	7.0	3.14
		4.7	18.8	45.3	20.3	10.9	

Source: own study based on research.

The IT systems used in the decision-making process, depending on its nature, can have a different operating scope. Despite the awareness that their implementation creates the possibility for the storage of information, giving management staff the appropriate knowledge in the field of processes undergoing within a company which, in turn, enables the determination, and later the execution, of tasks aimed at meeting the previously adopted objectives (Nogalski, Surawski, 2003, p. 205), these systems are not classified in the category of innovations (average rating 2.78; 3.1% of 5s). Actions supporting teamwork, which enable simultaneous work on common data and providing mechanisms to coordinate and track the progress of the activities are perceived in a similar manner (average rating 2.92; 4.7% of 5s). The category of mature imitation – according to the studied companies – includes complex tools for managing the relationships with business partners, enabling them to increase sales efficiency (average rating 3.06; 7.8% of 5s). Despite the fact that a customized tool provided much information on the market, hence, increasing the sales level and improving the cooperation with end clients, it is

not seen as an innovation, even within the sector; it was rather recognized as a complex Web-based tools utilizing the portal solution.

Timeliness is a measure of productivity, understood as an ability to meet specified delivery lead times. Because each company wants to be competitive, which depends on delivery efficiency, its natural objective should be a constant improvement in terms of timeliness. In the course of the studies, it was noted that improving timeliness involved shortening the order lead time, Just-In-Time [Kumar, Motwani, 1995], theory of constrains TOC (Mabin, Balderstone, 2000), single-minute exchange of die SMED (Shingo, 1985), total productive maintenance TPM (Madu, 2005), value stream mapping VSM (Nepal, Natarajarathinam, Balla, 2011) and others. However, in order to effectively imitate any of the available approaches or tools, it is necessary to adapt them to a specific enterprise and the conditions it operates in. Because in order to improve delivery timeliness, the vast majority of the studied entrepreneurs imitate existing practical solutions, therefore, mature epigonism is noted in this regard (average rating 3.19; 9.4% of 5s). Actions aimed at supporting customer communication, including building trust and cooperation, were relatively highly rated in the course of the conducted studies. Attention was drawn to the use of social media as modern tools for communicating with the client; Facebook and company homepage, as well as using other social media channels, such as: Blog, Instagram, Pinterest, Snapchat, Twitter or Youtube. This is not a surprise since it is a crucial medium in building brand recognition and awareness, hence, added value of the company. Possibilities to acquire knowledge about own brand, products and customer service methods were indicated. Despite the fact that these are interactive tools allowing one to build own groups of committed recipients, they are not seen as innovations but as mature imitation (average rating 3.31; 10.9% of 5s).

The direct interviews conducted by the authors indicate that – in the context of customer service – the studied entrepreneurs point to a too low efficiency of part picking and release processes, which results in delivery delays and mistakes. This mainly concerns mistakes resulting from the product range nature. Moreover, order lead time is too long, which is caused by the need to fill out many paper documents (excessive formalization). It is therefore suggested to introduce manual bar-code readers, which enable automatic identification of the products, their quantity and the immediate verification against shipment specification. Furthermore, after preparing a shipment, additional verification of the prepared product batch is recommended, in order to eliminate potential mistakes. Such an inspection involves both the product range of a prepared shipment, as well as its conformity with waybill data (e.g., delivery destination, recipient data). Although the imitated solutions bear the

hallmarks of innovation, the need to customize them makes this field classified in the category of mature imitation (average rating 3.36; 15.6% of 5s).

Most owners, especially of small and medium-sized companies, would like to spend more time on business operation development. At the same time, they are aware that in the light of limited funds and a small number of employees, the excessive number of documents restricts the time they could devote to more important processes in the company. Attention is drawn to the need to increase expenditure on advanced digital document processing systems, especially since the studied companies are still not sufficiently taking this chance; automation of the processes is a field generating the highest return on investment. Implementing tools, which automate document segregation, storage and archiving (data from different channels), printout, scanning and sharing in digital form, while being important, were not classified as innovations; they are rather seen as mature imitations (average rating 3.20; 9.4% of 5s). The authors believe this is due to the fact that the vast majority of the companies point to outsourcing selected processes to external providers as an antidote for administrative challenges.

Developing a product portfolio is a critical element in creating the entire productivity strategy to be followed by a company in the future. This is a very complex and time-consuming process. Moreover, it virtually never ends, since an implemented offer is not universal, there must be changes and it must respond to the current market demand and consumer sentiment. Attention is drawn to the need to gather, manage and expand product information, develop product catalogs and distribute information to sales and e-Commerce channels. As a result, the companies are able to significantly improve the quality of data, their accuracy and completeness, at the same time simplifying and streamlining product catalog management. This makes it possible for the companies to more easily and quickly create attractive products and supply them onto the market, provide the customers with a good experience, win more markets, improve the conversion ratio and utilize new sales channels. Today, business applications concentrating on product information management in order for them to be used within the entire organization – from the supply chain to sales – are the basis of each strategic initiative concerning product promotion and, therefore, they do not constitute innovations according to the studied companies (average rating 3.39; 12.5% of 5s).

A response to the current situation in the agricultural machinery market is a modern manner of supply chain management. This is why enterprises strive for a systematic improvement of the organization through implementing systems and introducing new technologies. This way of thinking encourages a constant roll out of changes, open to unconventional methods of operation and teamwork. The Just-In-Time model, which involves minimizing the

inventory and shortening the manufacturing cycle, is strictly associated with this philosophy. This, in turn, is associated with smaller warehouses, fewer employees, and lower costs. However, this model brings many benefits not only in the event of an excellent and precise exchange of data between supply chain partners. A necessary prerequisite for supply chain planning is information, the processing of which requires the application of appropriate information technologies. Software supporting the execution of a supply chain has the task of automating individual stages of such a chain. Since such software can be quite simple and only enables the direction of orders from manufacturing plants to relevant suppliers of raw materials or products necessary in the manufacturing process, the aforementioned area of operation was classified in the mature innovation category (average rating 3.19; 9.4% of 5s).

The activities aimed at high after-sales service quality, which imply a positive company image, were classified in a similar way (average rating 3.14; 10.9% of 5s). The conducted study allows one to unequivocally conclude that in order to improve productivity in the field of "*Management Processes*" the majority of the studied enterprises imitate existing market solutions and adapt them to their own needs. The research in the field of *"Manufacturing Process Organization"* involved selecting 9 descriptors used for the evaluation (Table 2.15). The approach utilizing experience, wisdom and creativity of others, enabling the subsequent designing of tools, which would enable everyday tasks to be carried out without any defects, and over their full duration, is mainly promoted in the group of manufacturing enterprises (average rating 2.89; 4.7% of 5s). It is critical to shorten the cycle time between the appearance of a specific defect and its detection (so-called waste window).

In order to adapt production to variable market requirements, it is necessary to decrease the manufacturing batch sizes. This assumption gives rise to a need for shortening changeover times because it is these times that usually determine the manufacturing batch size. This objective is achieved thanks to such a division and simplification of the entire process, where changeovers are executed safely, as per a specified standard, with the use of the smallest possible number of tools and with as little effort as possible. Changeover times are shortened thanks to the application of the SMED (single-minute exchange of die) method, with its implementation – according to the studied enterprises – seen as mature imitation (average rating 3.05; 4.7% of 5s).

Table 2.15. Imitations vs. innovations – study in the field of manufacturing process organization

	DESCRIPTORS	1	2	3	4	5	Aver.
		%					
MANUFACTURING PROCESS ORGANIZATION	Manufacturing cycle (lead time) minimization	-	12.0	21.0	22.0	9.0	3.44
		-	18.8	32.8	34.4	14.1	
	Improving the value added ratio (work time share percentage vs sample awaiting time)	2.0	12.0	19.0	21.0	10.0	3.39
		3.1	18.8	29.7	32.8	15.6	
	Work standardization	2.0	13.0	24.0	18.0	7.0	3.23
		3.1	20.3	37.5	28.1	10.9	
	Preventing errors	2.0	16.0	36.0	7.0	3.0	2.89
		3.1	25.0	56.3	10.9	4.7	
	Shortening changeover times	2.0	13.0	32.0	14.0	3.0	3.05
		3.1	20.3	50.0	21.9	4.7	
	Improving a work position	3.0	12.0	34.0	14.0	1.0	2.97
		4.7	18.8	53.1	21.9	1.6	
	Minimizing the average finished product inventory	3.0	10.0	25.0	18.0	8.0	3.28
		4.7	15.6	39.1	28.1	12.5	
	Minimizing average work-in-process inventory	3.0	11.0	26.0	16.0	8.0	3.23
		4.7	17.2	40.6	25.0	12.5	
	Reducing the distance between individual work positions within a manufacturing cycle	2.0	16.0	39.0	7.0	-	2.80
		3.1	25.0	60.9	10.9	-	

Source: own study based on research.

Establishing and keeping high-quality work positions – according to the studied companies – involves imitating the techniques and methods relevant for 5S. Since 5S is one of the basics of Lean Manufacturing and Lean Management, it is not classified within the category of innovations (average rating 2.97; 1.6% of 5s).

Despite attempting various concepts and techniques aimed at eliminating inventory, most companies must still maintain them. Due to the fact that maintaining inventory is associated with the need to incur costs, the issue of controlling inventory becomes a challenge for an entrepreneur. They have to be able to find an answer to the many questions regarding the storage locations for the inventory and product items available in these locations, the order sizes, order placing time, inventory size, safety, etc. In addition, the operating conditions of the company, the assumptions it adopted, and the issues associated with the required customer service level have to be taken into account. This all makes the decision regarding the selection of a specific solution in terms of shaping the inventory very difficult and requires the application of methods enabling finding the right solution in this regard. Minimizing the average inventory of finished products is usually associated

with the flow of data, which cannot be handled without a professional IT tool. In this regard, attention is drawn to the use of robots and the optimal utilization of bar-code readers. Special terminals, which enable work outside the office, are implemented. Electronic platforms are becoming a normal place for companies to contact, exchange data and information, conclude and process transactions. This made it possible to develop very specific and previously impossible to implement tools, which are currently rarely seen as innovations (average rating 3.28; 12.5% of 5s). Proper synchronization of the production with the provision of appropriate sub-assemblies and components for individual work positions requires the use of a pull system. Material management and handling in the course of transferring within an enterprise or warehouse can – according to the studied companies – be appropriately improved through the application of Lean Manufacturing tools. Despite the fact that Kanban cards, the application of a supermarket or a logistics train, significantly streamline the flow of products and information, that is, internal logistics, they were not classified as innovative actions (average rating 3.25; 12.5% of 5s). In light of the above, attention is drawn to the need to reduce the transferring distance to an absolute minimum. According to the surveyed companies, it is possible through a consistent and long-term imitation and implementation of Lean Manufacturing tools (average rating 2.80; 0% of 5s).

The conducted study confirms the conviction of the authors that in order to improve productivity in the field of "*Manufacturing Process Organization*," the majority of the enterprises imitate existing market solutions, adapting them to their own needs. The evaluation in the field of "*Manufacturing Process Execution*" was conducted based on 8 issues (Table 2.16).

The basic issue in terms of raising product quality is ensuring proper and specified system conditions for running their manufacturing processes. The basic criterion of efficiency is to reach an objective according to the established plans and procedures and using own resources and employee skills. This takes place in a teamwork manner and is integrated with other fields and functions within a company. Among the quality management methods implemented at the studied companies, the authors identified the ones having a medium-term impact on shaping product quality and execution quality: QFD (Quality Function Deployment), value analysis, FMEA (Failure Mode and Effect Analysis), DoE (Design of Experiments), SKO (statistical receiving inspection) and SPC (Statistical Process Control)[5].

5 Cf.: (Hamrol, Mantura, 1998).

Table 2.16. Imitations vs. innovations – evaluation in the field of "Manufacturing Process Execution"

	DESCRIPTORS	1	2	3	4	5	Aver.
		%					
MANUFACTURING PROCESS EXECUTION	Methods for improving the quality of offered products	1.0	8.0	19.0	29.0	7.0	3.52
		1.6	12.5	29.7	45.3	10.9	
	Manufacturing process execution (technology, items, means of labor, tools, etc.)	1.0	7.0	17.0	30.0	9.0	3.62
		1.6	10.9	26.6	46.9	14.1	
	Production instrumentation	3.0	8.0	16.0	29.0	8.0	3.48
		4.7	12.5	25.0	45.3	12.5	
	Synchronising work positions and manufacturing departments	3.0	12.0	26.0	17.0	6.0	3.17
		4.7	18.8	40.6	26.6	9.4	
	Eliminating downtime caused by awaiting instructions, decisions, accessories, material	3.0	13.0	25.0	18.0	5.0	3.14
		4.7	20.3	39.1	28.1	7.8	
	Reducing variability, deviation of process parameters	3.0	8.0	21.0	26.0	6.0	3.38
		4.7	12.5	32.8	40.6	9.4	

Source: own study based on research.

The set of traditional tools is also expanded by a group of so-called new quality management tools [Hamrol, 2005], which includes: relationship diagram, cause interdependence graph, affinity diagram, ordering data and information, decision tree systematics diagram, matrix diagram, table diagram, matrix analysis of data, decision-making process schedule graph, selection of the optimal target achieving method and arrow diagram or the computer-assisted PERT method. These tools, despite the fact that they generally concern issues associated with quality and are the output of pro-quality management systems, have a wide application range in all fields of manufacturing operations, even in small companies, where standardized quality systems were not implemented. The studied enterprises are characterized by the ability and motivation to constantly search for and apply in practice the outcomes of new research and innovations, therefore, the product quality management methods they implement – despite a high level – are seen as mature imitations (average rating 3.52; 10.9% of 5s)[6].

To accomplish the tasks associated with ensuring the quality of a product and manufacturing processes, it is necessary to manage the available measures, which enable shaping product quality at every product and technology development cycle stage. In the course of a technological process, raw materials, materials, semi-finished products and power, as a result of a correctly selected technology, gradually change their shape and performance properties.

6 The companies believe that these methods, though common and known, are useful in order to ensure manufacturing process stability through reducing its variability, which explains why this field is seen as an imitation (average rating 3.38; 9.4% of 5s).

This requires a company to exhibit an ability to constantly search for uniqueness, introduce changes, operate elastically and learn fast, as well as a great ability to acquire and allocate new resources, which according to the studied entities are also seen as mature imitations (average rating 3.62; 14.1% of 5s).

Increasing the scope of operation of machinery and equipment used in manufacturing processes is determined by the possibilities of producing accessories ensuring the best possible optimization of the manufacturing process, executed within the framework of company operation, both in terms of quality, as well as quantity. Mass production of various elements or shortening their lead time is often possible only upon using the correct equipment, tailored to a specific machine. Elements, which increase the productivity may include, e.g., supporting slats, appropriate molds, grippers, cutting tool adjusting sleeves, pins for mounting machined elements, etc. Such equipment is dedicated to specific machines and manufacturing processes; hence, the need to adapt it occurs in the event of changing the product range or using other manufacturing tools. Many equipment elements are created based on the manufacturing experience and the demand reported by the operators of specific manufacturing line machines. It is created while satisfying the expectations of a customer regarding the capabilities and new functionalities introduced into the manufacturing process, which is why the studied enterprises believe it is of a mature imitation nature (average rating 3.48; 12,5% of 5s).

The essence of operation of manufacturing enterprises is the optimal design of individual operations, namely, manufacturing activities in a correct sequence. Incorrect planning of the operational sequence leads to generating unnecessary costs and extending production time. The issues associated with improving production preparation processes seem very important due to the companies aiming for ever shorter production cycles. Process improvement is forced not only by striving for decreased manufacturing costs, but mainly by the need for competitive activities within the market. The creation of such conditions is supported by the correct organization and the relevant division of responsibilities, which guarantee full loads in work positions and the maximum possible compactness of a technological process. In order to improve work organization in a manufacturing position, it is necessary to thoroughly analyse the issues and make it a basis to generate a catalogue of residual actions, which enables improving the executed tasks and prepare suggested useful methods, techniques and tools that could contribute to increased manufacturing capacity of the work positions and to achieve cost optimization. The studied businesses believe that changes introduced to a work position, not necessarily innovative (average rating 3.17; 9.4% of 5s), are sure to translate to the increased capacity of the entire process and a long-term reduction of company costs.

Deciding with regard to the sequence of manufacturing tasks within systems or operation in manufacturing positions is one of the basic issues associated with controlling the production flow. Decisions in regard to the execution sequence of products and operation in individual positions are made during the on-going allocation of operations to specific positions. Selection of a product or operation from a set, to await execution or are accepted for execution regardless of the adopted criterion means that a task or operation is given the highest degree of urgency, namely, a priority. In light of the above, it is necessary to eliminate all downtime caused by awaiting instructions, decisions, accessories or material. Planning, ongoing records of the work progress and material consumption, analysis of the manufacturing sequence and process adjustment through actions, which coordinate and eliminate deviations, constitute efficient production control. It requires not only current information on the work progress and manufacturing inventory status, but also appropriately selected data processing methods. The variety of types and forms of organizing production, as well as the impact of customer expectations on the product variability determines the selection of a manufacturing control method appropriate for the company and the functionality range of the tool supporting planning activities; in the case of the studied enterprises, these tools bear the hallmarks of mature imitations (average rating 3.14; 7.8% of 5s).

The conducted study confirms the conviction of the authors that in order to improve productivity in the field of "*Manufacturing Process Execution*," the majority of the implemented solutions, tools or management methods is of a mature imitation nature. The vast majority of the studied enterprises focus on utilizing what already exists or had been designed. However, this is creative imitation, characterized by an innovative approach and the knowledge of circumstantial conditions. The applied strategy of imitation is not based only on copying a leader but mainly on better research of the applicability of adopted solutions. The strategy of flexible imitation involves adapting the quality of a newly implemented solution to the target requirements. In other words, it is seen as an assimilation of solutions developed by others and the simultaneous implementation of own, original creative work. The first extra-sectoral application in relation to an invention, new product, process, system or device is recorded to a minor degree.

5. Conclusions

The agricultural machinery sector is dominated by enterprises which, inspired by innovations and observing a pioneer, focus on competitive, efficient and mature imitation. Although innovations are a large driving force for contemporary manufacturers – manifesting their development and

maturity – they should not be seen as the sole solution for improving the value of a company. Although many experts still underestimate the strategy of imitation, it should be noted that contemporary Polish companies can be creative and go-getting, which, unfortunately, does not always translate into good financial results and a leading competitive position. An example is Ursus S.A.[7], a company which, supported by the Lublin University of Technology, put an innovative electric bus into production. Ursus S.A. is a fully innovative company, which responds to market requirements and is willing to offer products with the most technologically advanced parameters. Despite the cooperation of the enterprise with numerous research facilities, leading to innovative solutions, they were not successfully marketed. In this case, an innovation-oriented policy was not the right system, which would ensure effective links between science, technology, administration, and the market. We are currently witnessing a restructuring procedure involving the plant, which ran into financial difficulties in 2018, partially because of the bus company. 2017 ended for Ursus S.A. with a 20-million loss, which was associated with postponed bus orders (www1). The developing bus company was awarded a contract, but their performance was planned for the following year, which combined with large expenditure on innovations, significantly impacted the financial condition of the entire business.

The beginning of 2019 is a good time to discuss the innovativeness of Polish enterprises and the effectiveness of their innovation policy. Such speculations – according to the authors -should motivate entrepreneurs and scientists (especially, researchers of management and quality sciences) to take deeper reflections on imitation strategy, as this would decrease the degree of difficulty in attempting and implementing investments, lower the degree of risk and uncertainty, and help entrepreneurs, who are not fully familiar with the mechanisms of introducing innovations, make optimal choices.

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7 This is the largest Polish manufacturer of tractors and agricultural machinery, with more than 120 years of tradition in the mechanization of Polish agriculture. Ursus S.A. is the only company in the agricultural machinery and equipment sector listed on the Warsaw Stock Exchange.

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Implementation of the Fourth Industrial Revolution in the confectionery industry in Poland

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Abstract

The aim of the article is to answer the questions: 1) What is the mechanism (driving force) of the implementation of the assumptions of the Fourth Industrial Revolution in the specific conditions of the confectionery industry in Poland? 2) How mature is the analyzed industry in the implementation of the idea of the Fourth Industrial Revolution? The article is written on the basis of literature studies (general and related to the implementation of Industry 4.0 in the confectionery industry), secondary data related to the advancement of technological equipment in Polish enterprises and case study method. The case study is related to a large chocolate producer (a branch of a global corporation with more than 10 factories in Europe). The article describes specific production processes and main causes of implementation of technological innovation. The empirical research fills the literature gap and provides knowledge which can be useful in decision-making processes in the context of investments in the analyzed industry. The results can also be a basis to undertake research on the relationship between the labor market situation and the implementation of Industry 4.0 solutions in different industries and countries. The authors conducted general and in-depth literature studies. They characterized the confectionery industry with the focus on the specifics of production processes. They identified a driving force of the implementation of the assumptions of the Fourth Industrial Revolution in the specific conditions of analyzed industry in Poland. They also tried to assess – on the basis of their own concept – the maturity level related to the implementation of Industry 4.0 in the analyzed company and industry.

Keywords: *industry 4.0, Fourth Industrial Revolution, technological innovation, maturity level, confectionery industry, Poland.*

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1. Introduction

As Giddens (2001) states, something that most clearly distinguishes modernity from all preceding periods is the unbelievable dynamism. Nowadays, we are dealing with a dynamic era of change in the world of technology. Changes apply to everyday life and ways of performing work. The Industrial Revolution 4.0 (also referred to as the Fourth Industrial Revolution and the Cyber Revolution), is influenced by a range of new technologies and innovations resulting in driverless cars, smart robots, virtual reality, connected devices, artificial intelligence, etc.

Industrial Revolution 4.0 is an opportunity for development, especially for medium-sized industrial enterprises. It primarily results from the fact that the availability barrier of the latest manufacturing technologies is becoming increasingly easier to overcome and also because companies are responding faster and more flexibly to market needs. The main advantages to be achieved in production, as a consequence of implementing the Fourth Industrial Revolution assumptions, are as follows (Mychlewicz & Piątek, 2017):

- higher productivity – the possibility of using the available assets better and minimizing downtime, improved planning and monitoring of manufacturing processes, production cost optimization through identifying losses and monitoring costs, the possibility of tracing the current machine operation status;
- manufacturing "smart" products are ensuring traceability (e.g., using RFID tags) throughout their life cycle – from production, through transport, servicing, and recycling.

The above discussion should also include confectionery industry enterprises. It is worth noting here that the confectionery industry in Poland is developing much faster than other food industry sectors. It is, therefore, an interesting object of research. The continuously growing demand in the domestic market is noticeable. In addition, a high level of foreign investment is recorded in this market.

The purpose of the article is to answer the following research questions: What is the mechanism (the driving force) of the implementation of the assumptions of the Fourth Industrial Revolution in the specific conditions of the confectionery industry in Poland? 2) How mature is the analyzed industry in the implementation of the idea of the Fourth Industrial Revolution?

To achieve the defined purpose, the general characteristics of such concepts as the Fourth Industrial Revolution, Industry 4.0 and Smart Factory were presented. It was followed by discussing the industry sector under analysis, with the focus on the characteristics of manufacturing processes. Next, the authors presented the issue of measuring maturity level in the context of the implementation of Industry 4.0 with the results of the research conducted

on the topic of the advancement of technology and technological changes in Polish enterprises. In the third part of the paper the research methodology was characterized. Then the results of the in-depth literature studies, which focused on the implementation of the idea of the Fourth Industrial Revolution in the confectionery industry, were presented. The case study of a chocolate producer located in Lower Silesia was shown in the empirical part of the article. The article also provides discussion, conclusions from the conducted research, and identifies limitations resulting from applying the case study research method.

2. General literature background

2.1. Brief characteristics of the Fourth Industrial Revolution, Industry 4.0 and Smart Factory

The beginning of all industrial revolutions took place within the industry sector. In the Industrial Revolution 4.0, the commencement of a transformation process is not driven directly by the industry itself. The invention of social networks and intelligent devices used by employees should be considered as the main driving force. Today, the development of these mutual interrelations functions as the driving force for the production sector development (Schuh, Potente, Wesch-Potente, Weber, & Prote, 2014; Piwowar-Sulej, 2018).

The Fourth Industrial Revolution is a concept regarding the use of automation and both data processing and exchange, as well as the implementation of various new technologies allowing the creation of so-called cyber-physical systems and change in manufacturing processes. It also concerns the digitization of production, where devices and technological systems are connected with each other, including via the Internet, and where large amounts of production data are analyzed. We can consider the Industry 4.0 to be a conceptual aggregate that includes a number of new technologies – including the Internet of Things, cloud computing, Big Data analysis, artificial intelligence, as well as incremental printing, augmented reality or cooperating robots (Mychlewicz & Piątek, 2017).

The term Industry 4.0 refers to the Fourth Industrial Revolution and a German development program aimed at connecting people and machines to simplify all processes through digitalization (Weber, 2016). Although the term "Industry 4.0" has been around for almost seven years (it was used for the first time during the Hannover Messe in 2011), it is still unclear to many people, and there are many ways to interpret it. On the one hand, we can find that the Industry 4.0 has four main characteristics, i.e. vertical networking with individualized

production, horizontal integration across countries and continents, through-engineering and acceleration via exponential technologies (Deloitte, 2015). On the other hand, Industry 4.0 is sometimes attributed to one technology or a single change in production methods (Mychlewicz & Piątek, 2017).

The concept associated with Industry 4.0 is Smart Factory. This type of plant is based on cyber-physical systems, their integration using the Industrial Internet of Things and new methods of organization of production. The use and integration of technology enables high levels of personalization of products and production processes with low levels of participation of employees (Mychlweicz & Piątek, 2017).

Liao, Deschamps, Loures, and Ramos (2017) conducted the general literature analysis focused on the main research directions and the current research efforts connected in the Industry 4.0. The results show that attention has been paid to the concept of integration (especially vertical – IT systems' communication between different hierarchical levels of the company to share information and facilitate decision making company-wide; and horizontal – a connection of IT systems used at several different stages of the manufacturing process, either within the organization or throughout its supply chain networks). It can be seen that standardization and reference architecture, resource productivity and efficiency are the areas that attract most of the research efforts.

As a result of implementing modern, advanced technologies, an enterprise can increase its competitiveness in the market through (Mychlewicz & Piątek, 2017):

- developing a unique offer, offering personalized products along with minimizing costs,
- faster response to changes, shorter time-to-market for products,
- integration of production, storage and logistics processes.

Having the above in mind, it should be stated that various enterprises present different levels of advancement in the implementation of modern technologies. The level of advancement reflects the so-called enterprise maturity in implementing the idea of the Fourth Industrial Revolution.

2.2 The concept of maturity levels related to the implementation of the Fourth Industrial Revolution assumptions

In general terms, maturity is defined as "the state of achieving full development" or "the state of readiness for specific tasks" (Skorupka, Auderska, & Łempicka, 1969, p. 123). When assessing maturity level, it is important to select the characteristics which are naturally gradable on the continuum from an immature to a mature organization within a specific scope. As part of the introduction to the problem of enterprise maturity measurement,

it should be noted that achieving high maturity level results from the process of organizational learning.

For years enterprises have been measuring both process maturity (e.g., in quality management) and project maturity. For example, the Quality Management Maturity Grid developed by Ph. Crosby (1979) indicates five categories of an organization maturity measurement, which can be assessed on a 1-5 scale. The growing popularity of this model contributed, in the 1980s, to the development of further tools for assessing an organization's maturity in various areas of its activity. Among them the Capability Maturity Model Integration should be highlighted because it integrates previous proposals for process maturity assessment developed by Software Engineering Institute (for more see: Software Engineering Institute, 2006). In turn, one of the most popular tools used to assess project maturity in an organization is the Kerzner Project Management Maturity Model (PMMM). H. Kerzner identified five levels of maturity. At the first level, an organization has a common language, i.e. some knowledge about projects and is capable of distinguishing them from current activities or does not have such knowledge. At level 2 (joint processes), the processes are recognized within project management and the ability to replicate these processes in subsequent projects appears. At level 3 a uniform project management methodology is used, whereas level 4 takes into account the attempts made in an organization to improve the adopted methodology. At level 5, an organization itself can represent a role model for other organizations in terms of project management and self-improvement in the analyzed area (for more see Kerzner, 2001). The above-mentioned maturity assessment models are based on such enterprise characteristics as the existing knowledge and awareness of a particular problem, repeatability of practices and improvement of activities.

Efforts have been made in order to create maturity models in the context of the Industry 4.0 implementation. For example, Ganzarain and Errasti (2016) created Maturity Model in SME's towards Industry 4.0. The model includes the five following levels:

1) Initial: A company-specific industry 4.0 vision doesn't exist.
2) Managed: A roadmap of industry 4.0 strategy exists.
3) Defined: Customer segments, value proposition and key resources are defined.
4) Transform: The strategy is transformed into concrete projects.
5) Detailed BM: Transformation of Business Model.

The authors also develop a stage process model to guide companies in their Industry 4.0 vision and strategy finding process. The Vision 4.0 stage is dedicated to defining a tailored Industry 4.0 vision, developing its understanding of general Industry 4.0 ideas with company-specific capabilities and resources. Within the Enable stage the company starts from a substantial Industry 4.0 vision

and based on this vision, the company tries to define the technology portfolio and capabilities needed to give support to the new product-service solutions identified in the previous stage. The output of this stage is timely, ordered and multi-perspective map of the overall strategy towards the Industry 4.0 vision that builds the strategic frame for concrete actions (the last stage).

Scremin, Armellini, Brun, Solar-Pelletier, and Beaudry (2018) designed the Industry 4.0 Adoption Maturity Model (AMM). They identified 30 "maturity items," which can be assessed on a 0-4 scale and were grouped into eight maturity indicators organized along three axes (see Table 2.17). For example, "0" stage in the context of strategy is associated with the situation where Industry 4.0 is not part of the business strategy and no roadmaps are developed. In turn, in the "4" stage, Industry 4.0 is part of the business strategy of the company. Roadmap is developed with short-, medium- and long-term plans regarding the introduction of technologies and infrastructure, employee training and external/internal integration.

Table 2.17. Axes and their elements in the Industry 4.0 Adoption Maturity Model

Axes	Elements
Strategy	Business Strategy Indicator (used to assess the alignment between the company's business strategy and its implementation of Industry 4.0) Technology Strategy Indicator (used to assess the decision-making model designed by the company during the selection of infrastructure, standards and technologies related to Industry 4.0) Networking and Integration Indicator (assesses the scope of the introduction of Industry 4.0 in an organization)
Maturity	Infrastructure for Industry 4.0 Indicator (aims to assess the enabling infrastructure available to the company, given the requirements of Industry 4.0) Analytical Skills Indicator (i.a., the ability to analyze big data) Absorptive Capacity Indicator (reflects the company's ability to recognize and assimilate new information, practices and processes related to Industry 4.0)
Performance	Benefits of Industry 4.0 Adoption (economic, social, environmental) Impact on efficiency (based on 12 selected Key Performance Indicators such as i.a. number of breakdowns, cost reduction, energy consumption reduction)

Source: authors' compilation on the basis of Scremin, Armellini, Brun, Solar-Pelletier & Beaudry (2018).

Finally one can also find a maturity model specially designed for manufacturing companies. The so-called "acatech Industrie 4.0 Maturity Index" helps companies to determine which stage they are currently at in their transformation into learning, agile company. It assesses them from a technological, organizational and cultural perspective, focusing on the business processes. There are 6 stages in the Industrie 4.0 development path (Schuh, Anderl, Gausemeier, ten Hompel, & Wahlster, 2017):

1) Computerization. In this stage, different information technologies are used in isolation from each other within the company.
2) Connectivity. The isolated deployment of information technology is replaced by connected components.
3) Visibility. Sensors enable processes to be captured from beginning to end with large numbers of data points.
4) Transparency. In order to identify and interpret interactions in the digital shadow, the captured data must be analyzed by applying engineering knowledge.
5) Predictive capacity. The company is able to simulate different future scenarios and identify the most likely ones.
6) Adaptability. Continuous adaptation allows a company to delegate certain decisions to IT systems so that it can adapt to a changing business environment as quickly as possible.

At this point it is worth emphasizing that the survey conducted in 2015 by ASTOR company on the methods for data collection by production plants in Poland, shows that in the dominant group of companies data are manually entered into the system (59%), the second place is taken by companies where data collection is automated (36%), and 16% of the respondents still collect them manually on paper. On this basis, it is well visible that Polish industry still has space for mastering innovation, making one step ahead and keeping up with the change in the production sector (Iwański & Gracel, 2016). In 2016, the same company surveyed the automation level of companies in Poland. This study shows that the Third Industrial Revolution is a challenge for the management of Polish production plants. 76% companies are only partly automated, as few as 15% of the respondents indicated full automation and only 6% are at the stage of implementing Industry 4.0.

Also in 2016, Siemens carried out a study which focused on assessing the possibilities for industrial infrastructure development in Poland. The main reason for conducting the research was the need to determine both the current development status of Polish industry and the dilemmas associated with forecasting the future behavior of enterprises in the conditions of the Fourth Industrial Revolution. The survey covered a sample of N=100 people from the largest companies, employing 250 people or more, operating in the production sector and performing manufacturing activity in Poland. The respondents participating in telephone interviews (CATI) were the persons who made decisions regarding the scope of production automation in enterprises.

Referring to the results of these studies, it should be stated that as many as 89.7% of the respondents had never come across the idea of Industry 4.0 (Siemens, 2016). Polish companies are characterized by lower technological advancement compared to those from Western European countries. Companies with foreign capital stand out in terms of knowledge and application of the

particular production management methods. The companies with domestic capital, basically, use only the general rules of production processes optimization (Siemens, 2016).

2.3. Confectionery industry in Poland

The confectionery industry produces goods which use a significant amount of sugar and sugar substitutes. They are generally low in micronutrients, but rich in calories and carbohydrates. The confectionery industry consists of three categories: chocolate confectionery, sugar confectionery, and gum products.

In Poland until 1989 all chocolate producers were members of the Confectionery Industry Union, which was the result of an economic system based on central planning. Decisions related to the production profile of certain factories, production output, raw material procurement and the size and structure of the workforce, were taken by the state authorities. This situation changed as a result of the system transformation and privatization in December 1989. The transition from a centrally controlled economy to a free-market economy introduced changes in the confectionery industry.

The '90s saw a dynamic growth of the confectionery market in Poland. This growth was based on three pillars. The first pillar was the growth of existing Polish companies using their own capital. The second pillar was the establishment of new family-owned businesses which would operate in the local market. The third pillar was direct foreign investments made by multinational confectionery corporations. This investment was placed both in privatized Polish factories and in greenfield production plants. From 1991 to 1998, foreign investment in the Polish confectionery market came to 980.5 million USD, 40% of which was in greenfield sites (Kwil & Podsiadły, 2019).

The driving force for the development of the analyzed industry was mainly three factors: demand in the Polish market, low labor cost and Poland's accession to the European Union.

The huge demand in the Polish confectionery market was the first factor. Until 1989 the availability of confectionery goods was limited or even rationed. In the period 1993-1995, the average consumption of chocolate and other confectionery goods in Poland was 0.36 kg per person per month, which was several times lower than that of countries such as Switzerland, Germany, Belgium, Great Britain and France (Stasiak, 2006). Foreign producers who recognized the opportunity to increase their sales eagerly invested in the new market.

The second factor was very low labor cost in Poland because of the high unemployment rate and low wages. In 1996, the total annual labor cost per employee was 5,424 USD, while the average cost among European Union

member states was 33,572 USD (Stasiak, 2006). The average unemployment rate in the same period was 14% (Central Statistical Office, 2018). Companies did not have problems finding people willing to work. This is why investment in machinery was focused mainly on simple technology relying on manual labor.

The economic situation in Poland created a chance for foreign companies to improve the margin of production as well as optimize the level of investment. Investors also had a certain degree of freedom in the decision making process regarding the applied technologies.

At this point, it is worth characterizing briefly the technological processes in the confectionery industry. The confectionery production processes can be divided into two major components. The first of them is the production process and the second one is the packaging process. While the first of them forced investors to use machines and devices, without which producing a finished product was impossible, the second offered a choice, i.e. the option of using either packaging machines or manual labor. It should be noted that even when the use of machines and devices was indispensable, it was very common to transfer depreciated equipment from Western factories. Also, the individual operations, which did not require using any devices, were also based on manual work. An example is the production process for Jaffa Cakes (biscuits with jelly covered in chocolate). The baking mix preparation process took place in the dough-kneading machine, from which the dough was transported manually to the production line, where portioning and biscuit baking was carried out. At the same time, jelly was prepared in the cooking pot, which was later manually poured onto a cooling table, where the appropriate shapes were cut. The cooled jelly was manually placed on the biscuit and next the cake was coated with chocolate using a chocolate enrober. In this way, the production processes were based on well-proven, but old, technology. In the case of the packaging processes, using machines was even more limited as the majority of operations were based on manual labor.

The third important factor in the development of the confectionery industry in Poland was accession to the European Union. Lifting customs borders allowed the margin for products manufactured in Poland to be increased. Foreign companies gained production sites for Western European countries. The main players started to move production from Western Europe to Poland. Thanks to this investment, the export of Polish confectionery increased by nearly 80%, from 1.66 billion EUR to 2.98 billion EUR, and Poland became one of the main sweets exporters in the world, with a market share of 4.8% (Department of Strategy and International Analyses, 2017).

The technical development of production processes in the confectionery industry in Poland was infinitesimal because the labor costs remained low, even after Poland joined the European Union. The processes were based more

on solutions from the Third Industrial Revolution, which is associated with manual labor. In some cases foreign producers reduced the use of robots while moving their production to Poland. This situation has reversed within the last two years. The unemployment rate in Poland decreased from 17.6% in 2005 to a record low of 6.6% in 2017 (Central Statistical Office, 2018).

3. Research methods

The research process, being a conscious, purposeful and planned activity should follow specific rules and guidelines, which control the researcher's actions. Therefore, after defining the research questions, the next step was specifying methods, which allow providing answers to these questions.

The first research method which was used for the purpose of this article is literature studies. In a literature review, researchers describe, evaluate and clarify what is already known about the research area. The authors used a stand-alone review (Easterby-Smith, Thorpe, & Jackson, 2015), in order to provide an overview and synthesis. A review of the subject literature was carried out by analyzing databases such as Web of Science and Scopus. Such keywords as "The Fourth Industrial Revolution," "Industry 4.0" and "Smart factory" in combination with "confectionery industry" or "chocolate industry" were used. Then the authors read all the articles in order to check if they really focus on a similar topic to that which is presented in this article. The focus was put on academic papers (in Polish and English) that have been published in the last ten years (2009-2018).

The second research method was a case study. It is defined as a qualitative research method based on studying one or more objects (organizations, programmes, events, people, etc.) characterized by high internal complexity and intense relationships with the environment, using simultaneously many sources of information (such as: documents, interviews, observations and artefacts) and taking into account the context (e.g. physical, historical, social or economic) in which the analyzed case is embedded (Creswell, 1998). It is justified to apply the case study as a research method in the following circumstances (for more see: Yin, 1994):

- the initial stage of knowledge development was identified in a given area of research (e.g., a small number of publications);
- it is important to analyze the phenomenon in its actual conditions.

The case study is used in particular for descriptive research topics. It then answers the question „what, where and how something happened." With regard to exploration problems, it will facilitate an answer to the question „why the studied phenomenon occurred." For the purpose of this article the research process was of a cognitive nature. Among different types of case

studies one can distinguish those which focus on one research subject (Denzin & Lincoln, 2005) and don't lead to generalizations. Such an option is used when the studied phenomenon is long-lasting and typical. The use of a single case study method is also recommended when there is no theory regarding the studied phenomena. The use of a multiple case study method is recommended when the goal is to test an existing theory or improve it (Myers, 2010).

Data for the case study have been collected for the last 7 years in the process of direct observation, analysis of documents, and real participation in production processes and technological innovations in one of the factories of the analyzed company. These data collecting methods are acknowledged as appropriate for a case study method (Yin, 2009).

In order to assess the company maturity level in implementing the assumptions of the Fourth Industrial Revolution, the authors designed their model (Table 2.18).

This model was based on the approach used for the assessment of project management maturity. The authors analyzed the above-presented concepts of maturity levels related to Industry 4.0 and found them interesting. However, these models either need detailed data which are not able in each enterprise or focus on agility. It can be stated that the highest maturity level can be also reached in a company which prefers traditional project management methodology. The authors took into account criterion related to company awareness, the type of applied technologies (their advancement level, innovation and mutual integration of systems), the use of project management methodology, measurement of effects, and the customers involvement in product creation. This model is in the phase of operationalization (development of a measurement tool).

4. Results

4.1 The Fourth Industrial revolution in the confectionery industry – current research

In order to analyze the popularity of the Fourth Industrial Revolution idea and the progress in its implementation in the confectionery industry, the databases of scientific publications (Web of Science and Scopus) were analyzed. The following keywords were used: "The Fourth Industrial Revolution", "Industry 4.0", "Smart factory" in connection with "confectionery industry" and "chocolate industry". The search area was narrowed down to the publications from the recent ten years. The statistics of these publications are presented in Table 2.

Table 2.18. Maturity levels in implementing the assumptions of the Fourth Industrial Revolution

Maturity level in implementing the assumptions of the Fourth Industrial Revolution	Level characteristics
1 – unconscious	processes are based on manual work, no awareness of the available modern technological solutions
2 – basic	low awareness of the available technological solutions, partial – "random" – automation of production processes, chaotic implementation of changes in technology, no system integration and measurement of the effects of implementing changes in technology
3 – average	average level of knowledge on the available technological solutions, partial automation of production processes and system integration, methodological implementation of changes in technology, measurement of the effects of implementing changes in technology
4 – developed	high awareness of the available technological solutions, full automation of production processes, methodological implementation of changes in technology, integration of cyber-physical systems, measurement of the effects of implementing changes in technology
5 – continuously improved	high awareness of the available technological solutions, full automation of technological processes, integration of cyber-physical systems, Internet of Things, ongoing improvement of production processes through the implementation of technological innovations

Source: authors' compilation with the use of Kerzner (2001).

The results of the journal database analysis indicate only a slight interest in studying the idea of the Fourth Industrial Revolution regarding the confectionery sector of food industry and chocolate production. Only eleven scientific publications were found in the analyzed period of time, of which three articles were listed in both databases (they were duplicated). Therefore, a total of eight publications were found. After an in-depth analysis of the texts it turned out that only four of them cover the issues related to the Fourth Industrial Revolution. None of the publications presents research conducted in Poland.

Back, Dunnigan, Liew, and Vaughan (2012), for example, present a mobile application designed to control remotely and monitor machines and devices installed on the pilot line of one of the local chocolate producers. The main purpose of the application is to improve the work of the technologists involved in the development of new products.

Table 2.19. Statistics of the publications covering the analyzed problem within the recent ten years

Key words and data base	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
The Fourth Industrial Revolution + confectionery industry (WoS)	0	0	0	0	0	0	0	0	0	0
Industry 4.0 + confectionery industry (WoS)	0	0	0	0	0	0	1	1	0	0
Smart factory + confectionery industry (WoS)	0	0	0	0	0	0	0	0	0	0
The Fourth Industrial Revolution + chocolate industry (WoS)	0	0	0	0	0	0	0	0	0	0
Industry 4.0 + chocolate industry (WoS)	0	0	1	1	2	0	0	0	0	1
Smart factory + chocolate industry (WoS)	0	0	0	1	0	0	0	0	0	0
The Fourth Industrial Revolution + confectionery industry (Scopus)	0	0	0	0	0	0	0	0	0	0
Industry 4.0 + confectionery industry (Scopus)	0	0	0	0	0	0	0	0	0	0
Smart factory + confectionery industry (Scopus)	0	0	0	0	0	0	0	0	0	0
The Fourth Industrial Revolution + chocolate industry (Scopus)	0	0	0	0	0	0	0	0	0	0
Industry 4.0 + chocolate industry (Scopus)	0	0	1	0	0	0	0	0	0	1
Smart factory + chocolate industry (Scopus)	0	0	0	1	0	0	0	0	0	0

In turn, the authors of the publication entitled *"Sandwich Enzyme-Linked Immunosorbent Assay (ELISA) for Detection of Cashew Nut in Foods"* present a developed, fast, sensitive enzyme test which allows confectionery manufacturers to detect the remains of cashew nuts in the product. Such a test allows for more effective control over allergens in the product and helps to check quickly the quality of production line cleaning during retooling between products with different allergen profile (Gaskin & Taylor, 2011). Another article, entitled "*Treatment of a chocolate industry wastewater in a pilot-scale low-temperature UASB reactor operated at short hydraulic and sludge retention time*" discusses the low-temperature method of anaerobic treatment for the pre-treatment of wastewater from the chocolate processing industry. This method allows the process to be streamlined by achieving proper sludge retention (SRT) in a short time without affecting the reactor performance (Esparza-Soto, Arzate-Archundia & Solis-Morelos & Fall, 2013). The last of the found publications presents using spectroscopy in infrared reflection (ATR-MIR) along with multivariate analysis. It is a tool for fast quality assessment of cocoa butter. The knowledge about cocoa butter quality composition is important for the production processes of chocolate mass in the confectionery sector of food industry. As a result, it is possible to increase the efficiency of manufacturing processes (Maurer & Rodriguez-Saona, 2013).

The next part of the article describes the case study presenting changes in the technological process in a confectionery industry enterprise located in Poland.

4.2. The implementation of technological innovation in the confectionery industry – a case study of a large chocolate producer from Lower Silesia

A perfect example presenting the confectionery market transformations in Poland is the activity of one of the largest global manufacturers of these products. Currently, it has seven production plants in Poland, of which four were established as a result of greenfield investments – two in the nineties of the twentieth century, two at the end of 2000s, and three factories were taken over as a result of systemic changes.

The production plant is the object of conducted research was established in the nineties of the twentieth century, and its main purpose was confectionery production meeting the internal market needs, aimed at providing the manufacturer with a new market. After Poland's accession to the European Union structures, the discussed plant was expanded and its production profile changed. The average annual production level amounts to approx. 30,000 tons, of which only 1% stays on the Polish market. The rest of the production is exported to other European Union countries, as well as to the United States

of America, Canada, Australia, and New Zealand. Chocolate bars of various flavors, formats, and weights make approx. 48% of the annual production. The remaining 52% consist of chocolate drops – 20%, chocolate pralines – 18%, and hard candies – 14%.

Chocolate pralines are a very specific product characterized by high attractiveness for entrepreneurs. The selling price of chocolate boxes containing chocolate pralines is significantly higher than in the case of chocolate bars, while the weight of both types of products is often similar. In addition, chocolate bars, except for the stuffed and white ones, contain a high proportion of cocoa components in the raw material composition. Chocolate pralines, in turn, contain only 40% to 60% of chocolate, whereas the rest of their composition consists of water-based, milk-based or, less frequently, the so-called fat masses (using nut pastes, truffle mass or ganache). On a daily basis, the majority of consumers prefer chocolate bars. Pralines represent a luxury product, which is used occasionally.

For this reason, these products are included in the premium confectionery segment. In the period of twelve months, between September 2017 and August 2018, this segment reached 18.1% level of the turnover value, which means an increase in the importance of these products by 0.4 percentage points along with the sales dynamics of 8%. Chocolate pralines achieved a market share of 15.3% and recorded an increase of 8% (Rogalska, 2018). In order to make chocolate pralines a luxury product, different shapes and highly complex packaging are used, characterized by higher quality materials, sophisticated design and unique functionality. For this reason, part of the higher-margin resulting from similar or even cheaper raw components is "consumed" by the packaging cost. In addition, the specific packaging method requires more complex operations. However, as mentioned in the previous part of this article, low labor costs remained one of the driving forces in the development of the confectionery sector within the food industry. Therefore, the enterprises in which packing processes are largely based on manual labor, did not fear a margin drop in the production of chocolate pralines and were open to the most sophisticated solutions. This situation, however, has changed fundamentally as a result of transformations in the labor market.

In the analyzed production plant, chocolate pralines are manufactured using a traditional method. It involves the formation of chocolate shells by filling the previously heated molding cavities with chocolate mass and then turning these molds over. As a result, chocolate flows freely on the walls of the cavities, thus forming a thin layer of chocolate, which is later cooled. The prepared chocolate shells are filled with fillings and extras using depositors. After another cooling, chocolate pralines are closed by pouring the next portion of chocolate over the filling, which is cooled again. The prepared pralines are

unloaded from molds onto a conveyor. This method allows the production of chocolate pralines based only on one type of chocolate mass (milk, bitter or white), but it does allows the production of several types of pralines (by using molds of various shapes and the possibility of dispensing several fillings simultaneously). Chocolate pralines are moved from the conveyor onto plastic trays and – until all the flavors needed to prepare a chocolate box are produced – stored in an intermediate storage area (between the production and the packaging department).

In the analyzed enterprise, the process of chocolate pralines packaging was also carried out manually. Interestingly, before initiating production in this plant, chocolate boxes were manufactured in one of the Western European countries, and this process was performed using robots.

The manual packing process begins with placing plastic moldings on the conveyor, which transports them to twenty packaging stations. At each station only one praline flavor is packed and its positioning in the moulding is strictly defined in the product quality standard. At the end of the packaging process the moulding is checked and then mouldings are placed manually in a box prepared by a cartoning machine. The mouldings are separated from each other with a plastic cushion pad and the prepared box is closed by a machine and then foiled. The foiled boxes are manually packed into master cartons, which are closed with a gluer and placed on a pallet by an employee.

Forty-seven people are engaged in the above-mentioned manufacturing process of chocolate pralines, eight of which are involved in forming the product. It was the reason why labor market changes resulted in a margin drop of chocolate praline production and motivated management to implement technological innovations. However, it was not possible to carry out any significant modifications of technological processes in the area of product formation, as they required a different production technology which would result in high investment costs and other barriers, such as no free space in the plant and the need to stop production during the investment period. The potential for optimizing labor costs through the implementation of technological innovations was, however, identified in the packaging process.

It was possible to reduce the line staff to thirty-one people as a result of using robots on three work stations. It was achieved by using a robot for placing moldings on the conveyor, a robot packing the boxes into master cartons and a robot palletizing the cartons. These machines were operated by the currently employed staff handling the cartoning, closing and foil wrapping machines. As a result of using communication solutions between the individual devices, machine operation was limited to current control of their work and the possible service. Taking into account average annual labor costs, the implementation of such a solution will bring about measurable benefits to the enterprise in

the form of employment savings at a level of approximately USD 255 000. Apart from the savings, it will also reduce the number of challenges resulting from employee recruitment and their rotation.

An additional improvement was using a device to control the product's weight in the flow. As a result of applying such a solution, it was possible to change the scope of duties for a person employed as a weighmaster. Until now, in accordance with the provisions of the Act on pre-packaged goods, such a person was manually weighing a number of chocolate boxes constituting a representative sample. Since the new device has been applied, the control is carried out simultaneously for all products and in the case of irregularities, the device (connected with the other elements of the packaging line) can stop the process in order to control the current situation and take up the necessary corrective actions. Besides, the device has been equipped with software preparing various types of reports. An employee who, so far, has been weighing the goods manually received the possibility of preparing specific reports which allow streamlining and improving the entire production process. For example, based on the overweight report, corrective actions can be introduced in the area of product formation, thus improving the weight of chocolate pralines and eliminating negative deviation in raw material input.

5. Discussion

The results of the general literature studies present many benefits which can be gained after the implementation of the idea of the Fourth Industrial Revolution. Different company maturity models related to the fourth Industrial Revolution are designed as well.

The results of in-depth literature studies, which focused on the implementation of the analyzed idea in the confectionery industry, provide only some tips for answering the research questions. First of all, the authors present different technological solutions which are implemented in order to improve production processes (including manual work) and quality of products. But the publications don't give any focus on either processes and mechanisms or assessment of maturity level related to implementation of the idea of Industry 4.0. Moreover, none of the publications presents research conducted in Poland.

One can state that, predominantly, the labor market changes act as the driving force stimulating the implementation of innovations in production technologies in the analyzed company. The labor market in Poland is currently referred to as the employee market. The analysed company represents the group of so-called "X – Product-Based Manufacturing Companies" (Scremin, Armellini, Brun, Solar-Pelletier, & Beaudry, 2018). This group includes

enterprises belonging to the discrete manufacturing configuration that own the product design. In this classification, the companies have not exploited the opportunities of introducing additional services thanks to the adoption of Industry 4.0. The enterprises that are part of this group are focused on the optimization of their processes and efficiency gains. For the eventual enrichment of the company's offer, exploiting Industry 4.0 will lead to a transition towards the archetypal "Product & Service Based Companies".

Based on the surveys carried out by ASTOR and Siemens, it is possible to assess the maturity level of Polish enterprises in implementing the assumptions of the Fourth Industrial Revolution at level 3 as the highest. When attempting to answer the question about the maturity level of the analyzed enterprise in implementing the assumptions of the Fourth Industrial Revolution, one should conclude that it also represents level 3. Direct interviews confirm that the enterprise has average level of knowledge about the available technological solutions (although employees have had some training through participating in conferences on Industry 4.0). As the above discussion shows, partial automation of production processes and system integration are present in the studied entity. Changes in technology are introduced in a methodological manner and the effects of implementing these changes are measured.

6. Conclusions

The Fourth Industrial Revolution refers to the period initiated by the invention of the Internet, which resulted in a rapid acceleration of industry development. Today, at the beginning of the 21st century, all of us, although perhaps not everyone is aware of it, is witnessing this revolution. Barriers between people and machines are disappearing, along with the widespread application of the Internet of Things and cloud computing.

The enterprises using Industry 4.0 solutions have an opportunity to achieve unattainable, so far, flexibility in adapting to the expectations of customers, and thus gaining an advantage over the competition. Meanwhile, according to the analysis covering both the secondary data on industry automation in Poland and the case study, the maturity level of this industry in implementing the idea of the Fourth Industrial Revolution can be evaluated as 3 (on a scale from 1 to 5). Moreover, predominantly, the labor market changes (the lack of employees) act as the driving force stimulating the implementation of modern solutions in the confectionery industry.

At this point, certain limitations resulting from the applied research method should be emphasized. The case study covered only one confectionery industry enterprise. It is therefore difficult to generalize the obtained results over the entire industry. However, it can be assumed that the level of used

technologies is similar in other companies representing this industry. This is due to the fact that the same factors have an impact on the confectionery industry in Poland. The empirical research provides knowledge which can be useful in decision-making processes in the context of investments in the analyzed industry.

The authors recommend conducting further research. At this background, it would be interesting to undertake research on the relationship between the labor market situation and the implementation of Industry 4.0 solutions in different industries and in different countries. Changes in technologies are associated with technological unemployment, which affects workers with lower qualifications. In the studied case, it is not technology which is the factor of employment reduction, but the absence of "hands for work," which imposes the implementation of changes in technology. The presented concept of maturity levels related to the implementation of assumptions of the Fourth Industrial Revolution can also be used in further research which will be conducted and developed by the authors.

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Predictive factors of innovation in leisure industry organizations as an opportunity in the age of industrial revolution 4.0. – a case study of the Norwegian fisheries museum (Bergen)

***Jerzy Rosiński*[1]**

Abstract

The essential problem of the article is to indicate how the changes associated with Industry 4.0. influence areas which are not related to industrial production. The author expresses the hypothesis that, as it was the case with earlier industrial revolutions, the change will apply not only to the method of production itself but also to other areas of the economy and to the lifestyle of society. In connection with this hypothesis, the author raises questions about the consequences of the development of the services sector known as the leisure industry. The research question which is asked regards the factors that describe organizations from the leisure industry operating in the age of Industry 4.0. The author points out that a factor widely featured (and indeed considered the key factor) in the literature of the subject is creativity. However, the analyses conducted by the author indicate the likely significant effect of three other factors, so far mentioned marginally in the literature.
Keywords: *Industry 4.0., leisure industry, SMEs, entrepreneurship.*

1. Introduction

The transformations associated with the fourth industrial revolution concern not only digitization and automation. Just as in the case of the previous industrial revolutions, entire sectors of the economy may be subject to radical changes. At the same time, new areas of activity emerge, such as, for example, the creative services industry and the leisure industry. The gap in the description of the issues accompanying the fourth industrial revolution exists on two levels: on the one hand, the texts describing the transformation of the fourth industrial

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A. Ujwary-Gil & N. R. Potoczek (2019). (Eds.). Network, Innovation, and Competence-Based Economy, 181-203

revolution focus on thematic areas related to production; on the other hand, they primarily point to creativity as a crucial factor for the development of areas unrelated to production. The present article proposes to go beyond the area of industrial production (to include the leisure industry), and beyond the focus on the creativity factor. The text proposes a wider view of the leisure industry and based on an analysis of the economic initiatives in this area it identifies four growth factors relevant to the sector. It also presents a case study showing the implementation of the individual factors in the practice of business activity in the leisure industry sector. The 4-factor model presented in the text may prove to be a universal pattern of development: going beyond the focus on creativity as a single and decisive factor; applicable regardless of any specific geographical or cultural considerations (the same factors have been identified for Poland and Norway); and applicable beyond the specific context of the leisure industry. The theoretical background for the claims contained in the introduction is presented in the literature review (below).

2. Literature background

The processes referred to as the fourth industrial revolution trigger a wide range of changes extending beyond the technology of production. An overview of several dozen articles from the SCOPUS database published this year (2019) and dedicated to the impact of the fourth industrial revolution may indicate that reflection about transformations focuses most often on industrial production, and on such aspects of it as automation, flexibility, innovation, cost reduction, and information exchange. However, there are still a number of other significant research areas. The two major research trends include:

- changes in the global economy caused by digitization, e-commerce, consumer behavior after the digital revolution (Colangelo & Maggiolino, 2019; Johannessen, 2019; van Esch, Arli, Gheshlaghi, Andonopoulos, von der Heidt, & Northey, 2019);
- changes in organizations, challenges for management and challenges for entrepreneurship caused by the fourth industrial revolution (Agostini & Filippini, 2019; Browder, Aldrich, & Bradley, 2019; Jakhar, Mangla, Luthra, & Kusi-Sarpong, 2019; Kauffmann & Carmi, 2019).

One also needs to consider supplementary research areas, such as:

- tourism and leisure, often associated with changes in the natural environment (Yang, Dong & Li, 2019; Sati, 2020; Zhang & Liu, 2019);
- life in cities in the digital age revolution (smart cities), combined with the issues of public transport and environmental pollution (Chang,

Yang, & Lin, 2019; Efimova, Haitbaev, & Pogorelova, 2020; Tong, 2019; Bhatt, Jani, & Bhatt, 2020).

The research trends referred to as supplementary are often associated with sustainable economic development, which forms an important narrative for the entire text. When looking for areas that go beyond the "mainstream" in the description of the fourth industrial revolution, i.e. beyond the aspects related to industrial production, the focus of the present text was placed on an area which could be said to lie at the intersection of the areas identified above: one of the significant areas, and one of the supplementary areas.

On the one hand, the focus was on an area related to economic activity as seen from the perspective of the stages of development of a single organization (Koźmiński & Latusek-Jurczak, 2017). In this case, elements of economic activity in its initial and innovative scope may prove to be an interesting area for analysis (Lachiewicz & Matejun, 2011). This phase of organizational growth, described by the classic Greiner's model (1998, pp.55-68) as development through creativity, is used primarily in reference to SMEs (Brzeziński & Stefańczyk, 2013), and at present it is also associated with start-ups (Cohen, Fehder, Hochberg, & Murray, 2019; Tohanean & Weiss, 2019). It is a more precise formulation of one of the two major trends in research describing the transformations in organizations, challenges for management and challenges for entrepreneurship brought about by the fourth industrial revolution.

Looking for an impact area of the fourth industrial revolution outside industrial production, a supplementary area was selected, i.e. tourism and leisure. Therefore, the changes analyzed closely in the text are related to SMEs and with the leisure industry. In the current part of the text, the key concepts used in the text will be explained. These include the fourth industrial revolution, typology of response on the part of SMEs to the fourth industrial revolution, and the concept of leisure. Based on the literature on the subject, the impact of the fourth industrial revolution on the leisure industry will also be discussed.

2.1. Industrial revolution 4.0

The processes of changes in technology and production, known as the fourth industrial revolution, are associated with profiled initiatives in different countries and regions of the world. In Europe, the fourth industrial revolution is often referred to as Industry 4.0; in the USA, the term in use is Manufacturing Partnership 2.0; in China, it is called the Made in China 2025 initiative; while Japan carries out its initiatives under the name Revitalization – robotic strategy 2020 (Rozkwitalska & Slavik, 2018). The various national and regional initiatives differ from each other, but their common areas include: smart machines connected in networks, and data exchange for the formation

of the so-called smart factories understood as independent, fully automated units, continuously optimizing their production environment (Mařík, Bunček, Czesaná, Holoubek, Kopicová, Krechl, & Valášek, 2015).

Although the terms "the fourth industrial revolution" and "Industry 4.0" are often used interchangeably, one needs to remember that the term Industry 4.0 was originally a name invented in 2010 by the German government to outline the long-term strategy for the development of modern technologies. However, over time (and despite the existence of other national initiatives in the EU) it has become a term describing not only the connectivity and impact of the German economy on the EU, but it is also used as a term describing the transformation of the fourth industrial revolution in Europe (Rozkwitalska & Slavik, 2018). The change referred to as Industry 4.0 is defined in business in the following manner (after experts from Siemens): the completely IT-based interaction between human, product, and machine (Siemens Prepares Way for Industry 4.0, as cited in Rozkwitalska & Slavik, 2018; p. 194). This understanding is in line with the definition of Industry 4.0 in scientific literature as the introduction of the Internet of Things and Services into the manufacturing environment (Kagermann, Wahlster, & Helbig, 2013).

2.2. The typology of SMEs' responses to the fourth industrial revolution

When trying to categorize the changes related to SMEs, one ought to take note of the comprehensive review of responses to the fourth industrial revolution contained in the present text, whose authors are Müller, Buliga, and Voigt (2018). The focus on research among companies that are suppliers to businesses from the automotive and electricity market may limit the model to some extent. But even despite the narrowed research scope, the authors formulate a highly interesting model which seems to be very promising in terms of interpretation.

The basic categorization in the presented model is as follows:

- on the one hand, one needs to determine whether the described organization is a user of new technologies or a provider, or both (user and provider);
- on the other hand, one needs to analyze the motivation for joining Industrial revolution 4.0 (internal, external, or both).

Based on the above categorization, the stages of companies' responses, in the context of the fourth industrial revolution emerging, have been defined. Moreover, a change in the functioning of the company itself is associated with these successive stages. Details are shown in Figure 2.10.

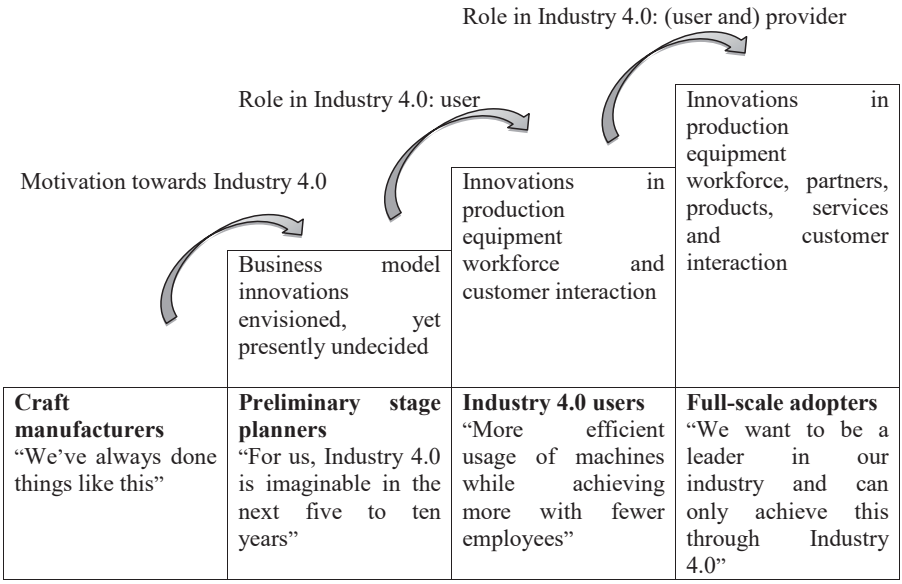

Figure 2.10. The typology of responses to the fourth industrial revolution using the example of companies from the automotive and electricity market

Source: based on Müller, Buliga, & Voigt (2018, p. 10).

Another way to search is to analyze the business activity sectors of the economy. While a decade ago the search gravitated toward the knowledge industry as a sector of the economy (Sadowski, 2007), today exploration is more detailed and may relate, for example, to the creative industry and the leisure industry (Knop, Szczepaniak, & Olko, 2014; Cellmer, 2011; http://badania-w-kulturze.mik.krakow.pl/tag/przemysly-czasu-wolnego/index.html).

2.3. Leisure industry

Before we proceed to discuss the references between the fourth industrial revolution and the leisure industry, a brief definition of the leisure industry is in order. One of the most commonly used definitions specifies that "[t]he 'Leisure Industry' provides services and products to consumers – business, families or individuals, domestic or foreign – to meet people's demand for leisure opportunities, experiences and facilities, in particular for sport, culture, recreation, entertainment, eating and drinking, days and nights out, betting and gaming, and accommodation" (Wyman, 2012, p. 6). Another frequently used definition of the leisure industry as a "multi-disciplinary branch of

industry related to relaxation and spending free time" (http://www.czaswolny.org; 2017) is concise, but it does not appear to be very precise.

The emergence of a wide range of services and products related to leisure is usually associated with a reduction in working time in Europe, as well as with a change in the very nature of work. Thus there is a demand in leisure not so much for physical relaxation as for recreation, entertainment, or development. In the UK, which is recognized as a leader in building the leisure industry, 2.6 million people were already employed within it in 2012, representing 9 percent of total employment and generating 4 percent of GDP. Companies operating in this sector of the economy were the biggest employer for people aged 16-25 years (Wyman, 2012). Since 2002, it was estimated that revenue from the leisure industry in the UK amounted to 117 billion pounds (Wyman, 2012), and by 2018 the leisure industry sector had grown in the UK by 17 percent (https://www.mintel.com; 2018). Estimates of the revenue generated by the leisure industry may be imprecise because of the overlap in the activities of the leisure and tourism industries. The inaccuracy (depending on categorizing particular business activities in specific sectors) may reach even 41 billion pounds (Wyman, 2012).

In Poland, the leisure industry seems to be concentrated on building increasingly more water parks and amusement parks, as stressed by the participants of the "Leisure industry" session within the ninth edition of the European Economic Congress in Katowice in 2017 (http://www.eecpoland.eu/2017/pl/wiadomosci/eec-przemysl-czasu-wolnego-to-juz-waga-ciezka,299458.html). There are emergent initiatives in the field of tourism and museums going beyond such a dual scheme. Excellent examples can be found in the Wooden Architecture Route in Małopolska, the Kraków Fortress Route and the Museum of Municipal Engineering in Kraków. But the most popular leisure activities in Poland include: going out to restaurants/bars, i.e. eating out, going to fitness clubs and to the cinema (Gastronomic Market in Poland – 2015 Report), which also results from the diverse nature of the services themselves (food vs. museums). This can also be a growth opportunity for redefining the function of exhibition spaces (going to a museum becomes an opportunity to have a family event or to eat out in the museum building).

2.4. The fourth industrial revolution vs. the leisure industry

The fourth industrial revolution has changed, among others, the sector of the leisure industry. This change may occur in accordance with a different model than, for example, the already mentioned sequential model by Müller, Rammer, and Trüby (2018). An attempt will be made in the current part of the text to demonstrate that in respect to the leisure industry we have to do with

characteristic elements of behaviour which constitute individual factors rather than a sequence. Of course it cannot be ruled out that further exploration of the area and/or the development of the leisure industry in itself will lead to the development of a more structured typology.

As noted by Rozkwitalska and Slavik (2018), automation and digitization associated with Industry 4.0 together with macroeconomic factors will usher in many opportunities, possibilities and challenges not only in the production industry but also in other sectors. Changes will be required in, among others, business models, models of employment, expected skills and new challenges in terms of results. Not only business models will change, but so will social relationships (Kagermann et al., 2013). A new work environment, featuring integrated activities of robots and cobots, will put the workforce in new roles in which past experience and competences will be obsolete (Lorenz et al., 2015; Rozkwitalska & Slavik, 2018). This means that the changes associated with the fourth industrial revolution go beyond the ICT industry and new material technologies, and they impact not only areas related to robotics, automation of production or information technology. It seems therefore that the transformations in these areas have an impact on other sectors of the economy, as well as on the style of living of workers and consumers.

One of the changes brought forth by the fourth industrial revolution triggers growth in creative activity and creativity. What is more, there is a clear relationship between the development of the ICT industry, the implementation of new solutions in IT and technology, and the development of the so-called creative industries (Abbasi, Vassilopoulou, & Stergioulas, as cited in Pichlak, 2018, p. 37). Organizations operating in the creative industries not only create new solutions, but their contribution is considerably wider. These organizations:

- have influence on the competitive advantage of the places in which they are located;
- generate demand for innovative solutions in their partners and suppliers (e.g., in the area of new technologies);
- provide a creative contribution to innovative solutions (understood as commercialization of creative ideas) also for companies from other industries (DCMS, 1998; Müller et al., 2009, p.149; Cooke & De Propris, as cited in Pichlak, 2018, p. 43).

When talking about creativity it is often said that unburdening employees from routine operations will allow them to focus on creative ones that generate an added value (Kagermann et al., 2013). In discussions on the fourth industrial revolution, creativity is understood as the production of new and potentially useful ideas for products, services, working methods, processes and procedures (Bratnicka, as cited in Pichlak, 2018, p. 40), and in that sense creativity differs from innovation: innovation commercializes creative ideas.

But if considered from the perspective of creative projects arising in business, creativity turns out to be more than the creation of ideas alone. Creative processes are also associated with the chain of value creation and the relations which emerge as a by-product, often unexpectedly (Cooke & De Propris, as cited in Pichlak, 2018, p. 40). Creativity is then also linked to cooperation within the framework of local and regional networks – building the so-called "creative spaces" (Granger & Hamilton, as cited in Pichlak, 2018, p. 40).

As noted by Pichlak (2018), the combination of competition and cooperation is a paradox of creativity in relation to business:

- there is competition, often reinforced through the functioning within the framework of digital technology, or even based on similar technology platforms;
- cooperation is crucial for the development of creative solutions and value creation.

The dichotomy between competition and cooperation may be apparent in relation to the creative industries, since such opposing relationships stimulate the production and supply of creative products, strengthen the effect of spreading knowledge, and allow for the synergy effect to occur thanks to the unexpected use of technology and knowledge (Pichlak, 2018)

In addition to the elements related to creativity, the analyses found in the literature mention factors such as increased customization and flexibility (Kagermann et al., 2013, p. 16). It is expected that customers will address organizations with new expectations: a greater cooperation with stakeholders, and a greater complexity of processes (Hecklau, Galeitzke, Flachs, & Kohl, as cited in Rozkwitalska & Slavik, 2018; p. 195). The claim that unburdening employees from routine operations will allow them to focus on creative ones that generate an added value is repeated (Rozkwitalska & Slavik, 2018). On par with issues related to flexibility and customization to meet the client's needs, security-related issues associated with transferring information and integration of IT systems are undertaken (Kagermann et al., 2013). However, in comparison with the previously mentioned creativity, these categories are much less frequently named.

3. Research approach and methods

The nature of the research data required the employment of the qualitative approach in the analysis of the data. The semantic analysis was selected to be the primary tool consisting in the categorizing and processing of qualitative data, as well as short statements and descriptions (Sezgen, Mason, & Mayer, 2019; Xiong, Cho, & Boatwright, 2019; Liu, Lai, & Xu, 2018). As a matter of fact, this method is also used in reference to data collected for the leisure

industry, regardless of the specific character of the described local market or the affiliation of researchers (Gorgadze, Gordin & Belyakova 2019; Homburg & Boochs 2019; Liu, Huang, Bao & Chen, 2019). Semantic analysis helps to describe the qualitative data currently collected on entrepreneurship and new forms of business activity (Erpf, Ripper & Castignetti, 2019). Therefore, considering the specifics of the analyzed problem (the leisure industry and SMEs) and nature of the data (qualitative data), semantic analysis seems an adequate method of analyzing the research data.

4. Discussion and results

The innovative factors of leisure industry enterprises were analyzed based on the data collected during the Start-Up Challenge Competition held in the years 2017 and 2018. Although the competition has been held annually since 2016, the character of the first edition differed from the following ones (start-ups were not split by categories, neither were they described). For this reason, this analysis will focus on the years 2017-2018. Throughout all the previous editions, the selection and presentation of the candidates for the Start-Up Challenge took place as part of the European Start-Up Days. Both the scale of the event and its agenda (meetings of start-up authors with experts, business decision-makers, investors, businessmen, and politicians) may allow the event to be considered a meaningful representation of the new entrepreneurship in Poland, and an interesting source for obtaining a sample of data for research.

Each year the competition attracts 100 start-ups from among which finalists are selected in particular categories. The competitions held in 2017 and 2018 featured a category of leisure industry. Table 2.20 presents the number and distribution of start-ups categorized as being part of the leisure industry. It shows enterprises presented in the final of the Start-Up Challenge competition in the years 2017-2018. Every entity was presented in the table along with a succinct description of the scope of the business.

The examples presented in Table 2.20 demonstrate a rapid growth in organizations present in the "leisure industry" category: in 2017, they accounted for 8 companies out of 100 competition finalists; in 2018, they were 18 out of 100. However, this growth does not necessarily mean an equally dynamic development in business initiatives in the field of the leisure industry. What confirms the rapid growth is the considerable year-on-year increase in initiatives and web services that are connected to the leisure industry and online shopping. Still, the cause of the change in the number of businesses from 8 to 18 may be a large instability in the content of the categories in the competition in the successive years of the Start-Up Challenge.

Table 2.20. The number of start-ups and their scope of business activity in the category of leisure industry in Start-Up Challenge in the years 2017 and 2018

Years of the contest			
2017.		**2018.**	
Number of declared projects qualified for the competition (only leisure industry)			
8.		8.	
Scope of business activity			
Shopping	0.	Shopping	8.
Restaurants	0.	Restaurants	1.
Support for events	3.	Support for events	3.
Sports	1.	Sports	1.
Green activity	0.	Green activity	1.
Entertainment online	4.	Online entertainment	3.
Brief description of the activity			
1. social medium for influencers 2. VR headphones releasing smells tailored to customer preferences 3. search and booking system for event tickets along with supporting services (transport, hotel, insurance, crowd funding) 4. online marketing channel enabling competing, creating challenges, gaining points and rewards from advertisers 5. short-term premises rental for events 6. device for detection and analysis of footballer moves 7. converting personal photos into a jigsaw puzzle/ postcards/ calendar 8. support for events (presentation, workshop)		1. interactive mirrors 2. support for events (presentation, workshop) 3. ordering and purchasing small gifts for friends 4. setting up appointments to do sports together 5. ordering meals at food places without calling waiting staff 6. for promoting and rewarding eco -oriented behaviour 7. connecting players with teams, coaches, managers and sponsors 8. short-term premises rental for various events 9. online changing rooms for trying on clothes in 3D 10. multimedia entertainment centre and intelligent control at home 11. converting personal photos into a jigsaw puzzle/ postcards/ calendar 12. online customization of insurance 13. connecting people with similar passions 14. rental of designer dresses at a fraction of the tag price 15. social medium that allows users to share discounts 16. social shopping delivered to the door 17. interactive games and installations rented for events 18. shopping assistant	

In 2017, the leisure industry was placed in the category of Lifestyle, described as: "leisure industry, others." In 2018, the category was called:

Client & Lifestyle, described in much more detail and more broadly as: "trade, customer experience, e-commerce, fin-tech, edu-tech, gaming, sport, leisure industry." In addition to the turbulence in categorization, another possible cause of the change in the number of initiatives from 8 to 18 could be a difficulty in obtaining separate content for each category (e.g. where does one categorize an app that has to do with leisure).

Despite these changes in category and the ambiguity to the assignment of a given object (single start-up) to the category of leisure industry, the empirical material is interesting and can be interpreted. What seems to be significant is the fact that both data from 2017 and 2018 can be divided according to the same categories. On top of that, these categories are consistent with the findings in the literature presented earlier in the text. If Table 2.20 showed in a summary form the scope of business activity for start-ups ("what a given start-up does"), Table 2.21 and Table 2.22 present a description of how market activities are implemented ("how a given start-up does what it does"). Table 2.21 shows an interpretation of the data for 2017, while Table 2.22 presents data for 2018. Both Table 2.21 and 2.22 are constructed in the same way. The description of how particular entities conduct their business activity (available on the website of the Start-Up Challenge competition) was allocated into four categories. If a given start-up could be allocated to a given category, then in a given category presented in Table 2.21 or Table 2.22 there is a brief description of the activity of the company already known from Table 2.20. The categories presented in Table 2.21 and Table 2.22 were obtained by means of a semantic analysis of the descriptions of business activities carried out by individual start-ups, available on the website of the Start-Up Challenge competition. Indications for their final naming were also found in the review of the literature describing the response to the fourth industrial revolution in the leisure industry.

In the course of the semantic analysis, four final descriptive criteria were selected, which: are distinct from others as individual criteria (meeting one category does not mean automatically meeting the next criterion), are specific (selecting a category so universal that each type of objects would fit in a given category by virtue of its range was avoided). The final criteria used to describe the way of conducting business activity are:

- customization (extreme);
- hand-made (not by a robot);
- real-time feedback (and action);
- creativity (unordered).

By far the most justified, from the point of view of the literature, is the element defined as creativity. At the same time, it is a very broad category (and therefore non-specific), hence the clarifying Creativity (unordered) in order to show the specificity of the category of creativity in the context of

the described business entities, and therefore the specificity of the leisure industry in the realities of the fourth industrial revolution. Already present in the economy after the third industrial revolution, Customization (extreme), or tailoring to the needs of the customer is a well known descriptive element. In this case, it is not so much a new descriptive element as growth in an already existing trend. Previously, nearly absent in the literature, the two remaining categories are relatively new elements in semantic analysis:

- hand-made (not by a robot);
- real-time feedback (and action).

What is described as Real-time feedback (and action) is already present in the relationship between software and user (especially in games and entertainment programs), thus in this case leisure industry organizations fit into an already existing trend. The factor of customization was certainly present in the earlier industrial revolution (3.0.), for example by producing a short series of products, the ability to choose additional features or supplement the product with minor differentiators (which increased the number of combinations), but in combination with the other factors (Hand-made; Real-time feedback; Creativity), it provides a new expression. These days, it is not so much the producer adjusting to the needs of his or her customers (read their needs and respond), but we witness a change in which the customer personally, on their own and by means of their activity (Hand-made) creates a solution, freely combining elements in unexpected new wholes (Creativity) and immediately achieves an effect (Real-time feedback). Such a way of thinking is already present in the leisure industry (creating a character in games such as *The Sims 4* or *World of Warcraft*). It is transferred out of the games from the virtual world to the real one (although this division seems to get increasingly fuzzy) and is transferred to new areas, outside games.

What is a non-standard element is the expectation that the product or service are not only surprising in its novelty, tailored to one's expectations and delivered quickly, but also that they are not generated automatically by robots: thus the category Hand-made (not by a robot). It seems that it is the last of these categories of descriptive categories that has the greatest potential for development for the leisure industry. It is a potential associated with redefining past activity and functioning according to new rules so as to perform new functions. Libraries have undergone such redefining. From places in which one checks out books, they have become a common space to spend time in a friendly atmosphere, as well as places which "create culture" through events and permanent features carried out in the space of the library. A similar thing happened to museums, which used to be spaces for collecting, describing, conserving and presenting, but have become interactive spaces of experience, integrating groups of visitors

(families, school groups). Later in the text, an example of a museum is provided which fits into not only the last category but all four of them.

Table 2.21. Description of conducting business activity by individual entities taking part in the Start-Up Challenge competition in 2017, representing the leisure industry – allocation into four categories

Customization (extreme)	Hand-made (not by a robot)
1. VR headphones releasing smells tailored to customer preferences 2. search and booking system for event tickets along with supporting services (transport, hotel, insurance, crowdfunding) 3. online marketing channel enabling competing, creating challenges, gaining points, and rewards from advertisers 4. short-term premises rental for events 5. device for detection and analysis of footballer moves 6. converting personal photos into a jigsaw puzzle/ postcards/ calendar 7. support for events (presentation, workshop)	1. search and booking system for event tickets along with supporting services (transport, hotel, insurance, crowdfunding) 2. online marketing channel enabling competing, creating challenges, gaining points and rewards from advertisers 3. converting personal photos into a jigsaw puzzle/ postcards/ calendar
Real-time feedback (and action)	**Creativity (unordered)**
1. social medium for influencers 2. VR headphones releasing smells tailored to customer preferences 3. search and booking system for event tickets along with supporting services (transport, hotel, insurance, crowdfunding) 4. online marketing channel enabling competing, creating challenges, gaining points, and rewards from advertisers 5. short-term premises rental for events 6. device for detection and analysis of footballer moves 7. converting personal photos into a jigsaw puzzle/ postcards/ calendar 8. support for events (presentation, workshop)	1. VR headphones releasing smells tailored to customer preferences 2. search and booking system for event tickets along with supporting services (transport, hotel, insurance, crowdfunding) 3. online marketing channel enabling competing, creating challenges, gaining points, and rewards from advertisers 4. short-term premises rental for events 5. converting personal photos into a jigsaw puzzle/ postcards/ calendar 6. support for events (presentation, workshop)

In the classification of the way the 18 entities from 2018 operated (Table 2.22), one can see the categories filled relatively evenly. The category of Real-time feedback (and action) is the best represented one – all of the start-ups meet it. It may be the result of the already discussed considerable year-on-year increase in initiatives and web services that are connected to the leisure industry and online shopping. This trend can also be the cause of the relatively least represented category of Hand-made (not by a robot), seeing as web services are intangible by nature, and are implemented by software which has

the character of artificial intelligence. But even the least represented category describes 2/3 of the entities included in the analyzed group.

Table 2.22. Description of conducting business activity by individual entities taking part in the Start-Up Challenge competition in 2018, representing the leisure industry – allocation into four categories

Customization (extreme)	Hand-made (not by a robot)
1. interactive mirrors 2. support for events (presentation, workshop) 3. ordering and purchasing small gifts for friends 4. setting up appointments work out together 5. ordering meals at food places without interacting with waiting staff 6. for promoting and rewarding eco -oriented behavior 7. connecting players with teams, coaches, managers, and sponsors 8. short-term premises rental for various events 9. online changing rooms for trying on clothes in 3D 10. multimedia entertainment center and intelligent control at home 11. converting personal photos into a jigsaw puzzle/ postcards/ calendar 12. online customization of insurance 13. connecting people with similar passions 14. rental of designer dresses at a fraction of the tag price 15. social shopping delivered to the door	1. interactive mirrors 2. ordering and purchasing small gifts for friends 3. setting up appointments to do sports together 4. ordering meals at food places without interacting with waiting staff 5. for promoting and rewarding eco -oriented behavior 6. connecting players with teams, coaches, managers, and sponsors 7. short-term premises rental for various events 8. online changing rooms for trying on clothes in 3D 9. converting personal photos into a jigsaw puzzle/ postcards/ calendar 10. online customization of insurance 11. connecting people with similar passions 12. social shopping delivered to the door
Real-time feedback (and action)	**Creativity (unordered)**
1. interactive mirrors 2. support for events (presentation, workshop) 3. ordering and purchasing small gifts for friends 4. setting up appointments to do sports together 5. ordering meals at food places without interacting with waiting staff 6. for promoting and rewarding eco -oriented behavior 7. connecting players with teams, coaches, managers, and sponsors 8. short-term premises rental for various events	1. interactive mirrors 2. support for events (presentation, workshop) 3. ordering and purchasing small gifts for friends 4. setting up appointments to do sports together 5. for promoting and rewarding eco -oriented behavior 6. connecting players with teams, coaches, managers, and sponsors 7. short-term premises rental for various events 8. online changing rooms for trying on clothes in 3D

Real-time feedback (and action)	Creativity (unordered)
9. online changing rooms for trying on clothes in 3D 10. multimedia entertainment center and intelligent control at home	9. multimedia entertainment center and intelligent control at home 10. converting personal photos into a jigsaw puzzle/ postcards/ calendar
11. converting personal photos into a jigsaw puzzle/ postcards/ calendar 12. online customization of insurance 13. connecting people with similar passions 14. rental of designer dresses at a fraction of the tag price 15. social medium that allows users to share discounts 16. social shopping delivered to the door 17. interactive games and installations rented for events 18. AI-based shopping assistant	11. connecting people with similar passions 12. rental of designer dresses at a fraction of the tag price 13. social shopping delivered to the door 14. interactive games and installations rented for events

The same trends can be seen in earlier results (from 2017), but the fact that the group is less numerous (8 entities instead of 18) means that the analyses of individual quarters may not be so suggestive. It seems, however, that we can see stability in the trends in subsequent years, as regards the two ranges:

- the ability to describe economic initiatives within the leisure industry using the four proposed categories;
- the tendency to assign entities more strongly to one of the categories, and a relatively smaller presence of entities described in the next one of the categories, which can be linked to market trends (growth in initiatives and web services related to the leisure industry).

What continues to remain an open question are the following issues: to what extent are these factors describing the specificities of the functioning of the leisure industry (and not only start-ups), and to what extent do the specificity of these four factors refers to the specific response of the industry to the challenges of the fourth industrial revolution? An attempt to answer that is made in the case study describing the Norwegian Fisheries Museum in Bergen.

4.1. Categories describing the manner of conducting activity – a case study

The organization in question is the Norwegian Fisheries Museum in Bergen. The value of this organization is that it implements all 4 out of the previously discussed factors specific to the activities of organizations within the leisure industry. A synthetic summary is contained in Table 2.23, with broader descriptions set out below in the text in the order of the individual factors.

4.2. Customization (extreme)

Far-reaching customization is already present in the offered ways to reach the museum. It can be done the "traditional" way: by city bus, by one's own car or on foot. A special museum shuttle bus is also offered. There are also other, less standard ways available, such as a historical small ferry departing from the fish market, a Viking longship, kayaks (for rent at the museum), a traditional rowing boat, and a plastic boat resembling a character from a fairy tale.

Upon entering the building, different visiting options are available: there are visiting paths to choose from (marked in a similar way as pathways to specific destinations at airports and railway stations). The visitor can freely change between these paths. Visual information is provided in such a way that the visitor always knows what "course" he or she is on, and one can return to the previous idea.

Taking breaks is also up to the visitor, and so is discovering the museum rooms. The space is constructed so that it encourages individual solutions, e.g. one can easily take pictures with a huge crab or lounge on pillows. The spaces which encourage the visitor to rest are also varied (pillows, chairs, café, nooks of the building, crab statue). Of course, one may just as well explore the museum dynamically and quickly discover subsequent rooms.

Customization is also facilitated by the attitude of the staff, who approve of adapting space to the visitor's needs: the outside spaces in the museum can become a picnic spot (bridge, table), while the spaces dedicated to rest may become a place for children to have a snack.

4.3. Hand-made (not by a robot)

The space is oriented towards using one's hands – twisting, moving, turning, etc. is possible and even necessary. For example, in order to play a film about fish, one must select a plush fish, put it on the scales and turn the crank to "scroll the film." It is also possible to use microscopes on one's own and view magnified objects arranged by oneself (shells, simple preparations). The space is filled by "organic toys" for a differentiated sensory experience (wood, plush, foil, plastic, metal, glass). What is important, the: "organic" experiences are addressed not only to children: also adult visitors take stockfish (dried cod) in their hands, transfer them to the scales, smell them, and take photos. The museum rooms left in their original condition (previously used for storing dried fish) encourage sensory exploration: the wooden walls are covered with salt accumulated over the years, which gives them a characteristic texture and smell. It is also possible to experience sea fishing on a small scale (in the waters around the museum). Children dressed in waterproof garments can use fishing nets to catch smaller sea organisms.

There are also small manual tasks to do: wooden puzzles can be done and freely arranged (maps, marine organisms); one can also independently catch fish using fishing rods with magnets. The theme path called "A world under water" makes it possible to experience the individual floors of the ocean. It is composed of elements which allow a "personal experience" by touching elements from the depths, which are also handmade (rather than mass-produced).

4.4. Real-time feedback (and action)

The case of the Norwegian Fisheries Museum in Bergen, the categories Hand-made and Real-Time Feedback overlap to a great extent. It is due to the fact that doing handmade things happens in the museum space and causes feedback in real time (hence points 3 to 9 in the Real-time feedback quarter, overlap with the description in the quarter of the table describing the category Hand-made).

In the category of Real-Time Feedback, separate elements describing this specific feature of activity are interactive exhibition screens and thematic computer games.

Table 2.23. Description of conducting business activity by the Norwegian Fisheries Museum in Bergen as an organization representing the leisure industry – allocation into four categories

Customization (extreme)	Hand-made (not by a robot)
1. ways of reaching the museum building 2. switchable visiting paths (at any time) 3. elements of spatial arrangement "invite" to take breaks freely and find one's own pace 4. wide range of rest areas diverse in terms of quality 5. staff approving of the adaptation of the space for one's personal needs (picnic spots, places to have a snack)	1. manual turning, moving, pushing necessary to get content of the exhibition 2. making discoveries independently (microscopes + ability to place different objects for viewing) 3. varied "sensory experiences" for children and adult visitors 4. fishing independently on a micro-scale (for children) 5. wooden jigsaw puzzles (maps, marine organisms) 6. manual skills tasks related to the sea (fishing with magnetic rods) 7. path "A world under water" allows one to have a personal experience of individual "ocean floors," and is composed of elements which allow a "personal experience"

Real-time feedback (and action)	Creativity (unordered)
1. interactive exhibition screens 2. thematic computer games *[and similarly as for category Hand-made (not by a robot)]* 3. manual turning, moving, pushing necessary to get content of the exhibition 4. making discoveries on one's own/by oneself (microscopes + ability to place different objects for viewing) 5. varied "sensory experiences" for children and adult visitors 6. fishing with one's own hands on a micro scale (for children) 7. wooden jigsaw puzzles (maps, marine organisms) 8. manual skills tasks related to the sea (fishing with magnetic rods) 9. path "A world under water" allows one to have a personal experience of individual "ocean floors", and is composed of elements which allow a "personal experience"	1. creating one's own visit and one's own space to rest 2. interactive avatars created from photos of visitors within the space of the town (on screens) 3. wooden and electronic jigsaw puzzles 4. unexpected activities along the way (huge crab statue, fishing, entering a metal diving suit) 5. availability of objects inviting use according to one's imagination, taking photos

Of course, in this case visitors use their hands too, but it is only a way to interact with a machine, which does not involve an experience that is differentiated in a sensory way, nor creating a real, tangible object. Interactive exhibition screens are not a new feature, but it should be noted that the activities in the area of this museum go far beyond this aspect (above-mentioned points 3 to 9 in the quarter for Real-time feedback in Table 2.23).

4.5. Creativity (unordered)

The museum space encourages a non-standard approach from the moment of choosing the way to reach the building, through the choice of one's way and pace of visiting and taking rest stops. Such an approach encourages creativity as it is forging new ideas. The way of visiting ("creating one's own version of the visit") or taking breaks in exploring the exhibitions ("one's personal space for rest time") is an opportunity for a creative way of thinking about spending time in the museum.

Among installations and equipment designed to develop creativity one can also list the installations on the top floor of the building where photos are taken of children so that their avatars are displayed on an image of the city with which they may then interact on the screen. It is possible to create one's own marine creatures: in a puzzle or on the screen. At various levels, visitors come across unexpected activities (diver's suit, huge crab statue, fishing rods

with magnets) encouraging non-standard interactions and stepping outside typical museum reactions. The objects are directly accessible, so one can take a commemorative photo, e.g. inside the diver's suit or in a wooden fishing boat. The accessibility of objects and their non-obvious placement in the space of the museum encourages one to think outside the box, while the ability to use and take photos encourage non-standard use.

The Norwegian Fisheries Museum in Bergen uses all four areas identified as important for organizations from the leisure industry in the era of the fourth industrial revolution. It also appears that a separate added value emerges here, resulting from the synergy between the four areas, such as, for example, solutions created with one's own hands foster creativity and facilitate considering the service as customized to one's personal needs, while all of it happens in real time. Therefore, areas presented in Tables 2 to 4, although they are separate, when applied in individual ideas for activity may remain in interaction, increasing the added value for the user.

5. Conclusions

The identification of four descriptive categories characteristic of the leisure industry operating in the age of the fourth industrial revolution may be considered a theoretical attempt at describing leisure organizations' modus operandi in a rapidly changing environment. It seems that the presented classification allows one to maintain a positive balance between a freedom of description and an overloaded set of options, which would blur the clarity of the reality described.

The case study featured in the text shows that a categorization consisting of four elements is not only a proposal founded on the basis of analytical thinking but also an opportunity offering positive effects to organizations in general (including those outside of the leisure industry). Identified by way of semantic analysis, the four factors describing organizations in the leisure industry not only constitute a theoretical reflection but also describe companies operating in the market. Therefore, the described four-element categorization may constitute a "road map" for those designing transformations within the sector of the leisure industry.

The analysis of the presented case study may suggest that adopting all four factors by an organization could bring additional benefits resultant from the synergy effect. What remains an open question are the following issues requiring further research:

1) Organizational effect within operating organizations resulting from the implementation of one of four factors – it remains to be seen whether one could expect similar effects to those observed in

employee competency development programs when the choice of a development priority proved to be a success. Another scenario assumes that after some time one of four factors will be dropped and the organization will return to its old strategies.

2) The synergy effect resulting from adopting all four factors – the presented case study is convincing, albeit it is just one single case.
3) The universal character of a four-factor model – regardless of the geographical specificity (research on organizations in countries other than Poland and Norway; wider research in Poland going beyond the analysis of semantic material); and regardless of the specificity of the leisure industry (a four-factor model would be an adequate description also of other organizations offering services, developing as a result of the fourth industrial revolution).

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European funds used as financial support for the innovative activity of Częstochowa enterprises in 2014-2018

***Anna Rybak*[1]**

Abstract

The goal of this article is to analyze enterprises' projects which received financial support from the Regional Operational Program of the Slaskie voivodeship for the years 2014-2020, for innovative activities in Częstochowa. Based on the data analysis collected during the survey, conclusions were made about a selection of projects related to the introduction of innovations. The Analysis and assessment of projects classified to be supported by ROP of the Slaskie voivodeship for the years 2014- 2020 realized by MSP from Częstochowa. The following research methods were used: 1. objective - classification of entities by type of innovation and amount of co-financing, and project implementation time; 2. subjective – analysis of applications submitted for the protection of property rights in the Patent Office, including entities that received co-financing for projects. Presented analysis and assessment will allow a better distribution of financial resources aimed at supporting the development processes of the Silesian region. It is claimed that practical solutions connected with the co-financing of projects will allow the development of innovative sectors in the region. The article is analytical and thanks to the proposals it is possible to evaluate projects under the innovative account, but also supporting the development strategies of the region of the Silesian voivodship. Presented results may be an inducement for theoreticians and practitioners to evaluate projects co-financed by the European Union, as well as the effects of their introduction, in the concept of regional development.

Keywords: *innovations, European funds, innovative projects, patents.*

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1. Introduction

An innovative enterprise's activity is a necessary condition for its growth. The pressure from stakeholders to create economic value forces entities into developing and implementing more and more, new solutions. Conditions created by the economic environment of a particular region should foster (not disturb) the enterprise in its development, because a rich enterprise is a source of a rich society, and a rich society promotes a rich country. The culture of societies and society itself may develop if the units create innovations, new ideas, creations, original works, which are not a repetition of what is already known and recognized. (Szczepański, 1988) Innovations are the source of the wealth of nations. Nordhaus (2004), using data from the U.S. nonfarm business section, estimates that innovators are able to capture about 2.2% of the total social surplus from innovation. This number results from a low rate of initial appropriability (estimated to be around 7%) along with a high rate of depreciation of Schumpeterian profits (judged to be around 20% per year). In terms of the rate of profit on capital, the rate of profit on the replacement cost of capital over the 1948-2001 period is estimated to be 0.19% per year. That is why it is so important for national governments to support research on innovation. When Poland joined the European Union (EU) there was a key idea: "It's better to be poor amongst the rich than to be rich amongst the poor." Financial funds that should influence the Polish economy for innovative enterprises should improve and strengthen the economic position of the country. Being poor amongst the rich was supposed to teach Poland how to become a rich country and European funds allowed this learning to be burdened with a lower financial risk. The introduction of a proven system of solutions related to the modernization of enterprises creates opportunities for effective competition in international markets. However, after 14 years of being in the EU, the European Innovation Scoreboard (EIS)[2] in 2017 amounted to 53.6, which placed Poland 4th from bottom of the 27 member countries. The rates shown in Table 2.24 dropped the fastest.

The biggest decrease was noted in SME innovations (by -22.7 points), so an attempt should be made to analyze the absorption of funds from the EU in order to support the innovation of small and medium-sized enterprises operating in Poland. Because of the fact that this issue is highly important, local enterprises should be looked at first, in order to be able to analyze the sources of failures in creating innovations by Polish SMEs.

2 [2] The indicators are compared with the Central Statistical Office Poland's data for EU data in a given year. EIS provides comparable results on the level of innovation in individual EU countries as well as the best-developed global economies. Indicators are grouped into four categories, i.e.: Framework conditions (Human resources, Attractive research systems, Environment friendly to investments), Investments (finances and financial support, expenditure supporting innovations), Innovation activities (innovators, public-private connections, and intellectual resources), and Impact (impact on employment, impact on sales).

Table 2.24. Declines in the EIS index indicators for Poland

Poland	Performance relative to EU in 2010			Relative to EU in 2017
	2010	2017	Change	
SUMMARY INNOVATION INDEX	53.5	56.7	+ 3.2	53.6
1. Finance and support	44.6	33.2	- 11.4	30.8
R&D expenditure in the public sector	*57.5*	*29.2*	*- 28.3*	*30.3*
Venture capital expenditure	*28.0*	*38.2*	*+10.2*	*31.3*
2. Innovators	25.6	2.9	- 22.7	3.4
SMEs product/process innovations	*24.3*	*5.9*	*-18.4*	*7.3*
SMEs marketing/organizational innovations	*27.7*	*3.0*	*-24.7*	*3.6*
SMEs innovating in-house	*24.8*	*0.0*	*-24.8*	*0.0*
2. Linkages	47.9	37.9	-10.0	37.6
Innovative SMEs collaborating with others	*52.1*	*23.0*	*-29,1*	*22.9*
Public-private co-publications	*34.2*	*36.6*	*+2.4*	*36.2*
Private co-funding of public R&D expenditure	*58.5*	*54.5*	*-4.0*	*53.8*
3. Employment impacts	91.6	92.5	+0.9	91.9
Employment in knowledge-intensive activities	*42.9*	*59.7*	*+16.8*	*54.1*
Employment in fast-growing enterprises	*126.4*	*115.8*	*-10.6*	*123.8*
4. Sales impacts	67.4	55.3	-12.1	53.1
Medium and high-tech product exports	*90.4*	*83.9*	*-6.5*	*79.2*
Knowledge-intensive services exports	*45.2*	*45.8*	*+0.6*	*43.7*
Sales of new-to-market/firm innovations	*66.2*	*32.7*	*-33.5*	*32.3*

Source: developed on the basis of European Innovation Scoreboard (2018).

The goal of this article is to analyze and assess the financial support for the innovative activities of Częstochowa enterprises from the Regional Operational Program of the Slaskie voivodeship for the years 2014-2020. The following research questions have been assigned to this goal:

1) What is the value of projects and the amount of financial support from the program?
2) When were the projects realized?
3) How many companies, either during or after the realization of a project, reported to the Patent Office for the protection of intellectual property (inventions, utility models, trademarks, industrial designs or decorative designs, etc.)?

The answers to these questions allow one to assess the impact of financial subsidies from the EU on the increase in innovation of SMEs in Częstochowa.

2. Literature background

Subject literature (e.g., Aarikka-Stenroos, Sandberg, & Lehtimäki, 2014; Story, O'Malley & Hart, 2011; Walsh & Kirchhoff, 2002) clearly states that innovations are a source of economic success for a country. The Polish economy developed at the level of 3,7% GDP (in 2017), but the position and the innovative capacity remains at a low level (the EIS indicator from 2010 is around 53.6). The critical assessment related to the innovativeness of the Polish economy (e.g., Brandt, 2018; Krajewski, 2015, Szajt, 2016 or NBP, 2015) and its connection with the inflow of financial resources from the EU has become the subject of many publications. Hausner (2013) thinks that financial resources coming from the EU to a small extent influence the level of innovativeness of the Polish economy. Jasinski (2015, 2018) underlines the lack of correlation between the inflow of funds from the EU and an increase in the level of innovativeness of Polish enterprises.

What is more, he thinks that they are the source of a negative phenomenon occurring in the Polish economy, namely, undesirable substitutions between various types of outlays or the effect of pushing out private expenditures by public funds (from the EU). Weresa (2015) finds the sources of failures in the ways of allocating funds that flow into entities or institutions instead of projects, which prevents cooperation and an increase in innovative potential. Gorzelak (2014) claims that the allocation of financial resources from EU support is ineffective and even harmful because "... investments in roads, buildings, their equipment, technical infrastructure are not conducive to the creation of innovation and only increase material values that are not the carrier of innovation." Another point of view comes from the institutions which research the innovativeness of the Polish economy. Namely, from surveys conducted by the Central Statistical Office (2017), the Polish Agency for Enterprise Development (2015) and Deloitte (2018), it appears that more than half of the entities from the SME sector have introduced innovations in recent years. The majority of these innovations were product innovations, usually financed from own resources. There may be a conclusion that the growth of the innovativeness of the Polish economy is lower than the average growth of EU countries, hence these discrepancies in assessment. Consequently, the level of innovativeness of Polish enterprises in relation to the European trend is insufficient.

Barriers related to insufficient innovative growth, which Polish entrepreneurs most often indicate, are as follows (Deloitte, 2018):

1) Lack of transparency of regulations related to incentives for R & D related expenditure (e.g., only 11% of surveyed Polish companies know and actively use tax relief for conducting R & D activity, another 39% are aware of existing incentives, but they do not use them).

2) Insufficient access to finance for research and development (R & D).

The specificity of the problem related to the growth of innovativeness of the Polish economy requires detailed research on restrictions connected to the development of innovation and the absorption of EU funds.

3. Research approach

For the purpose of the study the selection criterion was applied, of projects financed by the Regional Operational Program (ROP) of the Slaskie voivodeship for the years 2014-2020, III Priority Axis, Competitiveness of SMEs as "...a project focusing on gaining and implementing product and process innovations with the possibility of using non-technological innovations as supportive along with the possibility of their promotion on the national and international arena. The improvement of an enterprise's competitiveness requires a significant increase in the use of innovation in business."

According to the Oslo Manual (Eurostat, 2005) "*innovation* is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. A common feature of innovation is that it must have been implemented. A new or improved product is implemented when it is introduced to the market. New processes, marketing methods or organizational methods are implemented when they are brought into actual use in the firm's operations." Based on data from www mapa. RPO 2014-2020 enterprises' projects were selected which were qualified for financial support until 2018[3]. These projects were then divided into product and process innovations (material) and marketing and organizational (intangible) - such a division allows the source of innovation to be determined.

Because the analysis and assessment concern both innovative solutions and innovative products or services, that is, sensitive data, it was considered as appropriate that enterprises will protect intellectual values in the form of an application to the Patent Office – thus protecting innovations. For this purpose, the database of the Patent Office of the Republic of Poland was used and it was examined whether the entities that received the subsidy secured intellectual values in the past or whether they applied to the Office during or after the project.

According to the collected data, 55 entities were selected from Czestochowa which received financial support from RPO 2014-2018 of the Slaskie voivodeship (Table 2.25) for the total amount of PLN 31,847 457.30.

3 The time limit was enforced by a database containing only projects qualified for financial support.

Table 2.25. List of projects of economic entities financed by the Regional Operational Program Slaski for the years 2014-2020 in Czestochowa

Czestochowa	Product and process innovations	Marketing and organizational innovations	Altogether
Number of entities	24	33	55 (2 entities submitted two applications)
Total value of projects (in PLN)	77 134 776.00	19 981 086.98	97 115 862.98
Requested EU funding (in PLN)	23 942 368.01	7 905 089.29	31 847 457.30

Source: own study based on data from www mapa.RPO 2014-2020.

Entrepreneurs more often submit applications for marketing and organizational innovation support (58%), but the costs of projects related to product and process innovations are higher (79% of the costs of all innovative projects). If we analyze the funds qualified for co-financing, projects related to product and process innovations are only 75%. The conclusion is that higher costs are qualified in projects for marketing and organizational innovations.

4. Discussion and results

4.1. Financial support from RPO 2014-2020 for entities from Czestochowa

The analysis of projects which were classified for financial support from funds from RPO of Slaskie voivodeship allows us to assess the project values and co-financing amount. Quantitative research allows the assessment of the amount of support as well as the period that entrepreneurs need for the implementation of projects. In the beginning, the analysis of distribution of normal variables is made: the total value of projects, the amount of co-financing, and the time (in days) that the applicant has planned to implement the project. The Statistica program is used for this purpose.

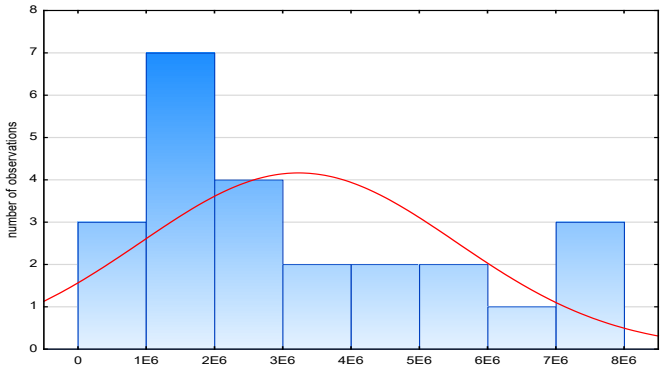

Figure 2.11. Total value of projects financing product-process innovations

The value of projects of technological and product innovations ranged from PLN 1 million to PLN 2 million (as many as 7 applications), the next from PLN 2 million to PLN 3 million (4 applications). Hence the conclusion that process and product innovations are capital-intensive. Therefore, it is necessary to think about comprehensive solutions that will allow for systemic solving of financial problems, especially those related to technological innovations.

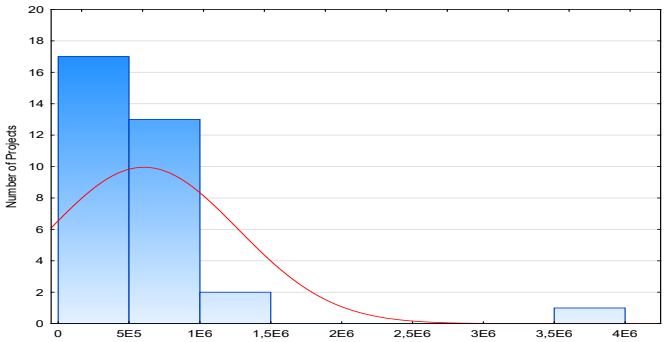

Figure 2.12. Total value of projects financing marketing and organizational innovations

Comparing marketing and organizational innovations, a difference between the value of intangible and material investment projects can be seen. The overall value of innovation projects related to marketing and organizational space is from PLN 0.1 million to PLN 1 million (30 applications). One project was submitted with a cost estimated at approx. PLN 4 million. This project is

related to the activity of an entity dealing with the promotion and service of sports events – hence the validity of the value of this project can be recognized. The following histograms concern the value of the EU co-financing applied for (Figure 2.13 and Figure 2.14).

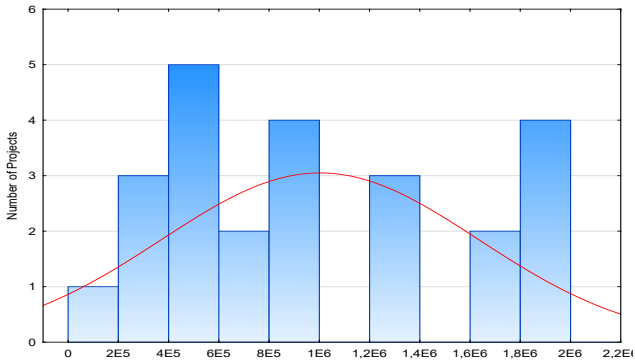

Figure 2.13. The value of the submitted projects co-financing product-process innovations

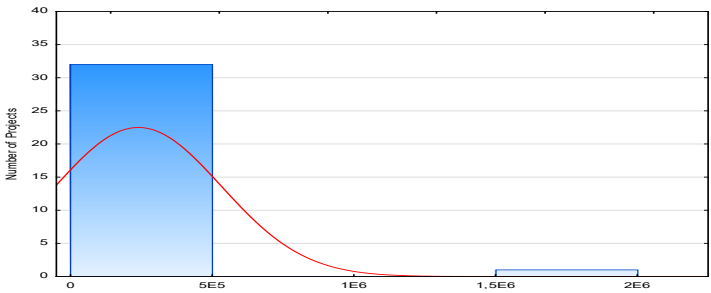

Figure 2.14. Value of the submitted projects co-financing marketing and organizational innovations

Normal distributions related to the amount of co-financing differ between material (technological and product) and non-tangible (marketing and organizational innovation) innovations. The majority of entrepreneurs who applied to the EU for funds for innovative activities connected with organization and marketing gained amounts worth up to PLN 0.5 million. The average value of co-financing from EU funds for entrepreneurs who declared product and technology innovations was PLN 1 million and confirm the fact that material innovations are capital-intensive.

Another issue concerns the time that is needed to carry out projects related to investments in innovation (Figure 2.15 and Figure 2.16).

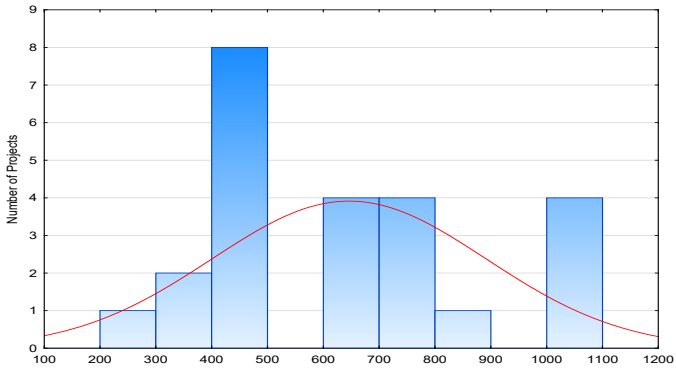

Figure 2.15. Number of days planned for project investment implementation on product-process innovations

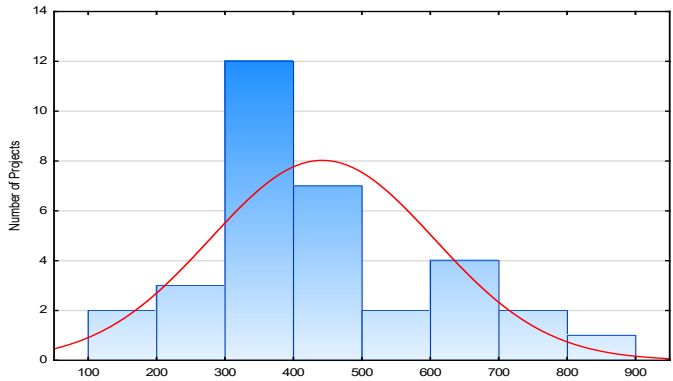

Figure 2.16. Number of days planned for project investment implementation on marketing and organizational innovations

Taking into consideration the length of time for introducing investments related to innovations, both innovations concerning organization and marketing (22 entrepreneurs) as well as product and technological innovations (11 entrepreneurs) need on average up to 500 days (about 1.5 years). This time is also connected with training for employees. The time which is needed by entrepreneurs for introducing innovativeness should be recognized as one of the

most important determinants because it determines whether it can be called an innovation. An interesting question is whether material innovations (product and process) need as many as 1100 days (about 3 years), as 4 entrepreneurs declared such time. Another problem which was supposed to be solved is the selection of industries and markets where entrepreneurs interested in investing in innovation operate. On the basis of cluster analysis, using the Statistica program, a division was made.

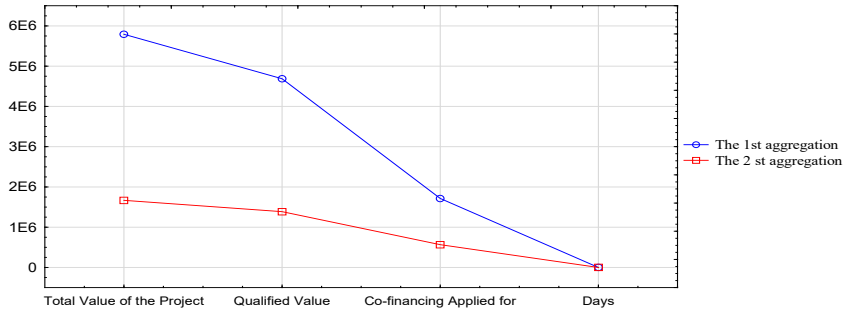

Figure 2.17. Average cluster chart for product and process innovations

The 1st aggregation consists of companies from industries such as textile, confectionery, paper, furniture, food, IT, metallurgy, board game manufacturers, glues, baubles, printing houses and even wholesalers (15 cases). Thus, the 2nd aggregation (9 entities) deals with glass, batteries, packaging and lamps production as well as construction, marketing, confectionery, and foundry companies. The above data indicate the lack of one industry that would become a leader in the innovation market in the region. A lack of cooperation and dispersion of production markets does not allow for building lasting business relationships in the region. Product and process innovations should foster cooperation and knowledge sharing between entities from various industries.

In the first group of aggregation, there are entrepreneurs from such industries as construction, electrical, commercial (shops and wholesalers), IT, medical, in a total of 13 cases. The second group consists of entrepreneurs from such industries as medical, automotive, construction, IT, and also dealing in the production of strollers (7 cases). In the third group an entrepreneur is dealing with sport, but in the fourth group there are entrepreneurs from industries such as medical, IT, education, and production of accessories for animals, lamps, and trade, all together being 12 cases.

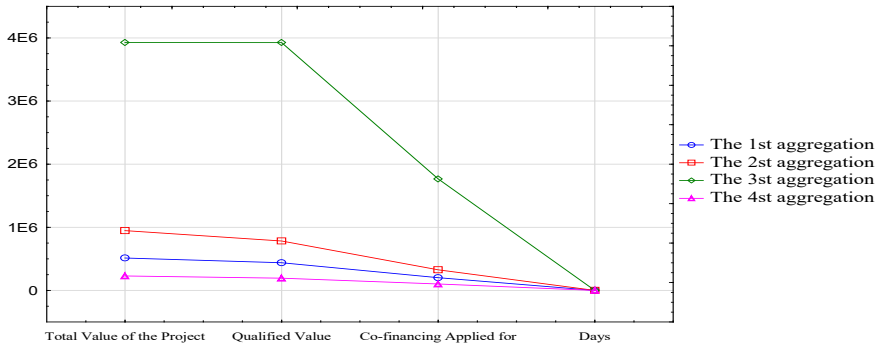

Figure 2.18. Graph of average cluster analysis for marketing and organizational innovations

Also, in the group of marketing and organizational innovations, there is no single market where entrepreneurs can share knowledge about conducting innovative activity or supporting innovative activity. Industry scattering, as well as the diversity of markets on which enterprises operate in the region, does not help to create clusters and cooperation in R&D.

4.2. Innovative activity and protection of property rights

Innovative activity has a high risk of interception of innovations by competing entities and, therefore, the protection of the value of an innovative project before the acquisition or imitation is an important issue. It is justified to consider that patent protection of the innovation is the most effective protection of property rights of an entity conducting the innovative activity. Because the essay concerns the course of investment activities, research was carried out related to the number of applications filed with the Patent Office in 2014-2019 by entities conducting business activity in Czestochowa (Table 2.26).

The tabular summary concerning applications about protection of property rights submitted by entrepreneurs in Czestochowa allows for the assessment of projects under the quality account (secured by property rights) of innovations and related to co-financing from the EU. Czestochowa entrepreneurs in the years 2014-2019 submitted 868 applications to the Patent Office, of which 83 applications were from entities that received financial support from the EU, which constitutes only 10% of all applications.

Table 2.26. Declared property rights to the Patent Office of enterprises from Czestochowa in the years 2014-2019

Declared		2014	2015	2016	2017	2018	2019*	Total	% share
Inventions	Total**	55	59	61	48	0	0	223	100
	Support***	5	2	8	10	0	0	25	11
Utility designs	Total	21	17	15	5	0	0	58	100
	Support	4	3	0	5	0	0	12	21
Trademarks	Total	89	99	119	105	90	15	517	100
	Support	3	19	2	18	0	1	43	8
Industrial designs	Total	21	17	12	9	11	0	70	100
	Support	0	1	1	0	1	0	3	4
Total	Total	186	192	207	167	101	15	868	100
	Support	12	25	11	33	1	1	83	10
% share of entities with support		6	13	5	20	1	7	10	

Note: * Data until 31/03/2019; ** Total – all reported property rights in the Patent Office from Czestochowa; *** Support – entities that received co-financing from the Regional Operational Program for the Slaskie voivodeship for the years 2014-2020.

Source: own study based on the Patent Office database. Retrieved from https://grab.uprp.pl

The most often Czestochowa entrepreneurs reported trade patterns (517), but the entities which gained co-financing were only 8% of the total. Among the surveyed SMEs, 11% of inventions reported were owned by enterprises receiving support for innovative projects. It cannot be diagnosed here that funds which were received by entrepreneurs do not create an innovative potential of a region. What is more, if entities gained support, their activity should bring a greater effect in the form of a larger share of their creative activity in the whole of enterprises that have not received this support.

The lowest number of submitted applications concerned 2018 (only 101), out of which only one entity that received the funding submitted the trademark to the Patent Office. It should be supposed that the settlement of projects was time-consuming and that is why entrepreneurs are waiting for their submission. Therefore, the first quarter of 2019 should bring more applications, but this is not the case. Hence the conclusion, that the submitting of patent applications has been terminated by entrepreneurs. The last element about the assessment of actions connected with the protection of innovation is a fact that few entrepreneurs decided to submit applications to the Patent Office. The study shows that only 6 (out of 24) SMEs who received funding for process and product innovations, and also 6 (out of 33) who received funds for projects connected with marketing and organizational innovations, submitted applications for protection of property rights.

Summing up, entities which received financial support from ROP of Slaskie voivodeship for the years 2014-2020 only secured property rights regarding innovation to a small extent. It can be supposed that the innovations introduced in the enterprise were modernized, but they did not affect the permanent innovative solution for the entire industry in which the company operates, hence the low activity associated with the protection of property law.

5. Conclusion

This article makes an attempt to analyze and assess the influence of ROP of Slaskie voivodeship for the period 2014- 2020 on the growth of innovative solutions in SMEs from the Czestochowa city region. The analysis was carried out according to the following criteria: the value and amount of project co-financing, the time of their implementation and the number of applications securing property rights. The presented survey results demonstrate the complexity of the problem concerning financial support for enterprise innovations within the ROP program.

In Czestochowa, 55 entities used EU funds for innovative activity. The declared value of projects realized within ROP for entrepreneurs from Czestochowa was about PLN 32 million. The value of co-financing for marketing and organizational innovation projects amounted to PLN 0.5 million, while for process and product innovation it was PLN 1 million. Also, the time related to the implementation of projects differed. For innovations of an intangible nature it was up to 1100 days, while for material-related innovations it was 200 days shorter. The number of applications for the protection of property rights by entities from Czestochowa was also analyzed. The study shows that few entrepreneurs (about 10%) who received co-financing secured their property rights in the form of applications to the Patent Office. It should be concerning if the submitted applications for co-financing of innovative projects should also be an assessment of an entrepreneur's experience in the field of securing and protecting intellectual rights. This approach will allow the co-financing of innovative projects that will be permanently connected with the company and thus contribute to the value of the innovation itself. The legal protection of innovations will not allow them to be copied by imitators, becoming also a market value in itself. Further surveys about SMEs should focus on systems, processes and entities' abilities to create permanent innovative value-creation, which will allow pro-innovation behavior to be consolidated without the need for co-financing by the European funds.

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Biographical note

Anna Rybak is an Assistant Professor at the Czestochowa University of Technology (Poland) at the Faculty of Management. Her scientific studies focus particularly on strategic management and management innovation. She has several research publications in well-known international journals and conferences about innovation in e-commerce and management of consumer behavior. In her research projects, she practically cooperates closely with SMEs.

Chapter 3.
Competence-based economy

The third chapter of the monograph presents the results of research where a common reference point is a man and his competences. The authors relate to various market and organizational problems, but the competences that are at the center of interest are either the cause or consequence of the processes observed. The attention of entrepreneurs and managers focuses on competences, such as when it is necessary to recruit a new employee, when he is expected to have a real influence on the development of the company, or when looking for ways to keep him in the organization. Development-oriented organizations, through the increase of innovativeness, will be particularly focused on competencies conducive to innovation activities. In turn, organizations focused on creating sustainable development must ensure that employees who will provide the organization with the desired direction of development have the right beliefs and skills.

In the first subchapter, the researcher discusses the problem for organizations in acquiring talented employees with appropriate competencies. One example is the widely used Employer Branding strategy, focused on building the image of an attractive employer in order to attract candidates with the right profile. The author set herself the goal of examining and presenting good practices in this field, and in consequence identifying positive and negative factors affecting the employer's brand. The conclusions formulated at the end of the study are of an applied nature, and their use can be of a practical and research nature, aiming at building a broader perspective, even related to the fourth industrial revolution and its consequences for building human capital in enterprises.

Competency studies of managers and leaders have long traditions and are part of the development of organizational and management sciences. All significant changes in the economy are related to the acquisition of new competences and the ability to use them. The author of the next section focuses his attention on the competences of network managers and leaders. The article contains the results of identifying these competencies and their position against the background of other managerial competences, thanks to which a broad perspective was created for the analysis and interpretation of the results obtained.

The next section presents research on managerial competencies that determine innovation in management. The starting point for the presented research was two significant observations of the researcher expressed in research hypotheses. The author draws attention to the need to introduce innovations in management and, at the same time, to the low competence of managers. Positively verified hypotheses led the researcher to formulate a postulate for further research in the direction of modeling innovation in management, as well as developing methods for measuring them.

The relationships between employee competences and increasing the competitiveness of enterprises, which have been confirmed many times in research, have also become the subject of research presented in this monograph. The researcher attempted to determine the impact of key employee competencies on building the competitive advantage of enterprises in the Pomeranian Voivodeship. The analysis of the results obtained introduces references and comparisons on the level of using these competencies in the most economically developed countries.

The issues of empowering employees, increasing their autonomy, and building subjectivity are examined in the next section. The presented research, constituting a case study of a small enterprise, should be treated as a pilot project and the basis for designing quantitative research. One of the most important conclusions is the recognition that it is necessary to thoroughly prepare the enterprise for the implementation of empowerment. Preparing the organization can be time-consuming and difficult, given that it may be necessary to change management style, and for employees and management to gain new skills.

The final research presentation relates to the importance of selecting employees in an enterprise in light of the concept of sustainable social and economic development. The research aimed to determine the relationship between knowledge and orientation of employees, and the effectiveness of implementing the concept of sustainable development in an enterprise. The research proves that, despite the widespread knowledge of the importance of sustainable development, only 25% of company directors involved in implementing sustainable development principles in the recruitment process, implement environmental and social activities for the company's goals and strategic plans. The key task of management should be to convince employees at lower levels that sustainable development will certainly bring measurable benefits, such as improving the company's image, which will translate into a more favorable assessment of their products. The conducted research inclines to pose another research question – why is such a small percentage of companies aware of, and taking real actions, in the field of developing sustainable socio-economic development?

Employer branding in the staffing process

Agata Branowska[1]

Abstract

One of the factors which builds the image of a company is the way the staffing process is conducted. Candidate experience – their impression regarding the process of recruitment and selection – has got an impact on the company's assessment not only as a potential employer but also as a supplier of goods or services. For that reason some companies implement Employer Branding (EB) – a strategy to establish the brand image of an organization to attract a particular set of talent. The aim of the article is to examine which actions related with Employer Branding the chosen companies involved in, to present good practices related with EB during the recruitment and selection process in those organizations, and to check what are the positive and negative factors which influence the brand of the company as an employer. The article structures knowledge about recruitment and selection, its phases, traditional and modern methods of staffing process. It presents how to proceed, step by step during recruitment and selection, and how to improve this phase of Human Resource Management. In the article, the concept of Employer Branding is characterized. Actions taken to build a coherent and positive image of the employer in the eyes of potential employees are described. The following methods are used: literature studies on the concept of Employer Branding, recruitment and selection; analysis of documentation of selected enterprises; analysis of online forums and blogs to seek opinions on these enterprises as employers; and interviews with selected HR managers.

Keywords: *employer branding, recruitment, selection, staffing process, good practices.*

1. Introduction

In a dynamic and unpredictable environment, organizations are able to maintain a competitive advantage thanks to the ability to constantly adapt to

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the changing reality. Another generations of candidates, new technologies, and changing regulations create challenges for HR departments that compete in order to acquire employees with the right knowledge, skills, and experience. To attract the most valuable employees, organizations try to build the image of being an attractive employer and get involved in employer branding activities. One of the most important employer branding tools is recruitment marketing. The recruitment marketing aim is to support the organization in achieving the image of the "employer of choice" through effectively selected forms of recruitment (Wojtaszczyk, 2012). If a company does have a positive image (brand) as an employer, the probability of candidates being attracted to the company is higher.

The aim of the article is to examine which actions related with Employer Branding that the chosen companies involved in, to present good practices related with EB during the recruitment and selection process in those organizations, and to check what are the positive and negative factors which influence the brand of a company as an employer. To reach that goal the analysis of a few well-known companies was conducted. The author conducted an analysis of the companies' documentation: websites, career pages, job ads. The goal of this method was to understand what Employer Branding activities the chosen companies try to implement during the recruitment and staffing process. The author also analyzed blogs/forums on which former, current, and potential employees express their opinions about particular companies. The aim was to check what are the positive and negative factors which have an impact on companies' brands as an employer.

The paper characterizes the staffing process – activities aimed at acquiring the right people for the organization and leading to a proper cast of vacant jobs to ensure the continuous and efficient functioning of the organization (Listwan, 2010). In the article, the phases, methods, and techniques used to assess technical and social competences are presented. The article contains the characteristics of the Employer Branding concept and a description of activities which aim to shape and maintain a positive image of the company. The activities are mostly related to an external group of stakeholders – potential employees of the company. The article presents good Employer Branding practices during the recruitment and selection process in well-known companies. Good practices are a set of principles that could be benchmarked and followed by representatives of HR departments.

In the first chapter the staffing process is characterized. The chapter presents a step by step guide on how to proceed during recruitment and selection, and what are the key elements of the candidates' profile. The second chapter contains the characteristic of selection methods. The next part of the paper contains the literature review of the Employer Branding concept.

The emphasis was put on external EB, related to the recruitment and selection process. In the fourth chapter the good practices related to the Employer Branding policy of several well-known companies are described, and factors which positively and negatively influence the brand of the company as an employer. In the next chapter the research approach, methods and results of the study are presented. The work is summarized by final conclusions.

2. Employee selection

The selection of employees consists of a logical time sequence of decisions and actions that lead to optimal fulfillment of the staffing needs arising both from employment plans, as well as emerging vacancies that cannot be predicted during planning (Zając, 2007). Selection of employees starts with a diagnosis of personnel needs – deciding whether and which positions should be filled. After the diagnosis, a profile of the candidate, based on the job description, should be created. The job description is a document containing the following information: job title, location in the organizational structure, responsibilities, tasks and goals, methods and tools as well as working conditions. The candidate's profile consists of personal requirements which include. among others. competencies, qualifications, training, experience, and organizational adjustment (Armstrong, 2005).

Competencies are aptitude, skills, and knowledge used to effectively perform tasks in given work conditions (Spychała, 2011). Occupational competencies can be defined as behavior determined by knowledge, skills and motivation, leading to the completion of tasks according to expectations (Jurek, 2008). Overall competencies of an employee can be divided into two categories: occupational competencies of a worker in a particular enterprise and excessive competencies. Technical and social competencies compose occupational competencies. Technical competencies are related to a specific work process and consist of knowledge of the process (means of labor, subjects of labor, technology), practical ability to perform a task and motivation to perform the task according to defined patterns (Spychała, 2011). Social competencies refer to the ability to get along with other people. They express an ability to establish and maintain contacts, empathy, an ability to cooperate in the pursuit of achieving common goals, and resolving conflicts. Social competencies are acquired in the course of social training (Matczak, 2001).

In order to make a proper decision related to staff selection, profiles of the required competences are created, which constitute a benchmark for assessing profiles of candidates for work. The competencies profile consists of requirements, which a candidate necessarily needs to have, as well as desirable

knowledge and skills (Pocztowski, 2008). An aptly defined competence profile indicates which person the company is looking for to effectively perform a job.

After creating the profile of competencies, the recruitment of candidates takes place. The aim of the process is to hire staff in the right number, quality, place and time from within the enterprise (this is the so-called internal recruitment which takes place on the principle of internal movements or retraining) or its external environment (it is the so-called external recruitment, which aims to identify and attract candidates from the external labor market) to cover current and future, anticipated or random staff shortages (Schwan & Seipel, 1995). Recruitment means attracting an appropriate number of candidates for work, among which, as a result of the selection, new employees will be selected and employed (Zając, 2007). Organizations can use a variety of ways to reach potential candidates (e.g., through the Internet, data banks, announcements, direct search; Suchar, 2009).

Selection is a key element in the process of acquiring employees and means the best possible adjustment of the competency profile of the candidate to the required competence profile at a given position (Pocztowski, 2008). The selection means a gradual reduction in the number of applications by checking whether, and to what extent, the candidates meet the requirements of the job description (Marek, 2008). To discover which candidate fits best to the job requirements, different selection methods can be used.

3. Employee selection methods – an overview of the traditional and modern methods

The following methods are characterized: document analysis, references, interviews, competence test, psychological test, knowledge and skills test, intelligence test, medical and physiological test, Assessment Center, multilevel fit, bimodal predictions.

Document analysis (CV, cover letter), references

The result of the recruitment is the application and submission of the documentation: candidate's CV, cover letter and additional documents (e.g., diplomas, school-leaving certificates, other certificates).

Interviews

An interview, the most popular method of recruitment, is a dialogue between the employer or employers' representative and a candidate applying for a job. The aims of the interview are related with gathering information about whether the candidate has got the required competencies needed to perform the work, does he fit into the organizational culture, what is his level of

motivation. Its aim is also to encourage the candidate to accept the job offer (Woźniak, 2013).

There are several types of interviews: individual (one recruiter), panel talks (several recruiters) and collective interviews (several recruits simultaneously). An initial aim of the interview, usually conducted by one employee from the human resources department, is to verify compliance with formal requirements and provide basic information about the job offer. An in-depth interview is carefully planned and prepared in cooperation with the supervisor of the future employee. There are structured and unstructured interviews. Structured interviews are more accurate and reliable than unstructured. They usually include several elements:

- in-depth work analysis, usually carried out using critical event techniques;
- standardized questions asked to all candidates in the same order;
- candidates' responses evaluated on behavioral scales (e.g., BARS - behaviorally anchored rating scales);
- training of people conducting interviews, which is to ensure that the standard form will be understandable for them and that they will adhere to it;
- calculation of evaluation results (Anderson & Cunningham-Snell, 2013).

Competency test, psychological test, knowledge and skills tests

Competency test (Situational Judgment Test)

The method is based on the fact that the respondent answers hypothetical questions (also known as situational questions). The questions describe situations that may occur in the workplace and several answers, which present alternative ways of behavior. The task of the respondent is to choose the option, which the candidate considers to be the most effective way to behave in particular situation (Smółka, 2011).

Psychological tests

Psychological tests are used to assess, inter alia, the level of cognitive, psychomotor functioning (Spychała, 2011). They are used to diagnose: intellectual abilities, personality, predispositions, level of social skills (Psychodiagnostics Tests, 2014).

Knowledge and skills tests

That kind of test are designed to check if the candidate has got knowledge and skills needed to perform a job (Woźniak, 2013). Knowledge tests usually consist of sets of questions examining the knowledge necessary to perform work in

a given position. Skills tests usually consist of a series of tasks of a certain type, for example, related to accounting, logics, verbal abilities (Suchar, 2009).

Medical and physiological tests

The aim of the medical test is to eliminate people who should not be employed due to their health condition. The medical diagnosis indicates whether, and in which positions, the candidate can be employed. The scope and accuracy of medical examinations depend on the type of work.

Assesment Center

The Assessment Center is one of the most comprehensive, reliable, but also the most expensive method of testing employees' professional skills (Skierkowski, 2003). It is a method of competence assessment focused on observing the behavior of candidates in various situations (Nikodemska, 2013). The assessment should start with defining the competencies that the organization expects from the candidate at a given workplace. The assessed competences are determined in advance – based on the work analysis – and formulated in the form of behavioral observation cards. Usually, between 6 and 9 competencies are being assessed (Woźniak, 2013). The competencies and predispositions most often assessed during AC include communication, the ability to influence others, planning and organizing, problem-solving, resistance to stress (Woźniak, 2013). After defining which competencies are needed, a set of tools should be selected which will enable the assessment of the competencies in the most reliable and effective way. During the Assessment Center, different tools are used: behavioral simulations, behavioral interviews, psychometric methods, skill tests, personality questionnaires (Zachariasz-Łobodzińska, 2009). The most commonly used types of tasks are group exercises, simulation exercises, presentations, business games, case study, basket of tasks (in-basket). Exercises that candidates perform during the Assessment Center simulate tasks, with which they will have to deal with in the job they are applying for.

Multilevel fit

This technique involves taking into consideration three aspects of the candidate's fit:

- person – job (compatibility that exists between individual personal attributes and the job characteristics; skills, knowledge, abilities to perform specific job);
- person – team (the ability of the candidate to cooperate within the team);
- person – organization (the internalization of basic organizational values, involvement in the implementation of organizational goals

formulated in the mission, the ability to represent the organization at external events, Suchar, 2009; Woźniak, 2013; Anderson, 2013).

Bimodal predictions

Bimodal prediction is related to the assessment of the candidate to perform tasks and duties not only today but also to take into consideration probable, future changes in the professional role (Suchar, 2009). Recruiters should anticipate how the requirements for a given job can change, and then look for the candidate. The selection today is related to the fact that the tasks, duties can change dynamically in the future (Suchar, 2009).

4. Employer branding in recruitment and selection process

Employer branding is not a new concept. In 1996, Ambler and Barrow introduced the term – they defined employer branding as "the package of functional, economic and psychological benefits provided by employment, and identified with the employing company" (Ambler & Barrow, 1996). Sivertzen, Nilsen, and Olafsen (2013) proposed that employer branding is the development of an organization's image and reputation as a prospective employer, and would affect its ability to retain employees. Employer brand is about giving an identity, image, and distinctiveness to the organization as an employer, in order to attract prospective employees and to motivate, engage and retain its current employees (Srivastava & Bhatnagar, 2010). Backhaus and Tikoo (2004) proposed a framework that included both external and internal employer branding. Employer branding activities should be addressed both to potential employees as well as employees already working in the organization. Internal employer branding is concentrated on creating a friendly work atmosphere, building opportunities for development and growth for employees inside the organization (Srivastava & Bhatnagar, 2010). External employer branding focus on building company image that increases candidates' and market awareness of the brand (company) and the advantages of working for it (Srivastava & Bhatnagar, 2010). Employer branding allows the firm to differentiate its image from other employers competing for talent and to attract applicants who ideally possess similar values as the organization (Backhaus & Tikoo, 2004). Employer branding applies marketing techniques to the process of recruiting and retaining employees (Backhaus, 2016). Companies try to develop their image as an employer of choice. In the fight for the interest of potential employees they use new elements and tools. Employer Branding techniques are varied. Table 3.1 contains examples of Employer Branding tools used in recruitment and selection.

Table 3.1. Employer Branding tools used in recruitment and selection

Nr	Type of action	Characteristics
1.	**Defining company culture and values**	- defining and communicating organization culture, goals, mission, vision and values; - people are attracted to and are selected by organizations that match their values, and they leave organizations that are not compatible with their personalities. 15% of candidates claim that company values most influence their decision to apply for a role. A good fit between the values of an employee and organization can lead to positive outcomes, like higher levels of organizational commitment; - informing about involvement in social and ecological initiatives, receiving prestigious awards (Top Place to Work, Empowering Women Leaders, Best Workplace Culture, etc.). Awards illustrate values, reputation as an employer of choice, and commitment to corporate social responsibility.
2.	**Solid preparation for the interview**	- making an analysis of the job position on which the candidate is to be recruited. Based on the job description and interviews with the managers the candidate's profile is created. The profile should reflect the tasks which are to be carried out and the characteristics of the team with whom the candidate will work; - when creating a candidate's profile, taking into consideration both technical and social competencies, and distinguishing competencies which a candidate necessarily needs to possess and competencies desired; prioritization of the criteria. Avoidance of using ambiguous and unclear criteria; - selection of the most accurate methods to evaluate candidate's competencies; - preparing a set of questions and making sure all were asked, providing adequate time for the meeting.
3.	**Communication**	- paying attention to proper communication during all staffing phases, for instance: confirming receiving the candidate's application, sending detailed information about the place in which the recruitment meeting is going to take place and the map, after the meeting giving feedback on time, and when there is no decision informing about delay, paying particular attention to negative feedback for candidates who will not be employed, after signing the contract, and before the first day at work sending information about the company's life; - the interview with a candidate should be a dialogue, a candidate should have the possibility to ask questions. Providing real information about the tasks, team in which the candidate will work and the company. - during the recruitment and selection no discriminatory behaviors should be present; - constant contact with former, current and future employees.

Nr	Type of action	Characteristics
4.	**Career page**	- a platform to share direct, honest insight into company culture, role responsibilities, career path, and growth opportunities; - highlighting Employee Value Proposition: the unique policies, programs, rewards, and benefits that a company can offer to the candidate; - preparing a clear and informative job description, tasks to be carried out and expectations. Providing information about the interview process and hiring criteria, phases, and methods of selection, information about the job interview; - adding information about internships and apprenticeships; - letting the employees be the ambassadors of the company: adding employees stories, testimonials; - career site should be mobile-optimized. Using uncomplicated and user-friendly application forms.
4.	**Job ads** **Search engine optimization**	- personalization of job ads to attract the best candidates. Making them clear and full of relevant information important to potential candidates. Giving concise, specific information why any talent would want to work for the company. 60% of job seekers have quit an application due to its length and/or complexity. A little thing such as too many fields to fill out may be the reason for not converting a potentially good hire into applicant; - personalization of recruitment processes means applying an individual approach to candidates (creating several different offers for one offer, creating personalized messages for candidates, preparing tasks strictly for a given position); - using proper keywords to describe the company's culture, your job openings, job descriptions, duties, and responsibilities, so that job seekers can easily find it on search engines; - using billboards, banners, leaflets.
5.	**Social media**	- showing the company in an attractive light, garnering potential future employees' interest, delivering interesting, useful and relevant information through social media. Social media is one of the key ways to promote employer brand. It's especially important when recruiting Millennials; - activity on social websites, both professional and relational ones; promoting job openings; reaching potential candidates on LinkedIn, GoldenLine, etc.; sharing employee-created content and testimonials on LinkedIn career pages to drive interest in the company; while hosting or attending events using live streaming on Instagram or Facebook; - encouraging employees to be active on social media, providing social media training if necessary (what kind of messages to send out and which to avoid).
6.	**Video advertising**	- including videos on job ads and on job boards – these will reach a wider audience than images and plain text. Using video to record employee testimonials, and putting them on a career site. Creating recruitment videos is an effective way to showcase employer brand.

Nr	Type of action	Characteristics
7.	**Blogs**	- engaging high-quality applicants by creating a blog where information about the company, its culture, values, current projects, and industry trends are shared. Encouraging engagement, comment, suggestions, share, or like. One of the most innovative and powerful tools that give a competitive advantage over competitors.
8.	**Email campaigns**	- creating and sending highly personal, email campaigns; sending relevant information about industry trends, tips for finding and getting jobs, updates about company, and new career opportunities.
9.	**Recruitment events**	- arranging an open house day in a company, events in a relevant learning institution that will connect with target candidates and show the company image in a positive light (for example conferences, workshops, seminars, inviting students to the company, organizing company visits, trainings, scholarship programs, internships); - participation in job fairs; - engaging with talents before job openings.
10.	**Talent pools**	- talent pools are shortlists of candidates that are not currently being considered for a role (i.e. not applicants); a database with current and potential future job candidates. Talent pools can be done using outbound or inbound recruiting strategies (sourcing tools, referrals).
11.	**Ambassador programs**	- engaging, often students, in the promotion of the employer brand, acting as a link between the organization and the university; supporting recruitment processes, promoting events organized by the company, e.g. training or open days. Supporting the company when organizing job fairs or other types of meetings with students.
12.	**Candidates' experience examination**	- Asking candidates about impressions related to recruitment and selection, and the areas/elements which can be improved. Implementing changes in the process. Continuous improvement.

Source: own work based on Robbins & Judge, (2009); Albrychiewicz-Słocińska & Robak, (2017); internet sources like What role does employer branding play in recruitment? Retrieved from https://medium.com; Employer branding in Poland 2018. Employer branding and recruitment: The ultimate guide. Retrieved from https://www.recright.com; WilsonHCG, 2018 Fortune 500, top 100 employment brands report. Retrieved from https://info.wilsonhcg.com/hubfs/2018-F500-Employment-Branding-Report.pdf; 2019 Guide for buying a recruiting tool. Retrieved from https://get.talentlyft.com; TalentLyft, how to build a talent pool. Retrieved from https://www.talentlyft.com.

5. Research approach and methods

Three groups of exploratory research were carried out. The first was based on extensive literature studies on the recruitment and selection of employees and the concept of Employer Branding. The second one was related to the analysis of secondary sources of information. The author conducted an analysis of companies' documentation: websites, career pages, job ads. The goal of this method was to see what Employer Branding activities the chosen companies try to implement during the recruitment and staffing process. The activities of six well-known companies were described. Next, the author analyzed

blogs/forums on which former, current, and potential employees express their opinions about particular companies. The aim was to check what are the positive and negative factors which have an impact on companies' brand as an employer. The third method is related to observation. The author has been working as a recruitment specialist and conducted several staffing processes, mainly for senior management positions. She was responsible for creating competencies profiles, publishing recruitment advertisements, accepting candidates' documentation, conducting job interviews, monitoring the labor market, searching for candidates on portals, and preparing reports and recommendations.

6. Results

Based on the research, the selected good practices of enterprises during the recruitment and selection of employees are described. Good corporate practices are a set of principles that could be benchmarked and followed by representatives of HR departments. Table 3.2 presents examples of behaviors of HR specialists in well-known companies.

Table 3.2. Good practices used during the recruitment and selection process

Name of the company	Good practices
Orange Polska	- the company offers a wide range of workshops that, in accordance with the preferences of the young in the field of new technologies, focus on on-line training and webinars; - thanks to the ambassador strategy, participants can arrange their individual development plan with vocational counselors and count on specialist mentoring from the company; - the company offers competitions, informal meetings, and games for candidates so that they can get to know each other better; - during the meetings at universities, students test innovative technologies and use interactive applications; - the information about the company's offer is not only substantive but also interesting (https://orange.jobs/).
TP S.A.	- HR department develops competence profiles for different business units. The profiles describe in an understandable way the requirements the candidates need to fulfill for a particular job. The profiles define the recruitment criteria and development possibilities; - to verify the competence requirements, various tasks and tests are being used to diagnose the level of soft and technical competences of candidates; - during interviews with candidates for specialist positions, the competence interview is extended to include various types of simulations; - for managerial positions, Assessment Centers are conducted.

Name of the company	Good practices
DHL Express (Poland)	- in the first place, the company is looking for employees for vacant positions within the organization (knowledge of the company's specificity, expected values, and attitudes by internal candidates); - primarily, the HR department takes into account the candidate's readiness for self-development, openness and other universal competencies; - the competency model is a permanent reference point at all stages of the recruitment process, starting from preparing the announcements, conducting the interview, choosing the evaluation tools, to the selection of the candidate.
GRUPA LOTOS	- the company enables students to participate in a variety of internships, trainings, scholarship programs, workshops, and meetings; - the company cooperates with the student organization AIESEC; - it organizes the LOTOS Academy – a system of the comprehensive employee development program, and offers attractive training; - the company describes itself as socially responsible, operating on the basis of a system of values described in the code of ethics, building a committed working environment; - the company cares about improving the image of a good employer.
DFDS Poland	- the company organizes internships and apprenticeships, during which the measurement and evaluation of pupils, students and trainee' competencies is done; - the competency profile consists of the candidate's knowledge, skills, and talents; - the competency profile contains tasks performed on the position, scope of cooperation in the team and adjustment to the organizational culture; - for chosen students, meetings with company management members are organized.
PZU	- the company is trying to meet the requirements and facilitate intergenerational cooperation at PZU; - each edition of apprenticeship and internship programs is preceded by training for trainee's supervisors; - the company offers trainings, introductory meetings, integration and access to the most important information about the life of the company. - trainees receive an employment contract and a quarterly bonus depending on the results; - the company offers ambitious tasks that are an evolving and interesting challenge for the candidates; - as part of the „Ambassador" program, students support and actively promote PZU's EB activities at universities and on the Internet.
Other companies	- cooperation with student science clubs; - co-organizing and co-financing conferences and seminars, specific fields of study, specializations or seminar groups of a given university; - possibility to participate in particularly interesting ventures, etc.; inviting selected students for meetings in the company, organizing company visits; - the selection process is conducted by trusted academic teachers, who among their students choose the most talented and organize contact with the future employer; - unconventional methods of examining candidates for work (e.g., research on the ability to acquire information, solve problems and learn).

Source: own study based on Albrychiewicz-Słocińska & Robak (2017); Morawski & Mikuła, (2009); Sienkiewicz et al., (2013); websites of selected companies.

Table 3.3 contains the analysis results of blogs/forums in which former, current, and potential employees express their opinions about companies characterized in Table 3.2. It contains factors which negatively and positively influence the brand of the companies as the employer and opinions of candidates about the recruitment, and selection processes in those companies.

Table 3.3. Factors influencing brand of the company as an employer

Factors creating negative employer brand
- incompetent management, poor technical knowledge and lack of social skills, for example, communication, promoting incompetent people, no support from supervisors when help is needed, sometimes incomprehensible decisions; - bad atmosphere in the workplace, lack of teamwork; - stressful place to work in, rat race, cases of mobbing, no action taken when reported; treating employees as machines not people, employees treated badly and unfairly, supervisors showing disrespect and ignorance, no trust in the management; - talking about changes in company culture – being sincere and honest, but in fact a lack of openness to listen about mistakes, errors and areas which need improvement, dissonance between declared values and reality, cynicism; - inefficient communication: the employees' opinions are not taken into consideration, inconvenient topics are hidden, chaotic information flow; - dangerous infrastructure; - payroll below average, poor basic pay, not paying salaries on time, showing old complaints to decrease the salary, mistakes in salary payment, socialistic approach to pay bonuses: dependent on results of the whole group, and not an individual effort; - no quarterly bonuses for all employees; bonuses only for the best employee in a given period (awarded by the Board); - huge rotation, a lot of work and lack of human resources, "good for singles and workaholics, not for marriages," "work up to 7 days a week", stress, a lot of tasks and responsibility; - employees forced to work extra hours; - chaos, lack of HR policies and procedures; - employees are laid off without giving reasons; there is no explanation; - old software, constantly something doesn't work; - no benefits in the form of medical and sports packages during the trial period; - pressure to lie to the clients.
Factors creating a negative employer brand during recruitment and selection
- nepotism and connections, not knowledge and skills; - recruitment and selection of leaders based on the following criteria: inability to make independent decisions, obedience, fawning; lack of knowledge, lack of help; - "the worst interview ever": instead of talking about professional issues, the recruiters focused on privacy issues, "confession from private life"; - inappropriate communication: not answering for candidate's emails, no feedback after the interview, interrupting during the interview, the interview was conducted not in a cultural manner, not a personalized process, sending standard mails, too many HR employees involved in the process (no one takes responsibility), on Pracuj.pl the candidate's application is hanging for several months.

Factors creating a positive employer brand
- good remuneration, a quarterly incentive award, an annual bonus, special prizes; - fully paid courses and training by the employer, co-financing studies and foreign language courses, development opportunities and growth possibilities; - co-financing holidays; - good working atmosphere, integration trips, and parties; - medical care and good insurance packages, which also include family members; - benefits in the form of a medical and sports package; - lack of monotony, possibility to work in another departments, interesting tasks, and projects; - ability to implement own solutions; - flexible working hours; - dynamic industry; - stable employment in a growing company; - contests, cinema tickets; - comfortable location; - regenerative meals, fresh fruit, flavored teas, coffee.

Source: own work based on analysis of Internet forums.

The image of the company as an employer is shaped not only by recruitment marketing but, to a large extent, by the exchange of opinions on online blogs and forums. Some of these opinions refer to the quality of the recruitment and selection processes. There is a clear gap between the expected and the perceived quality of candidates' service during these processes.

7. Conclusions

HR departments face the challenge of finding and retaining employees in the organization. Employers should get involved in employer branding activities in order to attract the most valuable candidates. The analyzed companies are involved in many activities related to achieving the image of the "employer of choice." Many of them are related to the recruitment and selection process. Employer branding activities should be addressed both to potential employees as well as to employees already working in the organization. When looking for a job, candidates check the Internet forums and blogs, on which current and former employees share their experiences related to employment in a particular company. Those opinions may have a bigger impact on candidates' decisions then actions made by the companies.

There are several groups of factors which shape the brand of the company. The brand of the company as an employer is shaped mostly by "hard factors" related with the remuneration system: the salaries, paying salaries on time, division of remuneration into a fixed and variable part (bonuses, commissions depending on achieved goals). Another group of

"hard factors" shaping the brand of the company as an employer is related to benefits offered by an organization, for example insurance, retirement, and medical packages. The brand of the company as an employer is shaped also by "soft factors", such as the atmosphere at work, growth and development possibilities, and work/life balance.

Another group of important "soft factors" is related to the quality of the recruitment and selection processes. On the forums, candidates shared mostly negative opinions related to staffing processes in organizations. The complaints were related mostly with inappropriate communication, lack of clear criteria of evaluation, nepotism and asking discriminatory questions. 7. The way the recruitment and selection are conducted affects the perception of the company. Unprofessionally prepared and carried out selection processes may negatively affect the image of the employer and discourage valuable candidates from applying for a job.

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Building a vision through the networking competence of managers

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Abstract

In today's global economy with rapid changes in technology, there is a focus on how best to lead organizations and to identify the characteristics of effective leaders. There are changes in society and the business environment with regards to social networking, and this is a new requirement for business leaders. Networking competence is necessary for managers to reach an outstanding level of performance. The aim of the article is to identify the networking competence of managers and position it in the context of other managerial competences. To achieve this goal, a literature analysis was done, and an empirical survey was conducted among N = 385 managers using Computer Assisted Telephone Interviews. The study conducted an analysis of descriptive statistics and exploratory factor analysis with a specified number of factors corresponding to the theoretical model. The study found that the networking competence of managers is a component of the competence of building vision and does not fit into the competences of engaging and supporting employee development as well as change management and innovation. The networking competence is aligned with strategic networking (Ibarra, Hunter, 2007) and indicates its wider usage. Networking competence is a conceptual rather than relational competence and is focused on executing vision by short and long-term planning. By establishing and maintaining contacts, managers identify organizational opportunities, create a vision, and implement it through goals for subordinates.

Keywords: *networking, competence, managers, building a vision, managerial competences.*

1. Introduction

Networking as a competence is required by organizations and managers because of the rapid changes within technology and the emergence of a new

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network society (Castells, 1996), network environment for organizations (Czakon, 2012) and network business (Hakansson & Snehota, 1995; Ratajczak-Mrozek, 2009; Łobejko, 2010). In a growing number of networked businesses, there is a need for network leadership (Sydow, Lerch, Huxham, & Hibbert, 2011; Ruckdäschel, 2015) or networking competence of organizations (Ritter & Gemunden, 2003). Research to date shows that managers networking as individual behaviors are internal and external (Michael & Yukl, 1993), operational, personal and strategic (Ibarra & Hunter, 2007) and are focused on establishing and maintaining contacts (Fryczyńska, 2018).

Competences are unique courses of action bringing results for an organization (Prahalad & Hamel, 1990) and its employees (Boytazis, 1982). Managers are a key professional group, which are responsible for implementing an organizational competences model among subordinates and also competences models for the organization. Competency models across organization and different professional groups are not the same. In the case of managers, they are characterized by sets of competences, and among these is networking. There are different approaches in understanding what makes managers outstanding, i.e. task- and people-oriented behaviors (Northouse, 2016), external and change-oriented (Yukl, 2012), technical, human and conceptual skills (Katz, 1974), operational and strategic or process and analytical (Rostkowski, 2014). Overall, it seems that leadership competence can be arranged as a matrix where process competencies include: building a vision (BV), Building Employee Engagement (BEE), Supporting Employee Development (SED), and creating change and innovation (CCI), and these are saturated by analytical competencies. The assumption in this study is that networking competence saturates building a vision and so the goal of the paper is to test whether the networking competence of managers supports building a vision.

2. Literature background

2.1. Managerial competences

Competences are perceived as attributes of people or behavioral standards formulated towards people (Heffernan & Flood, 2000). Competencies as attributes of persons, including managers, are bundles of knowledge, skills, attitudes, qualities, values, beliefs, motives that are revealed as stable behavioral elicitations (Fryczyńska, 2018), which result in more productive work (Boyatzis, 1982) and allow forecasting results (Spencer & Spencer, 1993). If the competencies influence the results of the work, it is in the interest of employers, education, and industry associations to define and standardize

the competencies necessary for occupations, positions or organizational roles, including managerial ones.

Competences as a concept arise from skills as a theoretical concept. Skills approaches rely on managers' actions and show that behaviors play a significant role in managerial quality. Managerial skills characterize managers, but skills are not inherent, because they can be learned and developed. Competency models imply that people have managerial potential and different levels of skills during their career. Managers' behaviors can be categorized as task and people-oriented behaviors (Northouse, 2016) or skills that consist of the core three – technical, human, and conceptual (Katz, 1974). The competence approach broadens skills and behavioral approaches by adding skills, knowledge, and attitudes using a dimensional approach. The competency model is behavior specific and stable over a specific time. Effective leadership can be measured by competencies within specific organizations. From an organizational perspective, leaders' competences are the result of core competences of the organization (Prahalad, Hamel, 1990). Organizations operate within a network environment; networking is a core competence which is also formulated as the standard for managers and other employees.

2.2. Managers' competence in networking

In contemporary environments, more organizations are changing into networked institutions, where key competencies are collaborative and self-governance is an important competence along with technical and commercial competences, which are needed in other structures (functional, divisional, and matrix). Socializing as a set of behaviors includes: chatting about non-work-related topics, informal joking, gossiping, complaining, putting others in their place, lobbying, and informal networking plays a significant role in a leader's competence profile (van Baalen & Moratis, 2001). Socializing brings insight into the nature of networking competence.

Network leadership relies on three kinds of activities: embracing, empowering, and mobilizing. The goal of embracing is to seek and find resources and identify accurate cooperators in order to gain network cooperation. The core activities are building a vision and enabling supporting conditions. Mobilizing is focused on the maintenance of cooperation and exchanges of the resources among network members. Empowering enables members to engage in active participation by caring for the members' concerns, showing appreciation, and making shared decisions (Ruckdäschel, 2015). In network organizations, there are more people involved in relations-oriented leadership activities.

The concept of managers' external networking is similar to "boundary spanning" (Williams, 2002; Fleming & Waguespack, 2007; Yukl, 2012),

which means building and coordinating linkages and ties across organizational boundaries. Managers need relations with those who can provide information, resources, and political support and to gain access to others to represent the organization externally (Ibarra & Hunter, 2007). Yukl (2012) states that networking includes attending meetings, professional conferences, and ceremonies, participating in associations, clubs, and communities; communicating, and socializing informally, finding common interests, and doing favors. Internal networking is focused on building relations inside the organization but with employees outside the manager's team (Michael & Yukl, 1993). Even if the organization is networked through external leadership (Yukl, 2012) and organizational leadership (Silvia & McGuire, 2010), networking activities are necessary to increase the effectiveness of the organization. Wolff and Mosser (2009), state that managers' networking should include both external and internal behaviors, but internal networking should be directed towards all coworkers within the workplace.

Building effective relationships is one of 10 leadership competencies, which include building a network of effective relationships inside and outside the organization. A study by Deloitte found that 85% of research participants stated that networking competence is critical or very important for managers and building relationships is the third most important competence for board members; however, discrepancies between the importance of competencies and their actual level is high (Deloitte, 2015). According to Yukl (2012), networking is one of the behaviors within the external domain and is regarded as a higher level of leadership behaviors' taxonomy. At the same level as external are task, relationship, and change-orientated. Networking is also a goal-orientated activity (Gibson, Hardy III, & Buckley, 2014) suggesting that managers' networking competence is distinctive from a relationship orientation.

Ibarra and Hunter (2007) researched managers in their transformation process and made the conclusion that they need three kinds of networking: operational, personal, and strategic. Of the three, operational networking is best known. It is a result of necessity to cooperate with others to accomplish current tasks. It focuses on deepening relationships with people who have the greatest impact on work results. To summarize, this is networking for maintaining the status quo in the current work assignment.

In a situation of change, it is necessary to leave this comfort zone and develop networking activities for future challenges, and in an environment outside the workplace. Hence, there is a need for personal networking that aims to intensify one's own development in a wider environment than the one in the current workplace. The manager establishes relationships outside the organization hoping that in this way she/he will gain access to people, and, thus, gain access to their knowledge, information, and their contacts.

The manager, being unsure of the location of valuable contacts, joins various activities and communities.

Strategic networking is essential for those managers who undergo transformation, striving for the role of a real business leader. In this role, it is necessary to link resources and internal and external contacts, to go beyond standard operations and create future organizational solutions. The manager, having contacts and external relations, recognizes the broad context of business activities. Through networking, the manager has easier access to knowledge about the activities of other organizations and emerging industry and social trends. However, developing internal contacts for future-oriented solutions builds a group of stakeholders ready to support future decisions and actions within the organization. Essentially, strategic networkers aim to increase their influence and power through others with whom she/he has internal and external relationships. They actively manage their network of relationships, join and quit some networks, develop involvement in relationships, and change the roles of their contacts in order to achieve their goals. The Ibarra and Hunter (2007) model shows networking at three levels, and the highest level is strategic networking. Among managers, it is assumed that networking includes strategic attributes, such as having a vision of the future, long-term planning, planning to develop business and manage teams, and awareness of potential sources of future success.

2.3. Results of managers networking

Luthans, Rosenkrantz, and Hennessey (1985) made a comparison between managers who were quick to gain promotions with those who were unsuccessful in the gaining promotions area. They found that the managers from the first group focused on acquiring resources from their social network. They undertook activities such as socializing and spent time together in non-work-related activities, conducting conversations, and discussions on a non-professional basis. Interestingly, they spent less time on the typical manager's work, i.e. planning, coordinating or monitoring the results of subordinates, compared to those who had fewer successes. Cannings' research (1988a; 1988b) confirmed the achievements of the researchers conducted by Luthans and colleagues (1985). They found that mid-level managers use informal inter-organizational networks to deal with career issues and achieving professional success, i.e. faster promotion. The Z result is a synthetic measurement of individual benefits which managers obtained thanks to high activity in large social networks and also serve to bridge poorly-connected networks. "Z" consists of a growing salary, higher performance appraisal score, faster promotions and improved innovativeness (Burt, 2004).

The research of Geletkanycz and Hambrick (1997) confirms that managers' participation in networks of people from outside the organization and industry (boundary-spanning relationships), increases their individual successes and results of the organizations for which they work. The formal and informal social networks of managers from the creative sector intensify organizational innovation, organizational efficiency, and contributes to gaining a competitive advantage (Klimas, 2015). In comparison, some managers focused only on activity in coherent networks, bringing risk for themselves as well as for their organizations. These low-networking managers are reluctant to try new challenges and barely follow structural changes in organizations (Gargulio & Benassi, 2000).

Despite the findings that networking is a predictor of success, the quality of networking among managers is not high. A study focused on networking behaviors, as proactive actions to develop and maintain relations with others in order to achieve benefits from work or career (Forret & Dougherty, 2001), was conducted among Polish employees with 67 participants in managerial positions. Their networking behaviors were at a fairly low level (scale 1-6, where 1 is the smallest intensity and 6 highest) M=2.66. Networking behaviors of managers are significantly higher than non-managers (Fryczyńska & Fierla, 2015). These findings were replicated by Wolff and Mosser (2009) in Germany. In another research study conducted in Poland part of the sample included 67 managers. Their networking competence, defined as establishing and maintaining contacts in order to work effectively in the present and in the future, reached M= 3.95 (scale 1-7, where 1 is the smallest intensity and 7 highest) (Fryczyńska, 2018).

3. Research approach and methods

3.1. Research theoretical framework

Theoretical concepts of managerial competences are based on two types of competences – process and analytical. Process competences show the core sub-process necessary to unfold the full process of a manager's job. Analytical competences are those which are necessary to provide the realization of each process' competencies. Different sets of analytical competences define the scope of each process competence and each analytical competence appears in more than one process competence. According to the theoretical model, Networking (analytical competences) saturates process competences, including Building a Vision, and Leadership Communication saturates every process competence.

Table 3.4. Matrix competences profile of managers

Process Competences	Building a Vision (BV)	Building Employee Engagement (BEE)	Supporting Employee Development (SED)	Creating Change and Innovation (CCI)
Analytical competences	business orientation	inspiration influence	recognition of competences potential	proactivity
	networking	building a relationship	developing employees	pro-innovativeness
	managing short-term goals	building trust		anticipating problems
	achieving long term goals	individual treatment/ attitude/ concern of		taking conscious risk
	implementing vision and values			
	leadership communication	leadership communication	leadership communication	leadership communication
	decision making	decision making	decision making	
		flexibility	flexibility	flexibility

Source: Institute of Human Capital (2017).

3.2. Research approach

Quantitative research was carried out in September and October 2017 by a research company commissioned by the Institute of Human Capital at the Warsaw School of Economics. The method chosen for the study was CATI (Computer Assisted Telephone Interview). Respondents answered the questions within the questionnaire. The questionnaire consisted of three parts: a survey and two substantive parts. The statute concerned the organization in which the respondent was employed as well as information about the respondent. The first substantive part concerned changes in the organization, their depth, and effectiveness. The second substantive part included questions about the self-assessment of managerial competences.

The subjects made a self-assessment of their own competences based on reflective indicators (behavioral actions). The questionnaire included statements such as: including employees in making decisions, inventing new ideas, inventing and implementing innovative solutions, clearly communicating changes – their purpose and expected results, and used a four-level scale, typical for assessing competences where 1 demonstrates a strong need for development (low level), and 4 represents a competence developed

at an expert level (outstanding level). Randomly chosen respondents worked in managerial positions or were owners of medium-sized companies (from 50 to 250 employees) and large companies (over 250 employees) operating throughout Poland. Representatives of 385 organizations were surveyed, controlled by size and sector.

The main objective of the research study was to identify and analyze the managerial competences of managers who are active participants in changes in organizations, as well as an attempt to assess the impact of their competences on the effectiveness of making changes.

3.3. Surveyed sample

Almost all respondents (95.6%) worked in private enterprises, they were managers (95.6%), not owners, and had higher education levels (86.8%). Over two thirds (67.6%) were 36-45 years old, and almost a fifth of respondents were 26-35 years old, and almost a fifth of respondents were 46-55 years old. The study examined more women (65.7%) than men (34.3%). The obtained sample has no representativeness features, and the collected data allows for formulating conclusions about respondents.

4. Analysis

The collected empirical material has been analyzed and the results are presented to answer the study's main research objective: to assess whether the networking competence of managers fulfills the vision and strategic perspective. To answer the main question, Explanatory Factor Analysis (EFA) was carried out with the SPSS 24 program. This analysis allows for evaluation of the theoretical model, the indication of indicators (statements), which saturate the tested variable most strongly and to choose indicators with the highest explanatory power.

The theoretical model assumed the coexistence of the same analytical competence in several process competences (i.e., Leadership Communication). In contrast, for EFA, every indicator of analytical competences saturates one process competence (principal component). Based on EFA, four process competences will be loaded for every indicator of analytical competences.

The results of the EFA analysis may lead to four principal components other than those assumed in the theoretical model, the necessity to eliminate certain indicators, and, in relation to the research objective, networking competence may be included in a different principal component than Building a Vision.

As shown in Table 3.5a, the results of the Keizer-Mayer-Olkin test are much higher than > .05, i.e. KMO = .969, and Bartlett's sphericity test (x2 =

7532.046, df = 435, p = .000) which are necessary to carry out the procedure of principal components analysis.

Table 3.5a. Tests of Kaisera-Mayera-Olkina and Bartlett's sphericity test

The KMO measure of the adequacy of the sample selection		.969
Bartlett's sphericity test	x^2	7532.046
	df	435
	p	.000

Four main principal components have been chosen, along with the theoretical concepts. Loads for individual components were separated by the Varimax rotation method with the Kaiser standardization. All four factors explained 61.622% of the cumulative variance. The rotation indicates that the first factor, Building a Vision, (BV) explains 19.90% of the variance, the second Building Employee Engagement (BEE) – 16.51 %, and the third Supporting Employee Development (SED) – 13.16%, while the fourth Creating Change and Innovation (CCI) accounts for 12.05%.

Table 3.5b. Total explanation of the variance

Principal components	**Initial eigenvalues**			**Sum of squares of loads after rotation**		
	Total	**% variance**	**% cumulative**	**Total**	**% variance**	**% cumulative**
1	15.06	50.19	50.18	5.97	1990	19.90
2	1.33	4.42	54.61	4.95	16.51	36.41
3	1.25	4.18	58.79	3.95	13,16	49.58
4	.851	2.84	61.62	3.61	12.05	61.62

The value of eigenvalue, >= 550, was assumed as determining the inclusion or rejection of each individual component to the principal four components (factor). As a result, 10 out of 30 individual components (statements) were rejected. The value of the transformed components for the third factor - Building a Vision has achieved a strong variance = .849, the highest score of the analyzed four.

Table 3.5c. Matrix of principal components analysis

Principal components	1	2	3	4
1	.59	.53	.44	.42
2	-.67	.30	-.11	.67
3	-.28	-.44	.85	.05
4	.35	-.66	-.27	.61

In the next step, the expert method was used to verify and detect substantive interrelations between components in each factor. For the purposes of this article, the main focus is on building a vision (process competence) and networking as one of the analytical competences that saturate it. The Building a Vision factor initially consisted of ten statements describing 7 analytical competences.

Table 3.6. The rotating components accepted for Building a Vision

Rotating components	Component				Analytical competence
	1	2	3	4	
3.04. Implementing short-term goals	.095	.245	.745	.158	Managing short-goals
3.03. Clearly defining goals in short periods	.223	.209	.728	.268	Managing short-term goals
3.02. Establishing and maintaining contacts needed in work and professional career	.369	.171	.654	.121	Networking
3.05. Clearly defining the vision – the concept of organizational development	.317	.281	.550	.207	Achieving long-term goals

Table 3.6 shows the matrix of rotating components. According to the theoretical model, networking is demonstrated with the statement 'Establishing and maintaining contacts needed in work and professional career,' which is shown as item 3.02 in Table 3.6 and is one of the items composing Building a Vision with the loading of .654. Other components saturating Building a Vision are: 'managing short-term goals' assessed by the item 3.03; 'clearly defining goals in short periods' = .73, assessed by item 3.04; 'Implementing short-term goal's = .74, and 'achieving long-term goals' assessed by item 3.05 and 'clearly defining the vision – the concept of organizational development' = .55. Another three analytical competences, assigned theoretically as Building a Vision, i.e. Leadership communication, Implementing vision and values, and Decision making, are loaded on the first principal component, i.e. Building Employee Engagement (BEE).

5. Discussion and conclusions

Networking competences of managers is part of the process competence of building vision and is not aligned with the competences of engaging and supporting employee development as well as change management and innovation. By establishing and maintaining contacts, managers identify organizational opportunities, create a vision, and implement the vision through goals for subordinates.

The obtained results show that networking competence is strongly related to the creation of change vision, and the development and implementation of short-term and long-term goals and objectives. Establishing and maintaining contacts is part of managers' activity, which requires short and long-term perspectives, and conceptual and implementation approaches. Due to the lack of statements diagnosing the inclusion of employees in the change process, it can be assumed that networking competence is closer to task orientation than to employee orientation. Network competence, in connection with this analytical competence, indicates that it is more than a relational competence.

The strategic dimension of managers' network competences is part of strategic networking described by Ibarra and Hunter (2007) and indicates its wider usage than just career development and work results. According to the research findings, networking competence supports building a vision by managers and it is challenging for organizations and managers. Organizations need to reorganize the scope and the quality of managerial activities. Establishing and maintaining contacts inside and outside organization, both formally and informally, should be an integral component of leaders' competences and must demonstrate clear responsibility, especially for those who are responsible for strategic management. The research has limitations, as only one statement was used to describe networking competence. In addition, the survey was completed using self-reports of managers and business owners working in mid-level and large organizations, so the responses are subject to bias.

Further research should assess the degree and magnitude of networking within organizations because the level of organizational advancement in networking would influence the competences composition. Another direction for further research should compare the levels of required and held competences and networking. Further research should focus on populations of micro and small companies and start-ups, to determine the importance of networking in newly established companies.

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Management competence as a determinant of innovation in management – results of pilot studies

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Abstract

The purpose of the article was to identify managerial competences determining innovations in management. The implementation of the goal was based on two hypotheses: according to the first hypothesis, innovations in management are not introduced despite the fact that management requires a new look. The second hypothesis is that managerial skills are one of the determinants of innovation in management. The research methods used to solve the problem are an analysis related to the study of Polish and foreign literature as well as the analysis and evaluation of information obtained as a result of surveys. The research was of a pilot nature and a questionnaire was used as a research tool. As a result of the conducted analysis, it was found that innovations in management do not occur in the surveyed enterprises. One of the determinants of introducing new solutions in the area of management are managerial competences and team acceptance. The conducted research allowed the identification of managerial competences determining innovations in management. The most frequently mentioned by the respondents are entrepreneurship, openness to people, creativity, ability to build teams, the ability to see from different perspectives, the ability to perceive mistakes in themselves, giving opinions and not evaluating employees, and knowledge in the field of management. The recommendation for managers may be stating that it is important to recognize the development opportunity in initiating changes in planning, directing, organizing and controlling, as well as attitudes and modification of their behavior by managers. The results that have been achieved are the systematization of knowledge in the field of management innovation, which provided new information on selected determinants of changes in the area of management. In the practical dimension, the research results will help shape management competencies needed to improve decision-making processes.

Keywords: *innovations, management innovations, managerial competences.*

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1. Introduction

In times of sudden changes in the global economy, one of the important elements of building a competitive advantage are widely understood innovations. Innovative attitudes are visible in the range of offered products, services, quality, production processes or management methods (Tiwari, Buse, & Herstatt, 2007). Due to the objective criterion in the literature and research, the division into product, process, marketing and organizational innovations is often accepted (OECD, 2005; Wasilewska & Wasilewski, 2016). Analyzing the possibilities of introducing innovations, one can notice the evolution of the paradigm of the innovation system from technological to non-technological ones. Innovative processes require good organization, a good organizational climate and support within the organization. It is widely believed that, from the point of view of innovative activity of an enterprise, the most important strategic resource, despite appearances, is not technology (modern technology), but the human factor. The management, engineering, and technical staff should be characterized by a creative attitude leading to constant changes (Sułkowski, 2006). The change process can be ensured by management innovations, which signify a departure from traditional management principles, processes, and practices (Hamel, 2006).

For the above-mentioned reasons, the purpose of the article was to identify managerial competences determining innovations in management. The considerations were based on two hypotheses. The first is: management innovations are not introduced despite the fact that management requires a new approach. The second is: managerial competences are one of the determinants of innovation in management. This study is part of the trend of research on broadly understood innovations, enriching the existing discussions about managerial competences that determine innovation in management. The research methods that were used to solve the problem were: an analysis related to the study of Polish and foreign literature; the analysis and evaluation of information obtained as a result of surveys.

2. Competencies and innovations in management – literature review

The understanding of the sources of innovation has evolved considerably from the classical trend (Schumpeter, Drucker, Kotler) and ending with modern times, where great importance is given to open innovations (Krupski, 2014; Pichlak, 2012; Rojek, 2014) and social innovations (Lachiewicz, 2014; Olejniczuk-Merta, 2014). Innovative attitudes are visible in the range of offered products, services, quality, production processes, or management methods (Tiwari, Buse, & Herstatt, 2007). According to Pomykalski (2004),

innovation should become the main creative force in any organization, and it should be permanently included in its management system and culture. Innovation is recognized as the organization's ability to constantly search for, implement and disseminate innovations.

This ability can be shaped and developed through innovation in the sphere of management. When studying the literature, we meet with the view that innovations, in the sphere of management to a greater extent than product, marketing, process or strategy, are responsible for creating value (Baran, 2012) and strengthening competitiveness (Hamel, 2006; Hamel & Breen, 2008; Kraśnicka, Głód, & Wronka, 2014). Hamel (2006) points to the growing needs of innovation in management. He defines innovations in the field of management rules and processes, and stresses that they must meet at least one of three conditions: they must be based on an innovative principle that undermines current views; be a system solution that covers many processes and methods; be part of an innovation program in which progress accumulates over time.

Management innovations could are known as a mechanism for creating, developing and promoting new ideas, and provide the company with constant pro-innovation activities that facilitate a quick and flexible response to market signals and challenges, and at the same time implement the chosen strategy (Penc, 1999). We can say that innovation in management means a new way of managing and makes managers change the rules of conduct in all areas of their operation. It is important to note that innovations in management are new management practices in terms of processes (new solutions in planning, organizing, managing and controlling), while innovative management is the ability of managers to apply innovations in the sphere of management.

Innovations in management mean implementing new solutions, principles and practices for management in a process approach to achieve goals in an efficient and effective way – that is, to increase the efficiency of operations (Gorzalany, Gorzelany, & Gaish, 2018). For this study, the definition of Stabryła (2007) is adopted, according to which management is an information-decision process, which is supported by the functions of nurturing, organization, motivation, and control. When referring to management innovations, it can be stated that it concerns new trends in thought and culture in the above-mentioned areas, as well as new ways of making decisions.

Therefore, before starting to introduce new solutions, managers should answer some questions: are they innovators in the sphere of management? Do they need new solutions for planning, organizing, motivating (leadership) or controlling? If so, in the next stage, it is worth making managers think about how they plan, and whether the developed plans have a strategic or only operational dimension. Does the team (employees) take an active part in the planning? Do they know the mission and the vision of the enterprise? The next

questions that managers should ask themselves concern the organizational structure: what is it? Whether new ways of organizing are used? Whether the structure is more flexible? Whether it is managed by the organizational structure? How is work organized? Another area is motivating, in which the key role is played by the managers and they should ask themselves the question: How do they motivate employees? Do they look at their needs? Whether from the role of transaction bosses, do they evolve to transformational partners? Are they open to people? The last area is controlling – managers should consider: How do they control? Is it worth thinking about moving away from controlling to monitoring? Are control mechanisms properly selected? The analysis of the above-mentioned management areas is to answer the fundamental question of: Does the enterprise have problems in the field of management or are there areas that require a new look? If so, what new rules can be introduced? For managers, this often means deconstructing their own orthodox views on management problems and this should be the starting point for management innovation. Clark (1997) stated that it might seem like a paradox, but the truth is that the person over whom we have the greatest horseback is ourselves, and the person who is the most difficult to change is also ourselves.

The problem in organizations is not to learn new, innovative ideas, but to depart from the old rules of conduct. Therefore, the attitude and willingness to innovate in the sphere of management depends on the subjective view of a man's own situation, knowledge, experience, imagination, as well as the compatibility of previous expectations with achievements.

Psychology says that every person has a specific personality structure. Many scientists have already wondered about this phenomenon and the attempt to describe it. Some of them have developed their theories that allow one to describe the personality of a person and thus better understand it. Personality can also be called a certain meta-level, which includes, among others, two areas extremely important from the point of view of professional success: competences and skills. This is what is looked for in new employees and they develop them in order to achieve better and more professional success. We often encounter a situation in which the words competence and skill are used interchangeably as if they were synonyms. However, this is not the case – competences and skills differ from each other, and understanding these differences allows for better management of one's self through development and better selection of staff to the enterprise (Stodolak). Sometimes the concept of qualifications and permissions is used interchangeably. Qualifications mean vocational education, work experience, while entitlements are opportunities to make decisions within the position held. The biggest problem is the distinction between skills and competences. Nowadays skills, abilities, qualifications are

considered to be the basic components of competencies (Tyrańska, 2015; Pocztowski, 2003; Oleksyn, 1997; Mikuła, 2001; Holstain-Beck, 1996).

The implementation of the management process is the essence and content of the manager's work. The management process is determined by the management functions: deciding, planning, organizing, motivating, and controlling (Stabryła, 2013b). The team of employees who manage an enterprise or its specific constituent units constitute the managerial staff (Lachiewicz, 2007). The implementation of individual management functions depends on the manager's predispositions, on general and detailed knowledge, erudition, the width of the perception of problems, experience, skills, translating theoretical solutions into the practical, an active attitude and happiness (Staniec, 2013). Knowledge of the work of managers is the basis for defining the essence of managerial competence, which is the resultant of all knowledge, skills learned, mastered and applied in practice by the manager to solve problems in the organization (Tyrańska, 2015).

Analyzing the definition of managerial competences presented in the literature (Thierry & Sauret, 2004; Armstrong, 2000; Rakowska & Sitko-Lutek, 2000 & Oleksyn, 2006; Nogalski & Śniadecki, 1998; Nosal, 1997), it can be stated that managerial competences are a set of features a managing person has, which include knowledge, skills and attitudes that remain in a cause and effect relation to the manager's actions, leading to the effective and ethical pursuit of goals.

In order to better illustrate managerial competences determining innovations in management, a division into two groups was assumed: "soft" competencies – interpersonal skills and "hard" – functional competencies. According to Walkowiak (2004), "hard" ingredients are knowledge and skills, and "soft" is personality, attitude, and behavior. In addition, creativity understood as the ability to apply knowledge to solve new problems is important in determining competences.

It is not an enigmatic process or a unique feature that characterizes only a few people. It can be learned and competences in this area can be consciously built and developed (Nęcka, 2003). Creativity helps in the creation of innovative products and solutions, allowing the generation of non-standard methods of operation, which in turn distinguishes companies in the market. The profile of managerial competences determining innovations in management is presented in Figure 3.1.

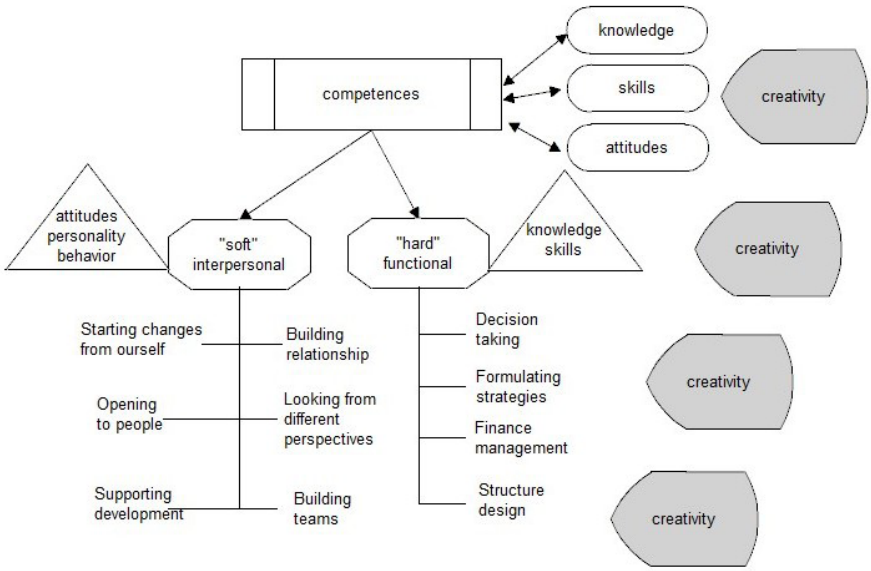

Figure 3.1. Profile of competencies determining innovations in management

Source: own study based on Tyrańska (2015) and Walkowiak (2004).

Analyzing the comparison presented in Figure 3.1, it can be concluded that the division of competences into hard and soft ones allows the distinction between those that are crucial for the proper and effective management of human capital and those that are necessary for the functioning of the organization. Soft skills are important when there are inevitable differences of opinion and conflicts in employee teams when ethics appears next to the efficiency and effectiveness of action. Building relationships and a good atmosphere in the team will help to create a friendly organization. For a leader to do her/his job well, she/he must have supporters at work. Such people will be primarily members of her/his team. In managerial work, soft skills are a key to success. Kazak (2017) believes that the ability to communicate with employees helps to avoid conflicts. Properly managed staff, knowing their duties and performing them with pleasure, as well as care for a good atmosphere in the company, lead to the success of the company. Functional competences (also called specialist, "hard" or technical), are all competencies characteristic of a group of positions. A high level of these competences requires the acquisition of specific specialist knowledge in a given field – for example, sales, financial and strategic competences. Because management innovations require a new approach, managers should have management

knowledge, strategy formulation skills, and decision making that will enable them to diagnose the organization and look at it in a new way. Attitudes, personality, and behavior will determine the implementation of changes.

However, it should be remembered that innovations are accompanied by changes created and implemented by creative and innovative people. The spontaneity of managing people should translate into the economic activity of all people in the organization because it is the result of the natural curiosity of people, creative approach, originality of thinking, imagination, and flexibility (Targalski & Francik, 2009).

It is worth noting that innovative entrepreneurs and managers during the discovery of groundbreaking ideas behaved in a similar way, they just thought differently – their minds were open, they were able to combine different concepts, which consequently brought original ideas (solutions). However, to think differently, one must also act differently, that is, to question the current state of affairs (the second level in management innovations). If we change our behavior, we can improve our creativity (Dyer, Gregersen, & Christensen, 2012). It should also be remembered that the changes start with each other, very often the managers introduce changes, give opinions to employees and do not notice their mistakes and their imperfections.

3. The concept of empirical research

In all empirical sciences, also in management sciences, research is aimed at achieving the progress of scientific knowledge, establishing new claims, theses, axioms, generalizations or definitions. The set of methods identified in the general methodology are methods that could be called universal, because they are used in all scientific disciplines, both in formal and empirical sciences. These include analysis and synthesis (Liśiński, 2016).

The outline of steps in the research process to achieve the purpose of this study is presented in Figure 3.2.

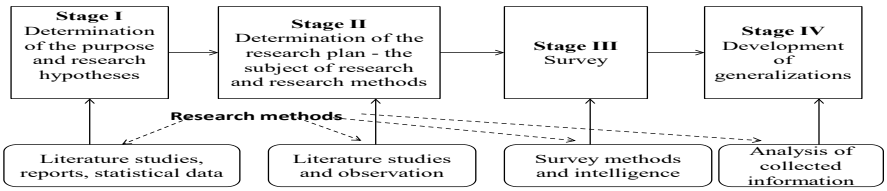

Figure 3.2. Stages of the research process

As indicated in Figure 3.2, the research procedure was carried out in four stages. We started with the review of continuous publications, and above all peer-reviewed scientific articles, monographs, research reports. The theoretical studies of the literature allowed reference to the existing state of knowledge to define the purpose of the article and the research hypotheses included in the introduction. In the second stage, the research concept was defined, i.e. the subject of the research was determined, and the research method was selected. The subject of the research were enterprises from various industries. The research was based on an analysis related to the query of Polish and foreign literature as well as to reports and statistical data. The cause and effect explanation procedures were used as the leading ones. From among various sources of information, the method of conducting primary research (observations and interviews) was used. As a result of this stage of research, knowledge in the field of innovation in management, innovative management, and managerial competences was systematized. This allowed transition to the third stage of the research process, which was a pilot survey carried out on a group of 111 scientifically connected people with management (people with higher education who studied or study part-time second-cycle studies in economics or management) who work full-time and have seniority of over one year. Respondents represented the following sectors: confectionery - bakery (5 people), catering (8 people), service (8 people), fitness, accounting (3 people), cleaning (2 people), photography, cosmetics – veterinary (2 people), horticultural (8 people), hotel (8 people), tourist, eventova (4 people), creative, horeca, sale of children's furniture, journalism (2 people), medical (7 people), transport, HR (6 people), IT (2 people), start-up, consulting, energy, fuel, real estate (2 people), architecture, automotive, textiles, education (7 people), finance (9 people), logistics (6 people), trade (3 people), construction (10 people), production (2 people).

Surveys were conducted based on survey methods and interview. The structure of respondents due to the size of the enterprise and the position held is presented in Figure 3.3.

Analyzing the data presented in Figure 3.3, it can be stated that the largest number of people from the research sample were representatives of large enterprises (30.6% of all respondents), followed by micro enterprises (28.8% of the total surveyed), small enterprises (27.9%) and medium-sized enterprises (12.6%). Small (medium and large) enterprises dominated small, medium, and large enterprises (56.7% of all respondents). 57% of respondents were employees in the surveyed enterprises, 25% were managers, 13% were business owners, and 4.5% were CEOs and vice CEOs.

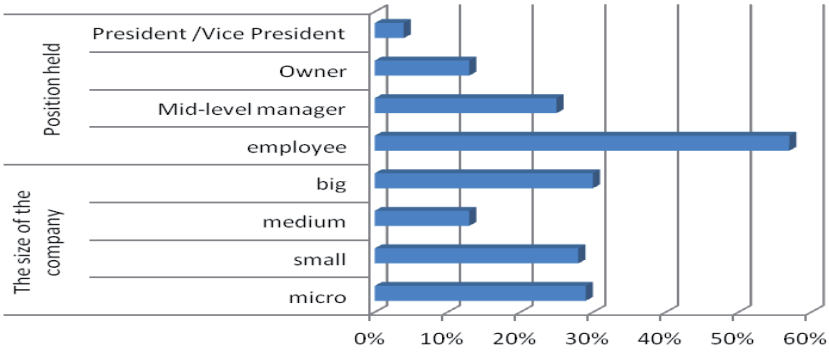

Figure 3.3. The structure of respondents

A questionnaire was used for the research, which was divided into two main parts referring substantively to the considerations presented in the theoretical part of this study. The first part of the questionnaire contains questions about the size of the company, the position held, changes in the area of management and management functions that require a fresh approach.

In the second part of the questionnaire, the questions concerned managerial competences determining innovations in management. In total, the questionnaire contained 10 tabular questions with a five-grade rating scale. The respondent answered which of the activities affect new solutions in the area of management. The evaluation was based on a five-point Likert scale, where 1 meant that the competency had no impact, 2 had very little impact, 3 had no opinion, 4 had impact, 5 had a great impact. The median and modal value were used for inference. The analysis and evaluation of the collected information allowed for the development of generalizations (stage four of the research process), which constitute the conclusions of this study.

4. Management competencies determining innovations in management - research results

To accomplish the purpose of developing and verifying research hypotheses, our own research was carried out. Because there were no correlations between the position held by the respondent in the company and the responses given, the results were summarized for all those surveyed by the size of the enterprise (the relationships are visible in some areas). The first two questions in the questionnaire concerned the degree of change in the area of management, as well as which management functions require a fresh approach. To be able to talk about innovations in management, it is important to assess whether new

solutions are needed. The results, in terms of percentage of responses, are shown in Figure 3.4.

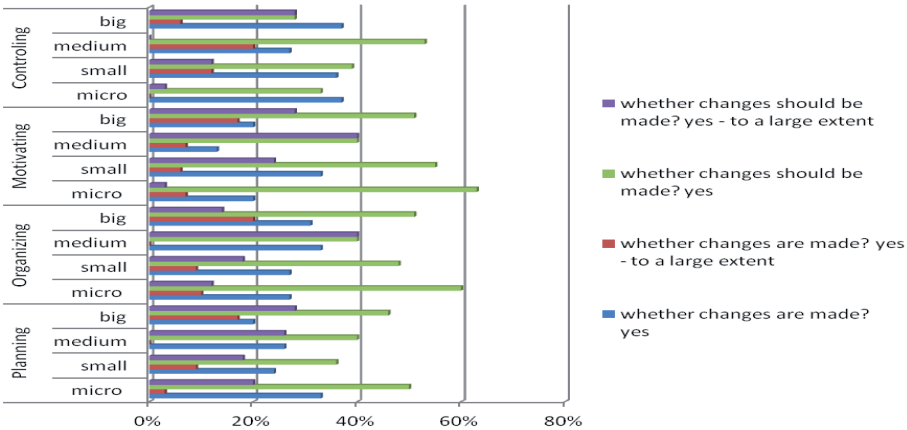

Figure 3.4. Introduction of changes in the surveyed enterprises

Analyzing the statement presented in Figure 3.4, it can be noticed that, in the opinion of respondents, changes in the area of management are not introduced (to a large extent), while the respondents see the need to introduce them. Analyzing the area of planning functions, it can be stated that in small enterprises changes are visible (36% of positive answers, but 70% of respondents perceive the need for changes in this area). In small and large enterprises, about 37% of respondents indicated that changes are being introduced, but 54% of people from small enterprises and 74% of large ones see the need for changes in planning. The least visible are changes in the planning area in medium-sized enterprises. Therefore, it can be concluded that innovations in the area of planning do not occur in the surveyed enterprises, despite the fact that about 75% of respondents perceive the need for a fresh approach to planning.

Another analyzed management function is organizing. In this case, it can also be stated that no changes are made. In large enterprises, 51% of respondents indicated that changes in the organizational structure are visible, but 65% of respondents see the need for further reorganization of work and tasks. In micro, small and medium-sized enterprises, changes are not visible (around 3-40% indicate that changes are visible, while 60-70% indicate partially or not at all), while around 70-80% of micro, small and medium-sized respondents perceive the need changes in the area of organization. It can be concluded that organizational innovations in the surveyed enterprises do not occur.

In the area of motivation, the need to introduce changes is most visible. In the surveyed enterprises, changes in incentive systems are absent (60-80% of respondents from micro-enterprises responded, from small and large ones, about 60% and from medium-sized ones 80%) or are partially present. 85% of respondents perceive the need to introduce changes in incentive systems (60% answered yes and 25% answered yes). It can, therefore, be concluded that in the area of motivating, new solutions are not introduced despite the fact that, according to respondents, changes in this area are necessary.

Observations made it possible to notice that changes in the control process are implemented partially. About 50% of respondents answered so, while about 30% of respondents stated that changes are introduced and 10% that they are introduced to a very large extent. Respondents indicated that they do not see the need for changes in the area of control. It can, therefore, be concluded that new solutions in the control process are not necessary.

The above analysis of the answers obtained in the first two questions allows one to verify the research hypothesis and formulate the conclusion, that despite the apparent need for a new view of management of innovations (new solutions) in management, they are not visible. Respondents in subsequent questions answered whether introducing changes in the area of management requires managerial skills and team acceptance. The respondents unequivocally indicated that management innovations require managerial skills (80% of respondents answered so) and 76% stated that implementing changes in the area of management requires team acceptance.

The above allows the verification of the second research hypothesis and state that one of the determinants of introducing innovations in management are managerial competences and the second determinant is acceptance of the team. Therefore, the managers should take into account the opinion of the teams with whom they are working and have their acceptance. The next question in the questionnaire concerned the determination of which competences affect new solutions in the area of management. The results are depicted in Figure 3.5.

Analyzing the presented research results in Figure 3.5, it can be stated that competences (knowledge, skills, attitudes) determine innovation in management. The respondents of medium-sized enterprises in 100% and micro, small and medium-sized enterprises in 90% determined that the main determinant of innovation in management are skills and knowledge (96% of respondents from micro-enterprises and 94% representatives of small, large and medium-sized enterprises).

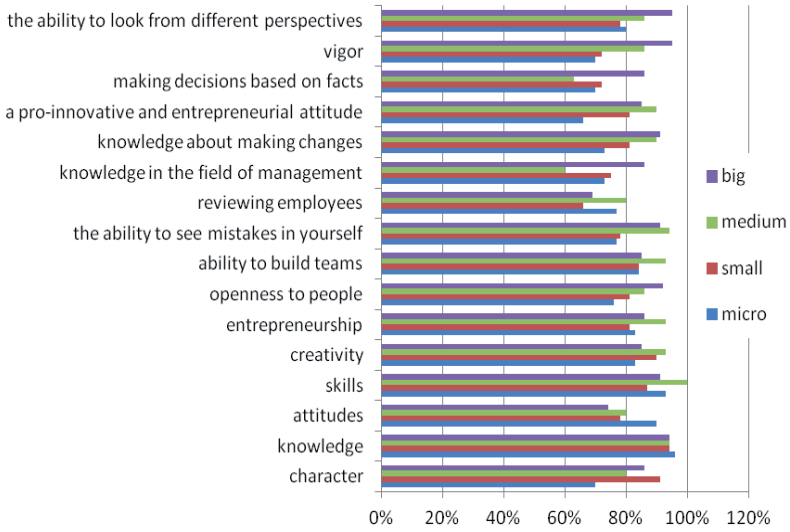

Figure 3.5. Competencies determining innovations in management

Attitudes and character traits were assessed a little lower than skills and knowledge. In small enterprises, as significant in management innovations, respondents assessed character traits (91% of the total), while in small, medium and large 70-86% of respondents. Attitudes have been assessed by respondents in 90% of micro-enterprises as needed, in small, medium and large by around 74-80%. It can, therefore, be concluded that in micro-enterprises attitudes are more important for management innovations than character traits, and in large enterprises the opposite is true.

Analyzing answers regarding competences broken down into "soft" and "hard", it can be stated that respondents rated soft as the leading ones: creativity and entrepreneurship as needed were assessed by 85-93% of respondents, openness to people 76-92% (here there are visibly differing responses given by the respondents of micro-enterprises – 76% – and large enterprises – 92%, who similarly assessed the ability to perceive mistakes in themselves, pro-innovative and entrepreneurial attitudes, energy, the ability to look from different perspectives). Differences in responses occurring between representatives of micro and large enterprises may result from the fact that micro-enterprises are more flexible. In the interview microenterprise respondents indicated that building teams, correcting errors, and perceiving errors in oneself is something natural. The area of "hard" competences has also been assessed as a determinant of innovation in management. And so the knowledge of management, knowledge about introducing changes

- formulating the strategy as useful, was assessed by 60% of respondents of medium-sized enterprises, 73-75% of representatives of micro-enterprises and by 86% of large ones. Making decisions was judged by about 70% of respondents of micro and small enterprises as having an influence on management innovations, by 63% representatives of medium-sized enterprises and 86% of respondents of large enterprises.

Summing up this part of the considerations, it can be concluded that competences understood as knowledge, skills, and attitudes determine innovations in management. The "soft" competences are more important for management innovations, but "hard" ones are also important. During the analysis, it was noticed that the respondents declare that new management solutions are necessary, the step that can be taken to design the questionnaire concerned the assessment of activities in the area of planning, organizing, targeting (incentive systems, employee satisfaction), organizing (matching structure, organization of work) and controlling. The results are depicted in Figure 3.6.

Figure 3.6. Evaluation of activities in management functions

When analyzing the results depicted in Figure 3.6, it can be stated that no evaluation of the management process is made in the surveyed enterprises. Only in large enterprises is the satisfaction of employees assessed (50% of respondents so). If the analysis is made, the assessment in the area of work organization, adjustment of the organizational structure, control system, ways of motivating and planning, the respondents' answers are below 50%. Therefore, it can be concluded that there are no assessments of management activities in the surveyed enterprises.

Summarizing the considerations contained in this study, it can be stated that innovations in the sphere of management are needed and to a large extent determined by both "soft" and "hard" competences. It can also be stated that the lack of assessment of the efficiency of the management process is a barrier to management innovation. According to Kozień (2019), the concept of management efficiency, although intuitively understandable, is in practice very difficult to identify. Referring to praxeology, Kotarbiński (1973) considers efficiency in a synthetic and universal sense. In synthetic terms, efficiency is the total of practical values of action assessed positively. Considering two actions, if the first one is more efficient than the other, it means that it is more effective, economical, rational and beneficial. In universal terms, however, efficiency is each of the values of good work separately (Pszczołowski, 1982). It is worth noting that the assessment of management efficiency refers to actions or organizations. Machaczka points out that the efficiency of every activity, including management-related ones, is efficiency (economy) and effectiveness. Activities are economical when there is a surplus of achieved results over incurred expenditure. We evaluate the management process positively from the point of view of effectiveness when the relationship reaches its maximum.

Effective managers try to get commensurability between used resources and pursued goals. In practice, however, it turns out that no degree of efficiency of activities can balance the lack of effectiveness. The actions are effective when they lead to the intended goal. The concept of effectiveness is related to the ability to choose the right goals and the degree of their implementation. The intersection of these two sizes creates the organization's development matrix. (Machaczka, 1998) The development of the organization and changes in the form of their functioning, force the building of new assessment systems. Analysis carried out to allow the observation that in the studied companies the assessment of the planning method is not carried out. In connection with the above, it is not possible to assess the extent to which the objectives are being achieved. Management, motivation and work organization also influence management efficiency. These areas are also not assessed in the surveyed enterprises, therefore, the managers do not have knowledge that, for example, the organization of work does not generate additional costs, or whether the employees are motivated and what are the effects of their work. Management efficiency means efficiency and effectiveness of operations. It can, therefore, be concluded that the actions are efficient if the management process is carried out effectively and economically. As the surveyed enterprises do not assess the activities in the area of management, you can not determine the efficiency of the measures taken. It can also be stated that introducing management innovations can increase the effectiveness of operations. For these reasons, the recommendation for managers may be that it is important to recognize

the development opportunity in initiating changes in planning, managing, organizing and controlling, as well as attitudes and modification of their behavior by managers.

5. Conclusion

This study systematizes knowledge in the field of management innovation and innovative management. The research hypothesis was positively verified that innovations in management are not introduced despite the fact that management requires a new approach. The conducted research indicates that managerial competences and team acceptance determine innovation in management. As having the greatest impact on management innovations, the following competences were identified: entrepreneurship, openness to people, creativity, team-building skills, the ability to see from different perspectives, the ability to perceive mistakes in oneself, opinions rather than assessing employees and knowledge in the field of management. As a result of the conducted analysis, it was also stated that the lack of assessment of the efficiency of the management process is one of the barriers to management innovation.

The recommendation for managers may be that it is important to recognize the development opportunity in initiating changes in planning, directing, organizing and controlling, as well as attitudes and modification of their behavior by managers. The developed profile of managerial competencies determining innovations in management can be used to shape managerial competences allowing for the introduction of innovations in management that are needed to improve the decision-making process. The above considerations have made it possible to determine the directions of further improvement of the research problem undertaken in the article, through an attempt to model innovation in management, as well as to develop methods for their measurement.

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The influence key employees' competencies have on the development of components of the competitive potential of Pomeranian enterprises

***Michał Igielski*[1]**

Abstract

The main aim of the article is an attempt to determine the influence of the competences of key employees on building a competitive advantage of the companies in which they are employed. In the beginning, the author conducted a literature analysis, including a comparison of the quoted definitions and specified competences of employees. The objective thus adopted determined the further course and character of the study – apart from the analysis of the literature, the author chose as another research method a structured interview with senior managers in the surveyed entities (the survey was conducted in 2018, in 14 randomly selected large enterprises with their registered office in the Pomeranian Voivodeship – in total 60 people took part in the survey). As the literature analyses and empirical research have shown, in relation to the conducted research in 2014-2017, the degree of use of the competences most important for employee organizations has increased, but is still at a low level – after all, the distance between Poland and the richest and most developed countries is gradually decreasing. Management boards of companies have realized the importance of this capital for the future of their organizations and create better and better working conditions for this group of employees. Unfortunately, during this process they did not strive to eliminate all barriers to better manage the competence of all employees – it would increase efficiency, innovation and flexibility in adapting to changes that are forced on them by a turbulent environment. On the other hand, for employees, intelligently organized work would be lighter, more useful, more satisfying and could satisfy more needs.

Keywords: *competition, competitiveness, competitive advantage, key employees, competencies.*

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1. Introduction

An unpredictable, turbulent and changeable environment in which modern organizations operate. The constantly growing role of the individual potential of employees in building sustainable competitive advantage. These are the main determinants that make the problems related to the concept of competence more important and complex as an area of interest in research in management sciences. This article is the result of a continuation of the research process from 2014-2017, which was devoted to the identification of key employees in companies that participated in the research process. Now, the main aim of the article is an attempt to determine the influence of key employees' competences on building a competitive advantage of the companies in which they work. Of course, in the beginning, the author made a literature analysis, including a comparison of the quoted definitions.

The new research process was conducted in 2018 in 14 randomly selected large companies from the maritime sector, located in the Pomeranian Voivodeship. The main respondents were management staff, selected together with HR departments – in total 60 people took part in the research. After the analysis of the literature and empirical research, it turned out that the degree of utilization of the most important potential for employee organizations is still at a low level – the distance between Poland and the richest and most developed countries is still structural. This is strange because company boards are aware of the importance of this capital for the future of the organization. They also know what barriers they would have to overcome in order to manage them better. On the other hand, the author states that the competences of the employed employees will remain a permanent element of management – such as tangible assets, organizational structures, strategies, processes, systems, financial resources or information. There will continue to be work, jobs, key employees, the knowledge they use and the value they create. Therefore, in the opinion of the author, we must overcome all barriers that hinder the optimal use of the potential of this group of employees. For an organization, this will mean higher efficiency, greater innovation, and flexibility in adapting to changes. And for employees, intelligently organized work can be lighter, more useful, more satisfying and covers a wider range of needs. For science, on the other hand, we can hope that the need to develop conceptual frameworks and methods of research into the management of key competences of employees in enterprises will not disappear. The author also hopes that the research presented in this article is conducted in the right direction.

2. Methodology and description of the conducted research

This research is a continuation of the 2014-2017 research process dedicated to the identification of key employees in companies. Now the aim is to try to determine the impact of the competences of this group of employees on building a competitive advantage in the enterprises in which they are employed. Such an objective determined the whole research process and the author had to apply such a set of research methods:

1) Literature analysis – systematization of the language of terms used in the concept of competitive advantage at the level of the market and organization, including a comparison of quoted examples of defining such terms as competition, competitiveness, competitive advantage, characteristics of key employees.
2) Interview – structured interview with senior managers in the surveyed enterprises.

The research was conducted in 2018 in 14 randomly selected large companies from the maritime sector, which have their registered office in the Pomeranian Voivodeship. The survey was conducted in 14 randomly selected large maritime companies with their registered office in Pomorskie Voivodeship. 60 people took part in the survey. At the stage of planning the research process, the author intended to use a deliberate – random selection of the sample on the basis of information about companies in this sector contained in the statistics for 2017. Unfortunately, due to limited resources and the specificity of a given industry, the author adopted the principle of selection based on his declaration of participation (he sent inquiries to 50 entities whether they are interested in participating in such an undertaking). Unfortunately, the research sample does not have the characteristics of the whole group for the country – the presented research results are only a complete set for the Pomeranian Voivodeship. It is the basis for future extension of the research process to the Baltic Sea Region – now it is only a pilot study.

In the article, the author described the partial results, which relate to the identification of those competencies of employees that have a real impact on the construction of competitive advantage by their enterprises in the market. Also, the author described the reasons for not using these competencies by some companies, and they assessed the importance of selected key competencies.

The author used the method of an individual interview during the research – the research tool was a structured and standard paper questionnaire. Selection for the sample was targeted on the basis of the following criteria: conducting business activity in the maritime sector, having a seat in the Pomeranian Voivodeship, having an HR department (this was to facilitate the acquisition of information about employees who can meet the criteria for belonging to the group of key employees). The respondents were managers due to their daily

contact with employees. Calculations and statistical analyses of empirical material collected during research works were made by the author using the Statistica statistical program and a Microsoft Excel spreadsheet. He used the following structure indicators and descriptive statistics: mean, median, standard deviation, quartile range, Spearman's rank correlation measures. This helped him determine which of the surveyed phenomena are most important for the respondents and what the diversity of their opinions looked like. It also served him to measure the interdependence between individual characteristics of the surveyed variables. In Figure 3.7, the author presented in detail the characteristics of the companies that participated in the survey.

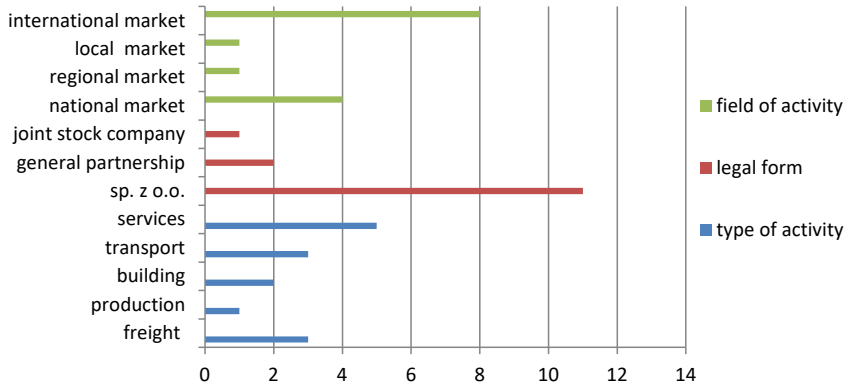

Figure 3.7. Characteristics of enterprises participating in the research

As a research method, the author chose the method of individual interview. According to the author of the article, it is the managers who have the greatest knowledge about the work in the different positions of their employees. Therefore, the basic technique of examining key competences of employees may be an interview. Other techniques provide partial data that are less reliable. The interview allows you to obtain the information most relevant to the objectives of the survey, ask questions about the exact competencies and how they are used.

3. Literature background

3.1. The essence of the key employees

In the 21st century, we can distinguish three main forces that determine the functioning of modern enterprises in the market. The first one is globalization, i.e. the liberalization of the exchange of goods and services together with the knowledge and transfer of people. The second feature is the rapid technological progress, which brings with it a lot of challenges and dilemmas. The third basic distinguishing feature is the increase in the importance of intellectual capital. There is a situation where the most important value for enterprises is knowledge possessed by people – this group becomes particularly important for them and it is to this group that the actions related to the change of management systems will be adjusted. This new economy forces the emergence of new forms of management and creates new organizations in which employees are the most important, with unprecedented (or unnoticeable and so far not needed) competences (Table 3.7).

Table 3.7. Conditionality of human capital management in the 21st century

A new economy	New organization	New employee
globalization tough competition continuous innovation monopoly breakthrough technological progress computerization cultural diversity customer orientation changes in the labor market	intellectual capital key competences restriction of the hierarchy project management network organizations virtualization of activities management of professionals talent acquisition	knowledge worker lifelong learning changes in occupations and functions less stable employment work as a task rather than a place of work creative thinking teamwork managing one's own time and career

Source: Pocztowski (2007, p. 39).

This means that the knowledge-based economy, to the greatest extent, determines the creation of modern organizations, which are characterized by a different approach to intangible resources. In these resources, an employee – his new type of employee, which is a product of the 21st-century society – is an integral part of the resource. We can also notice the metamorphosis that this employee has undergone in recent years. A detailed picture of this phenomenon is shown in Table 3.8.

Table 3.8. Changes in the approach to employment

Old model	New flexible model
A steel workers – contracts for an indefinite period of time, very expensive posts (100%)	A1: steel workers (core organization) with very high qualifications and skills; includes top management and workers who influence the conduct of the main activity (approximately 1/4 – 1/3 of volume A) A2: outside workers with qualifications and skills available in the labor market; employed on fixed-term contracts, for specific tasks (teleworking, job sharing), cheaper for the employer – do not have to care about their professional development
B staff recruited on a need-to-know basis	B: external staff recruited to perform specific tasks, tasks where other workers do not have the appropriate qualifications (e.g., improvement of technological processes, renovation of a building, etc.)
C staff recruited on a need-to-know basis	C: outside workers supplementing variable labor demand (e.g., peak season, unforeseen boom), employed under employee leasing, on-call, intermittent or casual work
D staff recruited on a need-to-know basis	D: external personnel recruited on a special basis to carry out cut-outs in the main activity (e.g., input work, accounting, cleaning, etc.), C + D segment: 1/2- 2/3 of the total

Source: Antczak (2014, p. 98).

We can put forward a proposal that is consistent with the hypothesis of this article that, in the 21st century, the competence of key human capital is a strategic element in the fight against competition. This allows us to create the expected competitive advantage in the market.

Of course, the success of this process is determined by the employees employed in the organization. Therefore, it is very important not only to attract people with high potential but also to create working conditions for them that are conducive to their development, motivation and building commitment. This is possible primarily by supporting and encouraging employees to be pro-innovative, creating a climate conducive to innovation and shaping a proper culture of the organization. In the face of contemporary challenges, complex management of employees with high potential – i.e. key – becomes particularly important here (Król, 2017, p. 41). So what are the characteristics of key employees? What features determine their uniqueness? These are, first of all, people who are characterized by great flexibility in crossing obvious boundaries. They show fluidity of ideas in creating many possible solutions to a given problem and independence of thinking. They thoroughly analyze all the tasks that are set before them to be performed. They also have the ability to manage conflicts efficiently (tolerance for ambiguities), are inquisitive, see and understand the needs of others. They are also very systematic, action-oriented and committed (Waisburg, 2006, p. 56). In turn, Białasiewicz (2015, p. 15) compares them to

another group of employees, i.e. the so-called talents, i.e. original people with flexible thinking and a creative approach to solving problems. They are also open-minded, they can take risks all the time, they are very involved in actions and they persistently strive for the set goal. They are emotionally intelligent and aware of the value and importance of their work.

We can also distinguish three types of competencies that differ from the average performers (Goleman, Boyatzis, McKee, 2002, p.57):

- cognitive skills – systemic and analytical thinking, pattern recognition;
- ability of emotional intelligence – emotional self-awareness and self-control;
- social intelligence skills – social awareness and relationship management skills, including empathy and teamwork

This means that key employees are those who use talent, skills, and abilities to meet the requirements of the realities (environment, work organization, environment) in which their organization operates.

To sum up, in the contemporary economic reality, it is an employee with a high potential, who is most often perceived as key from the point of view of the functioning of the company. There is also no doubt that the most valuable resources possessed by each company are people, and the success in business depends on the employment of the right people in key positions. In the English literature, such people have been assigned the term High Potentials (HIPOs) and there is a prevailing belief that proper management of them may translate into the market success of enterprises. Of course, it is not easy to identify them, due to the complexity and subjectivity of the criteria mentioned above. The problem also lies in the very definition of high-potential employees, as not all of them are crucial, despite their high efficiency (Igielski, 2018, pp. 205-206).

3.2. Key competences of employees in the 21st century

In the 21st century, in a knowledge-based economy, the theory of competence management of key employees has become an important element that allows one to optimize human capital management in every organization. Its effective use is conditioned by the proper identification of desired competences and their measurable measurement. Unfortunately, this is not an easy task in practice. In management sciences, competences are defined in very different ways. Most definitions focus on emphasizing the need to have up-to-date and multidimensional knowledge in a given area, which provides a basis for the proper performance of tasks and responsibilities. This can guarantee an optimal level of strategy implementation in the company.

Competencies can be defined as employee attributes that can be transformed into value – performance, and results that affect work efficiency. On the other

hand, it is a set of characteristics and properties of people that have a certain value and constitute a source of future income for both the employee (the owner of human capital) and the organization using this capital in certain conditions (Pocztowski, 2003, p. 45). Competence is the ability of an individual to use his or her knowledge, skills, abilities, values and personality traits effectively to achieve goals, results, and standards that the enterprise expects from him or her. It is an internal potential, manifested in the employee's organizational behaviors, which enables him/her to quickly adapt to the requirements of the changing environment (Walczak, 2010, pp. 6-8). And, as T. Oleksyn says (2006, p. 19), competences have different references. We can distinguish competences: organization, professional, positions, actually possessed and possible to obtain. This means that the concept of key competences reflects professionalism. Competences understood in this way consist of many factors, including knowledge, substantive qualifications, acquired skills, experience, as well as attitudes, behavioral patterns and level of motivation. Competences describe a range of reactions and behaviors of people in specific professional situations. They are perceived as tools that trigger intellectual processes and use their knowledge and experience. They also cause a reaction adequate to the existing professional situation (Szczęsna, Rostowski, 2004, p. 45).

In recent years, many scientists have been looking for, and are still looking for, answers to the question of what kind of competences the modern labor market expects from employees. The second question is what qualities and abilities an above-average employee should have. For example, T. Rostowski (2004, pp. 76-77) states that competences should now be understood as all employee characteristics that are used and developed in the work process to achieve results consistent with the strategic goals of the company. On the other hand, this topic also raises the issue of new expectations of employees themselves, which according to A. Pocztowski (2007, p. 56) include: fair, ethical treatment and respect for their dignity, perception of employees as stakeholders, and not only subordinates, appreciation and rewarding of the contribution made to the organization and support by the organization for the process of development and improvement of competencies. This situation has led to several classifications of competences and their division into specific types, groups, and categories (see Table 3.9 for a detailed description).

Table 3.9. Classification of the concept of competence

Author	Category
Armstrong (2007)	General competencies – required of professionals. Specific competences – distinguish a workplace or a defined organizational role from others. Threshold concepts – necessary to meet the minimum requirements at a given workplace. Differentiating competences – characterize behavioral features noticeable in employees achieving good results and their lack in those achieving worse results.
Szczęsna & Rostowski (2004)	Key competences – are common for the entire staff of the company. The task of key competences is to create a uniform and coherent organizational culture in the company for all employees. Function-specific competences – occur in persons working in specific organizational units. Role-specific competences – otherwise known as hierarchical competences - are required from employees depending on their role in the organization (e.g., leader, strategist).
Cockerill, Hunt & Schroder (1995)	Side competences – refer to a group of manager's behaviors that indirectly influence the manager's good performance. High-performance managers' competence – refers to a set of behaviors related to the high performance of managers, e.g. the competence to create concepts.
Pocztowski (2003)	Basic competences – are critical for the proper performance of a given job. They most often include knowledge and skills. Distinguishing competence – allows one to distinguish an effective employee from an average employee. This group of competences includes motives, attitudes, and values.
Kubicka-Daab (2002)	Basic competences – for all persons in a specific professional group (e.g., all teachers). Specific competences – distinguish workstations from others, or organizational roles from each other, e.g. numerical skills needed in accounting positions.
Filipowicz (2004)	Cognitive competence – problem-solving, broad horizons, flexibility of thinking, readiness to learn, creativity. Business competences – business orientation, knowledge of the industry, diagnosing customer needs, sales techniques. Social competences – negotiating, international relations, relations with superiors, relations with co-workers, written communication, communicativeness, presentation, exerting influence. Corporate competences – identification with the company, customer orientation, openness to change, ethics and values, foreign languages. Personal competences – action orientation, taking initiative, coping with stress, perseverance, commitment, effectiveness, organization of own work, conscientiousness, decision making. Managerial competence – building teams, caring for subordinates, delegating, motivating, managerial courage, leadership, organization, planning, process management, project management.

Source: own studies based on sources listed above.

If we do an analysis of all the above-mentioned definitions of contemporary employee competences and the accompanying categorization, we can try to describe the basic, and at the same time, key elements:

1) The ability to work as a team, i.e. also the ability to cooperate with other people/employees in the organization.
2) The ability to search for, acquire, process and share information.
3) The ability to organize work, not only for oneself but also for other employees.
4) The ability to negotiate objectives and set directions.
5) The ability to seek compromises.
6) The ability to control and analyze the results obtained.
7) Seamlessly exiting one's own comfort zone for the benefit of the company.
8) The ability to adapt in organizations with complex structures and the ability to formulate a problem and find a solution.
9) Proper reaction in unpredictable and stressful situations – lack of resistance to changes.

The author would also like to draw attention to a wider range of definitions of key competences in the 21st century. One of such supporters is T. Oleksyn (2006, pp. 23-24), who claims that competence is knowledge, experience and practical skills, internal motivation, talents and predispositions, health and fitness, and other psychophysical features. They are important from the point of view of work processes, attitudes, and behaviors expected in the workplace. The competences listed in the chapter complement each other and have an impact on the functioning of the organization, as well as on achieving competitive advantage in the market. In general, these are the capabilities of the employees that result in the achievement of the company's objectives. For example, one employee will never have the same knowledge as all the employees of the organization put together. It is the employees who create the organization and influence its position in the market and the achievement of the intended objectives (Matysik, 2016, pp. 19-20).

To sum up, the optimal use of key employee competences (competence-based management) helps the company to function better in the economic market of the 21st century. In determining the key competences we can observe the occurrence and repetition of basic elements related to knowledge, skills, and attitudes. Knowledge is acquired throughout life and you never know when you will need it and when you will be ready to use it. This, in turn, is determined by the skills acquired, which indicate when and to what extent the employee is ready to use his or her knowledge to perform the job assigned to a specific position. On the other hand, the attitude itself concerns the willingness and readiness (commitment) to use the acquired knowledge and skills during the performance of duties.

3.3. Concepts of competition, competitiveness and competitive advantage

We must start our considerations on competitive advantage with the concepts of competition and competitiveness. All three categories are directly linked - but we cannot treat them in the same way. We have to differentiate between them, and the relationships they are connected with are best illustrated by the graph in Figure 3.8.

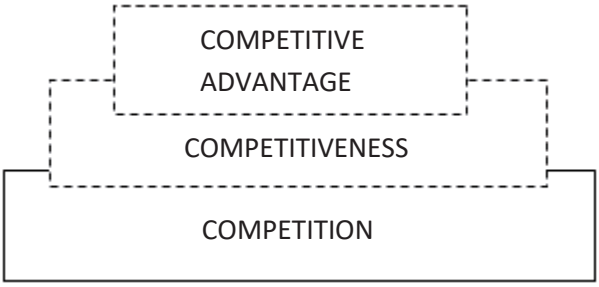

Figure 3.8. Relations between competition, competitiveness and competitive advantage

Source: Kasiewicz (2006, p. 46).

The term competition comes from the Latin term *concurrere,* which means to run together. However, the substantive meaning of the term is different and boils down to competition between rivals. The phenomenon of competition occurring in this sense is very old. We are dealing with it in many areas of social, economic, political, cultural, artistic and sporting life (Lisbon Group, 1996, pp. 13-14). Competition is commonly understood as competition and rivalry between individuals, groups and organizations that are interested in achieving the same goal. Its intensity depends on the types of products/services offered, the structure of the sector offering the products and services, the competitive instruments used and, finally, the structure of the buyers themselves. Competition is, therefore, a process that indicates which economic entity is the best and whether its activities are conducted in the right and desired direction by the market (Kraszewska & Pujer, 2017, p. 9). To sum up, this term can be understood as a market in which companies compete for customers. It may include companies operating in a given sector, competitors, institutions regulating the functioning of companies and many other entities.

The term competitiveness, on the other hand, is very often used by scientists and practitioners alike but does not have a clear definition. It is therefore perceived differently and defined according to different interest groups.

Competitiveness can be defined as a result of competition and indicates how companies compete in the market for customer favor (Beyer, 2012, pp. 241-244). In this concept, customers see characteristics related to the product or service, its attractiveness. For enterprises themselves, however, this term is closely related to the functioning of the organization in the context of its market success. Generally speaking, we can say that competitiveness reflects the company's potential – resources, skills, and abilities that provide an advantage over other entrepreneurs (Walczak, 2012, p.11). In other definitions, the authors focus only on microeconomic and macroeconomic foundations (Szymanik, 2016, pp. 107-113) and on accents that draw attention to the transnational aspect of competitiveness (Nowacki, 2015, pp. 446-449). As for example. Zorska (1998, p. 7), who emphasizes the global aspect of markets by defining competitiveness as the ability to create and use competitive advantage over other domestic and foreign companies. Similarly, A.J. Abbas (2000, p. 4) believes that it is the ability of companies to innovate and be flexible, which manifests itself in gaining a competitive advantage.

However, what the definition of competitive advantage is more specific. The simplest definition can be found in the Management Encyclopedia (download date: 11.03.2019), in which it is the achievement by the enterprise of a superior position over a larger number of competitors. It is a relative measure of its functioning in the market – it allows one to offer customer services or products that meet their expectations and are better than those of competitors. This is expressed in a higher quality product, lower price, and better service or more comprehensive satisfaction of customer needs. An interesting definition of this phenomenon was prepared by Grahovac and Miller (2009, pp. 1192-1201), who believe that it is a cross-section of differences in the development and functioning of the company – a vertical discrepancy manifesting itself in what the company uses in the market in relation to the price it paid for production factors that are not fixed. Obtaining a competitive advantage by an innovator (relatively stable competitive advantage) and potential followers (unstable competitive advantage) depends on the value of resources and their development paths.

All activities aimed at building a competitive advantage consist of obtaining benefits greater than the competitors in the market. Within the framework of activities aimed at being the best, gaining a competitive advantage is their key element. An enterprise that tries to differentiate itself from others must do something that seems to be better or different. This is the essence of the ability to build a competitive advantage, which determines whether the company has the status of a leader, second player, significant competitor or one of many (Janiak, Kolemba, & Śmietanka, 2017, pp. 7-9).

To sum up, modern concepts of competitive advantage refer to the functioning of enterprises in the reality of an often-changing market,

technological and competitive environment. This indicates the most important material and non-material resources and competences that an entrepreneur should possess. Unfortunately, the authors of these concepts approach the essence and sources of competitive advantage in a selective way. The lack of a uniform definition and analysis of various resources and competences of a strategic nature by the authors results in a very rich typology of competitive advantage. Enterprises that are willing to identify their key resources may of course benefit from the following with the help of scientists. But they must always take into account the specificity of the industry and market conditions in their research. It is also worth noting that none of the new theories defines precisely the notion of competitive advantage itself.

4. Analysis of test results

In the Pomeranian region, the maritime sector is made up of several hundred companies, which have in their organizational documents appropriate PKD codes. However, if we take into account the criterion of size, in this group we will find only 63 companies that are large. Over 20% of companies (14) representing this sector took part in the survey. This is a research sample representative for the Pomeranian region, but not for the whole country.

The research conducted by the author in these companies shows that the elements most expected from the employees are: their education and the profession they desire at a given moment. Many respondents also pointed to their professional experience. Additionally, according to the management staff participating in the survey, the most important elements that are emphasized in the recruitment process include foreign language skills and additional courses/training courses. The following places were taken by problem-solving skills and contacts and acquaintances, ease of adapting to new situations (flexibility), interpersonal skills (e.g. establishing contacts, communication skills), independence in action. The remaining answers were indicated by less than 20% of respondents. Figure 3.9 presents the features and abilities most useful in work according to the respondents from the group of managers.

The next stage of the research process was an attempt to identify and evaluate the components of the competitiveness potential of the studied entities, which is affected by the employees and their competences: 1 – factor does not affect competitiveness; 2 – has a minor impact; 3 – has a medium impact; 4 – has a major impact; 5 – has a very significant impact.

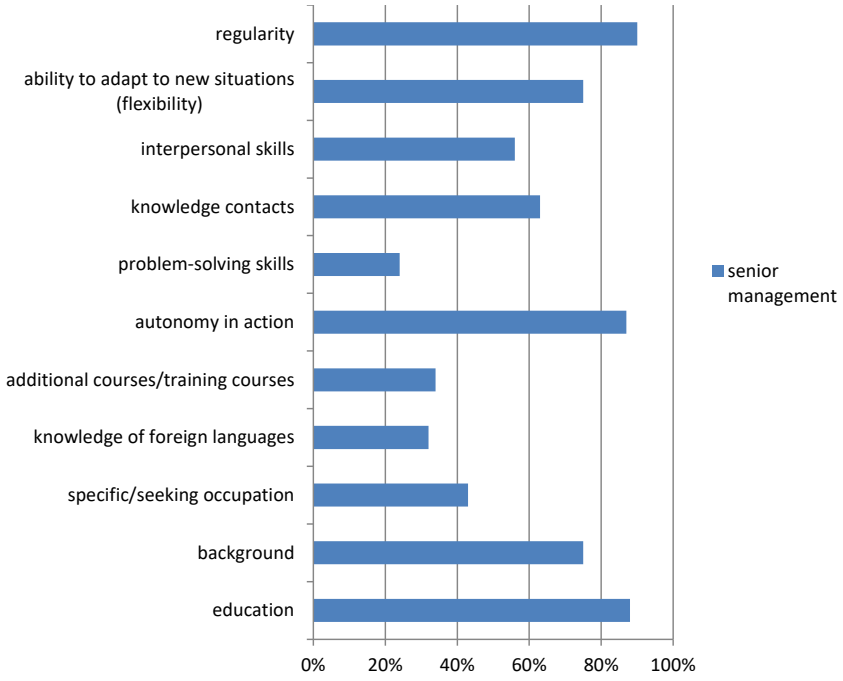

Figure 3.9. Features and abilities most useful in the work

After analysing this material, the author came to the conclusion that employees have the greatest influence on: research and development, marketing, innovativeness in creating new products, a wide range of services or customer service in the process of building a competitive advantage of the company in the market (a detailed picture is presented in Table 10).

Due to the fact that the author managed to identify the processes, which during the construction of competitive advantage of the company are affected by the key competencies of employees, the author also asked about the action taken in the company to develop the potential of employees and thus increase their competencies. Most often, in the surveyed companies, participation in occasional training and permanent access to the Internet, where specialized services are located, were indicated. The answers related to the possibility of using modern technologies, subscriptions to trade magazines or participation in systematic training and meetings/seminars were less frequent. The reason for this situation (almost always) was high costs. In the author's opinion, it is strange, because professional knowledge is priceless.

Table 3.10. Components of competitive potential of the surveyed entities

Components of the competitive potential	Senior managers in the surveyed entities	
	Number of responses	Degree of impact on competitive advantage
innovativeness in creating new services	85%	5
Marketing	85%	4
customer service	80%	4
wide range of services	75%	3
research and development	70%	2
market penetration and knowledge	50%	5
adaptation to market requirements	50%	5
possessed certificates of quality of services	40%	3
the efficiency of the information system	35%	1
the enterprise's ability to learn	35%	1
business reputation	20%	2
other answers less than 10% of indications		

And Polish companies save money and decide on solutions that are simple and inexpensive. This was confirmed in the next question. It was a question not related to the subject of the article, but the answers were very interesting. The author asked what kind of competences the employees are lacking so that companies could better build a competitive advantage. After comparing the answers, the author stated that the managers pointed to the same elements as in the question about the desired competences, i.e. systematicity/diligence, ability to solve problems, ease of adaptation to new situations (flexibility), interpersonal skills (establishing contacts, communication skills) and independence in action. Table 3.11 presents a summary of these elements.

Table 3.11. Competences identified by managers as elements missing from the work of their employees

Possible answers	Respondents Number of indications
Systematicity/diligence	85%
Problem-solving skills	35%
Adaptability to new situations (flexibility)	70%
Interpersonal skills (networking, communication)	60%
Independence and independence in action	80%

These data show that the responses to the question of independence and independence in action were identical: managers responded in the same way

to the competencies that employees lack and the competencies needed to build a competitive advantage. The result was also very similar in the case of problem-solving skills and regularity/partners. The author would like to point out that it confirms the need for a specific character of employees' competences, which clearly help companies to build their competitive advantage in the market.

An important element of the survey was a question concerning the opinion of managers on the conditions that are created for employees in enterprises - this is to stimulate the optimal use of their potential. The respondents had at their disposal a scale of grades from 1 to 5 – where one is a very poor condition and five is a very good condition. Unfortunately, if we take into account the previous answers, it looks very pessimistic – detailed information on the distribution of answers is presented in Figure 3.10.

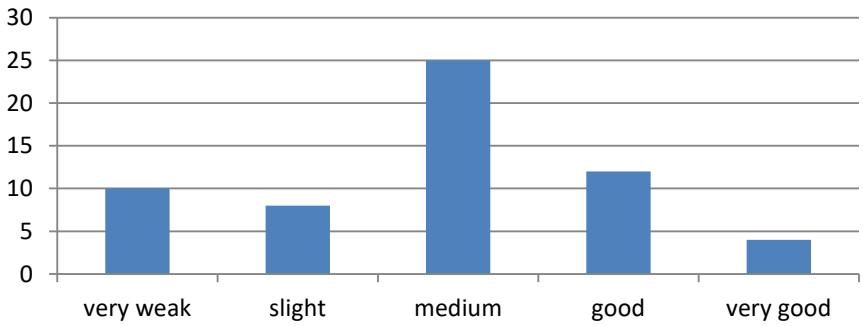

Figure 3.10. Evaluation of the conditions created for employees

According to the author, it is difficult to look for another translation for such a poor evaluation of working conditions, conducive to optimal work of the employed workers, as only the characteristics of the Polish reality. We cannot define the average opinion differently at the level below 3, i.e. lower than the average (this is also confirmed by the calculated median at the level of 3). The author also suspects that the managerial staff might have been even more conservative when expressing opinions on this subject – after all, in fact, much in this aspect depends on them. The more so because, in this case, the calculated coefficient of correlation of Spearman's rank, i.e. the description of the power of correlation of two features, confirms this fear. In comparison with the opinion on satisfaction with the current workplace (additional question, which the author prepared only for the needs of interpretation of the relevant research results), the result of which was also below the average, the calculated coefficients can be interpreted as a very high correlation, i.e. a very high relation.

According to the author, this may indicate a tendency directly opposite to the one declared by the management boards of companies to eliminate barriers that hinder optimal use of the potential of key employees – everyone knows what to do, but does not take the desired and expected actions.

6. Conclusion

It is already a fact that modern companies (including companies from Poland) are trying to strive for optimal professional management, which requires the use of a high level of competence. Among them, the main place is occupied by the competences of key employees. This is expressed in the most frequently possessed knowledge, as well as skills, attitude and experience. These are the features that are increasingly necessary for the process of building a competitive advantage. It is proof that along with permanent technological development (IT revolution) people's competences also develop.

Modern people adopt different attitudes – they are more or less active. However, in the eyes of employers, the employee should adapt to the continuous need to improve their qualifications and continuous pursuit of self-development. The author will now ask the question: why? The research process has shown that key competences are needed not only for the proper performance of work in a given position but also for the proper functioning of the organization. What is important is that having key competences is no longer the domain of the management staff only, but also of various types of specialists. Unfortunately, the research carried out also confirmed that the degree of using the potential of the most important competences for the employees' organization is still at a low level. Poland's distance to the richest and most developed countries is gradually decreasing, but it still has a structural character. Fortunately, the awareness of people responsible for the functioning of enterprises is changing – in comparison to previous surveys, the management boards of companies know how important this capital is for the future of their organizations. They also know what barriers need to be overcome in order to better manage them. Again, the author asks the question: why do they not do it systematically and effectively? After all, the key competences of employees are a very important element of management – such as tangible assets, organizational structures, strategies, processes, systems, financial or information resources. This was confirmed by the respondents themselves, who during the survey stated that only the complete elimination of all barriers that stand in the way of the optimal use of the potential of key employees will give the company higher efficiency, greater innovation, and flexibility in adapting to the changing conditions in which it has laboriously built, in the 21st century, a competitive advantage.

Not only the development of management sciences, and especially the theory of motivation, points to the importance of this problem. It was the companies that understood the need to shape the attitude of employees in order to optimize the use of their competences. Therefore, it is not only necessary to eliminate barriers. Enterprises must also undertake long-term, systematic and specific actions towards their employees, which will help them to meet their expectations and provide opportunities for development and job satisfaction. This is in line with the concept of stakeholders, in which each company in its strategy takes into account the expectations of different groups of stakeholders, to which employees also belong. It is very important because in the 21st century it is the people who determine the competitive position of the company in the market – its success. Therefore, in the opinion of the author, we must make an attempt to identify the expectations (at the beginning, or even a narrow group of key employees), which depend on many variables of social, economic and demographic factors, and try to conduct a dialogue. It is important to pass on information to employees and to obtain input from them, which is necessary for the company's activity. This is to increase their involvement in the implementation of the company's strategy. On the other hand, employees need intelligently organized work. At that point in time, they will be able to work more easily and their work will be more useful, more satisfactory, and this will enable them to satisfy more of their needs.

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Methodical aspects of empowerment implementation in an enterprise – the concept of research

***Katarzyna Kolud*[1]**

Abstract

Empowerment is a complex process of giving autonomy to staff actively involving the person holding a position on a strategic, tactical, or operational level of management. In order to obtain benefits in the management, employee and organizational dimension, empowerment needs to be implemented gradually, consolidating good practices. This allows one to combine business goals and the fulfillment of the expectations of staff, as key interest-holders in an enterprise. For some of them, such values as autonomy in taking decisions, freedom to choose resources to accomplish tasks, and the opportunity to activate their potential will all be overriding values at work. The aim of the article is to present the author's set of activities to be taken while implementing empowerment and to present the results of such implementation, obtained as a result of the overt participative observation conducted by the author, with the observation plan and the observation sheet. The implementation was conducted in a small enterprise employing fewer than 50 workers and generating less than EUR 10 million of annual net turnover from sales of goods, products and services. The identification of a single research object is perceived as a pilot survey. The results obtained here can be treated as a basis for designing proper research comprising a greater number of cases. The proposed set of activities, additionally verified in the practice of managing a small enterprise, might constitute an inspiration to other enterprises which would like to stimulate staff potential by implementing empowerment. The author of this article claims that the considerations presented here, along with the pilot survey and its results, may contribute to a better understanding of the circumstances accompanying the implementation of empowerment.

***Keywords**: delegating, empowerment, empowerment implementation, observation plan, observation sheet, pilot survey.*

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1. Introduction

The main research problem posed in the article was to analyze the course of empowerment implementation in a small enterprise, based on the author's proposal for the sequence of activities to be taken in this area. The author determined the research goals and cognitive goals stemming from the main problem and research goals, aimed at providing material illustrating or even stimulating other small enterprises to implement empowerment. In the paper, the author is seeking answers to the following questions:

1) Does empowerment implementation offer an advantage over a sudden change?
2) What are the key components of effective empowerment?

In order to solve the research problem and the research goals, a hypothesis was formulated, namely that preserving the order of activities in empowerment implementation helps in the gradual attainment of benefits in the management, staff and organizational spheres.

The choice of research problem was made because: (1) the author knows the specificity of management in the analyzed enterprise – she advises the company in business issues; (2) observing the excessive burden placed on the manager, the author postulated the implementation of empowerment, provided that she obtained consent for conducting a participative overt observation. The empirical part of the article is an outcome of this observation. Thus the information gap concerning the potential set of activities to be taken while implementing empowerment in a small company was bridged and information was provided on behaviors and events occurring during the implementation.

Empowerment consists of providing staff with freedom, giving them full autonomy in the whole process of decision-making (Armache, 2013). The subject literature, referring to key issues of empowerment implementation, points at the activities accompanying it: employee participation and delegating (Roberts & O'Reilly, 1979). The former concept is connected with collecting and providing information by an employee, as a result of which they affect decisions taken by a manager. The participation of the employed person is thus active, but not necessarily connected with decision-making powers. Delegating, on the other hand, boils down to entrusting an employee with a task to perform by the manager, according to their recommendations and subject to their supervision. Participation and delegating are not synonyms of empowerment. Scientists point at these concepts, defining them as related management practices (Conger & Kanungo, 1988), while practitioners are often unable to see the differences. Both activities should precede the empowerment implementation so that it does not constitute a sudden change, but a thought-out process of gradually building staff involvement. In the literature review

the author concentrated on delegating, as it relies more on trust – the basis of successful empowerment – than participation.

2. Literature background

2.1. The essence of delegating

The subject literature provides analyses of the delegating issue from the perspective of definitions, goals, scope, necessary competencies of a manager and employees, and barriers to its implementation. Some scientists question the legitimacy of delegating by the top management level (Oehmichen, Schult, & Wolff, 2017), though many share an opinion that it is inscribed in management. It constitutes then an integral part of organizing and the main mechanism of distributing tasks among those employed at various rungs of the hierarchy (Agerwal, 2007). The delegating goals are associated with:

- limiting the excessive obligations in the work of middle and first-line managers (Cuba & Milbourn, 1982; Hammer & Stern, 1980);
- allocating the gained time to accomplish key tasks (Tarnowski, Quinn, Alvero, & Sardi, 2019);
- developing the potential of operational staff and preparing them for empowerment (Culp & Smith, 1997);
- increasing the productivity of an individual employee and even of the whole teams and freeing the potential of the staff in an organization which implemented downsizing (Maertz, Wiley, Lerouge, & Campion, 2010).

One of the most widely described issues related to delegating is the resistance it arouses among managers. This may be due to the lack of trust in their staff, their fear of losing authority, lack of control over tasks and results, and a belief that a manager can perform a particular task faster and more effectively (Rolkova & Farkasova, 2011). The lack of common use of the methods that diagnose managerial competencies might, however, result in their excessive work duties. The tasks that are delegated should be characterized with simplicity and ease of mastering, their laborious, and time-consuming nature or time sensitivity (Blake, 2017). Traditional and new organizational roles and competencies of managers intermingle. The requirement of being effective in accomplishing goals and results and the optimal use of resources are at the basis of the new roles: a manager who is entrepreneurial, creative and who inspires others to act (Oleksyn, 2018). The practice of delegating is an important step on the road to implementing empowerment, as it teaches managers to develop trust in their employees so that they could work unsupervised in the future.

2.2. The essence of empowerment

The term empowerment is often explained as strengthening (Kanafa-Chmielewska, 2012), and in this context, it might be associated with the phenomena of a continuous nature, which needs to be maintained, developed and improved in an organization. Empowerment is the process of turning employees into entities that allows an organization to react flexibly to changes taking place in its surroundings, to create the climate for organizational learning, to develop a corporate culture that values initiative, honesty and that encourages the sharing of power and responsibilities through cooperation (Gupta & Murari, 1996).

As emphasized earlier, the implementation of empowerment should be preceded by delegating. If we assumed that empowerment is just a synonym for delegating, this would mean omitting its most important aspect – supporting the employees in taking risks and in their personal development (Quinn & Spreitzer, 1997). Other than delegating, empowerment is not at the discretion of a manager, but the whole organization – people occupying various positions at all levels of management, who should create an atmosphere of support for the employees.

The etymology of empowerment is searched for in many fields of science, considering the concept, inter alia, in the context of the empowerment:

- of women. The subject literature studies on the strengthening of the role of women by their participation in micro-, small and medium-sized enterprises reveal the importance of this issue, treated as a weakness, especially in less developed economies (Basak & Das Gupta, 2018);
- in education. Strengthening students' involvement in order to develop it later into empowerment is one of the concepts dealt with in education studies. The expected result will be to bridge the gap between students' expectations concerning the educational offer and the requirements of the business world (Kavatekar & Vijaya, 2017). Self-management, readiness for life-long learning, fluency in learning new skills are all the features coveted and searched for by employers;
- in politics. Attention has been paid to three possible levels of empowerment: national, local and personal. National empowerment is understood as mobilizing a group to overthrow the existing power. Local empowerment is related to rationalized and systemic activities of the government in public politics, focused on building recognition, respect, and involvement of institutions creating local politics. The third, personal, level of empowerment refers to the power of consumers (Lincoln, Travers, Ackers, & Wilkinson, 2002);
- in management. Empowerment is at the center of interest for management theorists and practitioners because: (1) the key

"component" of organizational effectiveness are workers, (2) organizational effectiveness grows along with the progressing sharing of power and control with the employed people, (3) empowerment plays a vital role in group development (Conger & Kanungo, 1988).

The review of Polish and foreign literature allows us to conclude that the sequential implementation of empowerment does not often constitute the subject of research. One of the proposals covers five phases (a set of activities): the first one consists of diagnosing the internal environment of an organization and seeking reasons for the feeling of helplessness experienced by the staff. The discovery of such reasons allows us – in the second stage – to use managerial techniques eliminating the factors that weaken staff involvement. These might include management by participation, setting goals, providing feedback, work enrichment. The third stage includes informing the staff about the effectiveness of the actions taken by them. Receiving such information – in the fourth stage – the employees believe in their effectiveness and feel strengthened. The fifth stage is the consolidation of empowerment (Conger & Kanungo, 1988). This article presents the author's own proposal of a set of activities to be taken while implementing empowerment so that, through a staged implementation, its positive effects could be achieved in a managerial and personal dimension, as well as for the whole organization.

3. The sequence of activities in empowerment implementation

The set of activities consists of ten logically tied tasks which need to be taken when implementing empowerment in order to achieve mental and content-related preparation of both parties – the manager and the employee – for the implementation. They are presented in Table 3.12 below.

A manager representing an autocratic management style gives direct commands, decides who, how and what resources are used to execute them. The criticism of this style is justified when it was not tailored to the personality and the working style of the employees. Thus it is appropriate in managing workers who prefer messages that are clear and unambiguous, who neither need nor expect their creativity to be developed in their place of work. This style would be appropriate in delegating. Employees for whom the superior values are the needs of self-actualization and self-development as well as employee autonomy – due to their potential – will not be interested in working in an autocratically managed team. Relinquishing this style is the foundation on which the working atmosphere conducive to further empowerment is built.

Table 3.12. The sequence of activities while implementing empowerment

Activity	Characteristics
1	The manager ceases an autocratic management style
2	The manager practices delegating
3	The manager confirms that they are personally ready to implement empowerment
4	The employee to be empowered is selected and chosen
5	The employee confirms personal readiness to be empowered
6	Possible levels of empowerment in an organization are analyzed
7	The employee receives theoretical and practical induction to the execution of tasks within the selected level of empowerment
8	The tasks performed by the employee within the selected level of empowerment are monitored and the real-time feedback is provided by the manager
9	The employee is empowered on the selected level of empowerment and the limits of such empowerment are determined
10	A culture of trust in the empowered employee is created

The practice of delegating should be a standard in managing an organization, and in particular – a learning organization. The fear of delegating stems from a lack of trust in staff skills and qualifications. In the autocratic management style these fears are coupled with the belief that employees are only influenced by external motivators and they are not aware of the existence of internal motivation. Thanks to the practice of delegating, managers acquire skills shaping their altruistic attitude to the staff. Giving them tasks to perform, managers show that they are concerned with staff development and, at the same time, they integrate individual and organizational goals. The manager's readiness to implement empowerment starts when he or she notices the necessity of prioritizing tasks, assuming that other tasks will be passed on to be completed by employees.

The feeling of the loss of power and the fears it evokes might constitute a factor that strongly blocks the empowerment implementation. The implementation requires mental readiness on the manager's side. It has its source in understanding the goal of the implementation, its legitimacy, or the acceptance of the way in which it is conducted. The manager may focus on strategic goals, building relations with key partners, developing the organization. Assuming such a new role helps managers realize that they do not have to be afraid when implementing empowerment. The above-mentioned readiness can be strengthened by the awareness of the benefits and the belief that there is a person among the employees who could be empowered.

The competences, qualifications, and skills of the employee may not be sufficient for the implementation of empowerment if there are various incongruities

in the way to their full use. Therefore emphasis should be placed on eliminating them, obtaining the highest possible match between the employee and:

- the job – by obtaining compatibility between skills and predisposition to perform tasks;
- the organization – by building the feeling of belongingness to corporate culture;
- the manager – by treating the employee as a subject, not an object;
- the group – by aiming at filling the competence gap.

The smooth matching starts at the recruitment and selection stage, but it should be improved through training and development, employee assessment and even the amount of remuneration.

The decision as to which of the employees is to be empowered is a complex process, but it largely depends on the observation of the working styles of employees. An employee confirming their readiness to be empowered needs to be aware of their competences, their effectiveness, autonomy, sense of work and their influence on the obtained results. The provisions accounting for the new scope of responsibilities should be added to the employee's personal file in the part concerning the commencement of the work relationship and the course of employment.

Every organization should decide on the allowable and possible levels of empowerment, the starting point is the weight of its anticipated consequences. The lowest level of empowerment should cover the tasks which do not have long-reaching effects for the organization. The moderate level should be implemented when satisfactory results are achieved on the lower one. A higher level of empowerment is appropriate when, as a result of changes to corporate culture, employees determine their individual remuneration, decide on commencing work on a specific project or on the place in which work is performed (Appelo, 2016).

In this context, the first level of empowerment is accompanied by a state of certainty, the second – with a state of risk, and the third one – with a state of uncertainty. Each of these states has its source in the preparation of the manager and the employee. The lower level of empowerment is proposed for performing simple tasks (but not too simple, as it might hurt the employee's ambition). The moderate level is recommended for tasks requiring much higher qualifications (but not too high, so that the employee does not feel that the task is unattainable to them). The higher level of empowerment is appropriate for tasks affecting the organization understood as a system. Entrusting the employees with planning, organizing, coordinating, performing and controlling tasks, the organization tests their understanding and following the vision, mission, and goals of the organization by taking specific operational activities. On this basis we can determine the empowerment level displayed by the organization.

The individual potential of the employees develops when it is accompanied by theoretical and practical support on the manager's side. It is a mistake to expect that an employee deprived of such support will acquire new skills. If we assume that the structure of the 70-20-10 model is created only by the forms of learning in a place of work, then organizational learning would be a more effective way of effective transfer of knowledge in an organization and changing tacit knowledge into explicit one. In this case, the manager should be an expert, a coach, a mentor, and a trainer. This could lead to improvement of not only the pace of assimilating knowledge by the employee, but it would also facilitate checking current progress in performing tasks.

The monitoring of the status of performed work may be iterative or incremental. In the former case, we observe and assess how an employee gradually improves the actions they take. In the latter case – the way in which the employee increases the obtained results with added value. Development activities should be accompanied by feedback regularly given to the employee. Feedback is effective when it is generated on the basis of:

- observing the employee performing the tasks;
- noting down irregularities and cases of going beyond the limits of empowerment;
- communication containing observations rather than judgments;
- explaining or reminding the employee of the mission and values of the organization as tools for shaping the expected behaviors and attitudes.

The above-mentioned components of feedback increase the employee's awareness of the place in which they are and the place in which they should be.

The limits of empowerment can be defined as a list of goals to be accomplished by the employee but without the rules and principles of operating established by the manager. However, the manager is responsible for providing the employee with resources necessary to accomplish the tasks. The employee's self-discipline understood as consistency, self-control and the art of performing the commissioned tasks might be helpful when defining limits. Assuming that the employee selected for empowerment is intended to be placed on some selected level of management in the future, it is necessary to build trust with them. Other employees should see this worker as a competent person, able to coordinate activities, creating friendly working environment.

4. Research approach and methods

The overt participative observation was made in line with the observation plan determined by the researcher, which formed the basis for its preparation and execution. The survey included the top-level manager and eight subordinates, employed in the sales department. The manager was acquainted with the

proposed sequence of actions to be taken when implementing empowerment (which also constituted specific tasks of the observation), however, the manager was not told what would be observed, so that he could not adjust to or try to meet the researcher's expectations. The observation plan ensured that the observation of the execution of the empowerment implementation, as well as the activities (behaviors, phenomena) taken by the manager and the employee in their natural working environment, was in line with the concept of the survey. It is presented in Table 3.13 below.

Table 3.13. The plan of the overt participative observation

Guidelines	Description
The object of the observation	The course of empowerment implementation in line with the proposed sequence of activities
General goals of the observation	Empowerment implementation
Specific tasks of the observation	Management style represented by the manager Practicing delegation by the manager Confirmation of the manager's personal readiness to empowerment implementation Selecting and choosing an employee for empowerment Confirmation of the employee's personal readiness to empowerment The analysis of possible empowerment levels in the organization Theoretical and practical induction of the employee to performing tasks within the selected empowerment level Monitoring tasks performed by the employee in the selected empowerment level along with real-time feedback from the manager Empowering the employee on the appropriate level of empowerment by determining limits of empowerment Building the culture of trust in the empowered employee
Time of the observation	15 working days (3 weeks), during working time
Method of the observation	Personal, direct, by the researcher
Technical means of the observation	A set of office applications
Technical conditions of the observation	Natural environment, everyday behavior of the manager and the selected employee
Method of recording and collecting the results	The overt participative observation sheet (in the set of office applications)

In spite of the mutual ties and interdependencies between the analyzed enterprise and the researcher, the author aimed at maintaining the highest possible degree of objectivity by faithfully recording the observation results. The observations were qualified into two categories: "present" (the researcher observed the occurrence of the behavior/phenomenon) or "absent" (the researcher

observed the absence of the behavior/phenomenon). The results of the observation were included in the observation sheet constructed for the purpose of the conducted survey. It is presented in Table 3.14.

Table 3.14. The overt participative observation sheet

Object of the observation	Activity	Detailed tasks of the observation	Findings of the observation (Category: Present)	Findings of the observation (Category: Absent)
The course of the empowerment implementation according to the author's concept	1	Management style represented by the manager	Manager: • holds not dispersed power • has not dispersed decision authority • focuses on tasks • uses external motivation	Manager does not use: • commanding • omnipresent control
The observation takes place in a small production company, employing fewer than 50 staff and generating less than EUR 10 million net turnover from sales of goods, products and services Observation time is 15 working days (3 weeks) Observation in the organizational environment	2	Management style represented by the manager	Manager: • wishes to determine the scope of his responsibilities again • delegates 23 tasks from his responsibilities • is available and offers assistance (explanations) to employees • understands the need for staff development • uses trite, general and related to all employees in the department appreciation • demonstrates limited trust in the employees • takes care of the positive atmosphere at work	Manager: • does not use appreciation which is full, personalized and oriented at real achievements of a specific employee • does not show full trust in his employees
	3	Confirmation of the manager's personal readiness to empowerment implementation	Manager: • notices his excessive obligations • analyzes the potential of his workers with a view to empowering them • understands the need for changes • does not show or demonstrate fears of losing power • feels that he is irreplaceable in some scope of his duties	Manager: • does not notice a link between empowerment and the possibility of focusing on strategic aspects of the enterprise • does not consider the formal and legal aspects of empowerment

Object of the observation	Activity	Detailed tasks of the observation	Findings of the observation (Category: Present)	Findings of the observation (Category: Absent)
	4	Selection and choice of the employee for empowerment	Manager: • at the recruitment stage adjusts the employee to him, the post, the group and the corporate culture • in the course of employment improves adjustment in training, development and amount of remuneration • makes a pre-selection of the employee, taking into account their skills, qualifications, predispositions to work independently, their involvement in performed duties so far	Manager: • in the course of employment does not improve adjustment in employee assessment
	5	Confirmation of the employee's personal readiness to empowerment	Employee: • understands what empowerment means and wishes to accept it • appreciates that he was trusted • retains the right to withdraw at any time • expresses his fear of the reaction of other workers in the department • analyzes the maturity of the corporate culture for empowerment	Employee: • does not mention the integration of personal goals and the organization's goals • does not ask about limits of empowerment • does not mention building the culture of cooperation • does not ask about the change (increase) in his remuneration
	6	Analysis of possible levels of empowerment in the organization	Manager: • allows low and moderate level of empowerment (simple tasks): planning, organizing, coordinating, performing in the hands of the employee, controlled by the manager (until the employee gains enough practice)	Manager: • does not decide to apply high level of empowerment (complicated tasks): planning, coordinating, performing and controlling in the hands of the employee • does not demonstrate unlimited trust in the employee
	7	Theoretical and practical induction of the employee into the execution of tasks in the selected level of empowerment	Manager: • allocates tasks within the low and moderate empowerment • shares knowledge with the empowered employee • is accessible for the employee • understands that the employee should be supported in his development	Manager: • does not transfer knowledge to other employees in the department • does not make any connections between knowledge transfer and organizational learning

Object of the observation	Activity	Detailed tasks of the observation	Findings of the observation (Category: Present)	Findings of the observation (Category: Absent)
	8	Monitoring tasks performed by the employee within the selected level of empowerment, along with real-time feedback from the manager	Manager: • conducts current control of the implementation • checks and assesses progress	Manager: • does not provide effective feedback
	9	Empowering the employee on the appropriate level of empowerment by determining empowerment limits	Manager: • sets goals to be accomplished within tasks of low and moderate level of difficulty • does not determine (indicate) ways of accomplishing goals • provides necessary resources • expects to be reported on progress in attaining goals and final results	Manager: • does not set complicated goals, connected with the high level of empowerment of great significance to the organization
	10	Building the culture of trust in the empowered employee	Manager: • praises the employee in public • shows him as an example to be followed by others	Manager: • does not demonstrate higher expectations towards the employee

5. Discussion and results

The implementation of empowerment in line with the author's own proposal of the sequence of activities and its verification in the practice of managing a small enterprise offered the background to discuss and attempt to solve the research problem and the resulting goals.

The major research problem was to identify the implementation of empowerment in the analyzed enterprise based on the proposed set of activities to be performed. The manager implemented empowerment in 15 working days of the observation (3 weeks). At particular stages we additionally observed:

- 1st activity – relinquishing an autocratic management style was omitted since the manager defined his style as moderately democratic;
- 2nd activity – the manager had started practicing delegating prior to the observation, as during his whole time of employment in the company (since 2006) he had allocated various tasks and controlled their execution and obtained results;
- 3rd activity – the manager's personal readiness to implement empowerment stemmed from his excessive professional burden.

In the prepared scope of his responsibilities he listed 18 complex, multi-layer tasks;

- 4th activity – conducting the procedure of recruiting for the sales department, he sought a specialist for supporting sales and delivering orders, emphasizing the desired independence, initiative to take action, efficient organization of one's work, conscientiousness, and precision. The selection and choice of the employee to be empowered were based mainly on careful observation of the specific worker who clearly stood out amongst other workers in the sales department due to his involvement. He proposed some ideas for improvements, participated in decision-making, skillfully communicated with team members. In order to appreciate his wish to develop, his individual efforts to expand his knowledge, his activity in the enterprise and his particularly strong employee participation, the manager decided to entrust him with the execution of selected tasks within the empowerment process. Due to the flat organizational structure with only one level of management (one manager), the decision to empower offered an opportunity to keep a valuable employee in the company;
- 5th activity – the employee accepted the proposal of empowerment, understanding it as a significant expansion of his current autonomy and self-control;
- 6th activity – the manager analyzed the possible levels of empowerment. He qualified his tasks in three groups: (1) key tasks (impossible for delegation and empowerment due to their strategic importance for the enterprise development), (2) delegated tasks, (3) and tasks for empowerment. They are presented in Table 3.15. The third activity showed that the manager did not notice the connection between empowerment and the possibility of focusing on the strategic aspects of the enterprise operations. In the sixth – he was able to distinguish these tasks from others. This allowed him to determine and choose the low and moderate level of empowerment. The manager (during the observation) did not decide to implement the high empowerment – identifying it at that time only with tasks of key significance. In the low empowerment the manager allocated: (1) the coordination of the service work and (2) dealing with matters related to certification. In the moderate empowerment: (1) preparing offers with calculations for regular and new customers from Poland and abroad and (2) choosing specialist equipment for Polish and foreign clients;
- 7th activity – during the theoretical and practical induction of the employee to the tasks performed in empowerment, the manager demonstrated strong motivation to provide the employee with substance-related support. In order to do so, he collected and organized the information and knowledge in the company knowledge base – the so-called start kit, which will also be used for training new employees;

- 8th and 9th activity – both tasks from the low and moderate level of empowerment required initially the manager's controlling and monitoring of the correctness and the quality level of the tasks performed by the employee. Gaining assurance that the employee dealt properly with clients and was able to satisfy their needs allowed to empower the employee on both levels. The limits of empowerment somehow resulted from the tasks the employee was entrusted with;
- 10th activity – building mutual trust was the key aspect of successful empowerment. The second activity showed that the manager did not appreciate workers, however, in the tenth – he saw the necessity of using praises and appreciating results and progress in the employee's self-development. Other workers began to see the employee as a person who was able to solve problems. Thus the manager gained an informal but competent deputy.

If there had been no potential candidate among the employed persons, the assumptions of the recruitment process would have had to be redefined and special attention would have had to be paid to employing talented workers: obtaining good or very good results in their previous place of work, with practical and valuable opinions, ready to take the challenge, with high potential – ambitious, talented and involved.

6. Conclusions

The aim of the article was to present the implementation of empowerment in a small company, based on the author's proposal of a set of activities to be taken. Seeking answers to the questions stemming from the research goals, the author determined that empowerment should not be implemented as a sudden change, without any preparation. The requirement to abandon the autocratic management style, the need to possess certain skills by the manager and the wish to delegate tasks, the creation of the working atmosphere stimulating autonomy or the process of selecting a candidate for empowerment should be spread in time. The universal nature of the proposed sequence of activities allows them to be implemented in every enterprise which has at least two key components determining effective empowerment. These are a manager ready for empowerment and an employee with relevant predispositions.

Formulated research goals have been accomplished. The observation of the empowerment implementation provided some material demonstrating its course and it might constitute an inspiration for empowerment implementation for other small enterprises. IBy solving the posed research problem and accomplishing research and cognitive goals, the author confirmed the hypothesis that the sequential implementation of empowerment helps to gradually achieve benefits for the manager and the employee as well as for the organization.

Completing consecutive actions provided an opportunity to get used to the new experience for the manager and the employee alike. As a result of the conducted implementation, inter alia, the manager significantly decreased the scope of his duties, focused on the strategy of the enterprise development, became open to transferring his tangible knowledge into tacit one. The employee, on the other hand, achieved greater control over the working environment, increased his self-esteem and was encouraged to display greater creativity. On this basis the enterprise as a system (in which people, tasks, structure, and technology depend on each other and shape each other) also experienced a positive outcome of empowerment – it gained knowledge of general organizational practices that could be applied in order to improve its effectiveness.

In the analyzed case – both for the manager, the employee and for the organization – the effectiveness of empowerment has thus been confirmed.

The observation findings, however, demonstrated that there are still some areas to be improved, such as the recruitment process – so as to achieve a satisfactory employee adjustment; more emphasis should be placed on organizational learning and knowledge transfer among all staff of the sales department and on mastering the techniques of effective feedback. Taking all these recommendations into consideration will probably lead to more effective empowerment in the analyzed enterprise.

The presented results are somewhat limited by the fact that the close observation covered just two people: the top-level manager and one employee in one analyzed object. In spite of this, the observation allowed the author to conclude that company development is a result of the hard work of all employed people – both those who are empowered and those performing tasks supervised and controlled by the manager.

The results of the research should be treated mainly as the basis for designing further proper research aimed at verifying the proposed sequence of actions in a greater number of cases. Broader empirical research on the managerial practice in other companies would also encourage the identification of appropriate circumstances for the implementation of high empowerment – connected with the key competences of the manager.

Table 3.15. The scope of the manager's responsibilities in the analyzed enterprise

No.	Scope of responsibilities before the observation	Tasks considered to be of key importance	Tasks delegated after starting the observation	Tasks covered with empowerment
1	Ordering raw materials for production		•	
2	Preparing tender bids		•	
3	Preparing offers and calculations for regular and new clients from Poland and abroad			•
4	Preparing documents for customs clearance		•	
5	Choosing specialist equipment for regular and new clients from Poland and abroad			•
6	Dealing with e-mail and phone inquiries, both specialist and general ones		•	
7	Preparing acceptance (hand-over protocols)		•	
8	Dealing with certification matters			•
9	Coordinating servicing work			•
10	Analyzing geology for rental and assembly	•		
11	Settlement of foreign rental		•	
12	Analyzing and acquiring new foreign products and brands for sales	•		
13	Analyzing the results obtained from the market research	•		
14	Invoicing rental and services		•	
15	Running the website, advertising in the press and internet services, preparing projects of advertising printed materials, diaries, calendars, leaflets		•	
16	Conducting recruitment processes	•		
17	Training for new employees	•		
18	Possessing expert knowledge, offering assistance and advice to employees	•		

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Biographical note

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Relevance of employee selection in the enterprise in view of the concept of sustainable social and economic development

Anna Kurzak-Mabrouk[1]

Abstract

The main aim of the article is to show whether large food industry enterprises undertake activities in their recruitment process aimed at attracting employees with orientation, beliefs and experience that are in line with the concept of sustainable social and economic development. Manufacturing companies in the food industry that wish to become committed to sustainability are required to pursue the priorities of a sustainable human resources policy in their business activities in order to manage their workforce in accordance with the principles underpinning sustainable management. The study on the profiles of employees and their knowledge of the idea of sustainable development was carried out in large food industry enterprises. The information was collected during a personal interview with the use of a questionnaire for the interview. The results of the survey will precede the presentation of model activities which should be carried out by large food industry enterprises in relation to the employees and their management in accordance with sustainable development principles. The results obtained in the research process show that a shortage of sustainability-oriented staff means that it is not possible to manage employees following the principles of the concept of sustainable development. This is due to the fact that these employees who are not familiar with the principles of the concept of sustainable development are not able to fully engage in the activities which are in line with pro-ecological and pro-social aspects of business activity. Therefore, they are not aware of the use and implementation of sustainable management and do not contribute to making their company sustainable.

Keywords: *sustainable development, sustainability-oriented management, sustainability-oriented company, sustainability-oriented personnel.*

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1. Introduction

Sustainable management is a young area of knowledge that is only just beginning to emerge and is therefore not yet fully formed. Implementation of its principles in the business activity of enterprises is at the stage of innovation, so conducting research in this area seems to be of high importance, enriching both the theory and practice of sustainable management. Its functions have to include both top and senior management, thus leading to a turning point in companies, which will need to include pro-ecological and pro-social projects.

The answer to numerous global threats is the emergence of the concept of sustainable development. In economics, the concept of development has evolved from economic growth through social and economic development to finally take the shape of sustainable development (Poskrobko, 2012). The spread of sustainable development in the 1970s was influenced by the intensification of numerous phenomena which are shown in Figure 3.11.

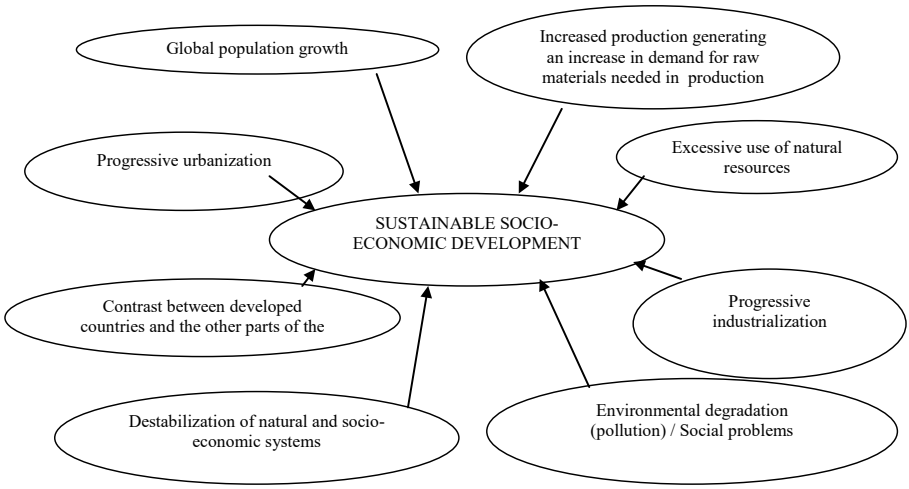

Figure 3.11. Phenomena determining the emergence of sustainable development

Source: author's analysis based on Mikłaszewski (2010); Płachciak (2011); Rucińska (2014).

These problems contributed to the reconstruction of the system of values valid at the time, which resulted in the need to strive for sustainable development. The new development paradigm has been defined in a number of ways, but for the purpose of this paper, the author will quote the most widely recognized taken from "Our Common Future" report prepared by the World Commission on Environment and Development (WCED). It is, therefore, a development that meets the needs of the present without compromising the

ability of future generations to meet their own needs. This definition shows that the needs of today's society are as crucial as those of future societies, and that satisfying these needs should be integrated with taking into account the constraints of technological development, social governance, as well as the capacity of the environment to absorb the negative effects of human activities (WCED, 1987). This concept is intended to transform the current consumption-oriented societies which are wasting the many natural resources available to them and that do not care about health in societies that will take better care of these values.

Sustainable development is characterized by three aspects, i.e. environmental, social, and economic ones. The dependencies between these dimensions are complex. Sustainable development must also be implemented from the perspective of the scope of its spatial impact, where there are five stages of its implementation: 1 – unit level covering an economic unit, 2 - local level covering a unit of territorial division, 3 – regional level covering a region, 4 – national level covering the country, and 5 – global level covering the whole world.

The current globally binding document containing 17 sustainable development objectives is the 2030 Agenda for Sustainable Development (2015 Agenda for Sustainable Development). Under this document, activities at lower levels of sustainable development implementation should be taken into account. At the national level, the principle of sustainable development is indicated as the one of special importance, which is provided for in Article 5 of the Constitution (Constitution, 1997). Many authors have identified the regional level as a relatively homogeneous area, which is distinguished from others by its natural features. Other authors have emphasized the role of the local level here (Elkin, McLaren, & Hillman, 1991; Pęski, 1999; Martos, Pacheco-Torres, Ordóńez, & Jadraque-Gago, 2016; Andrzejewska, Łuczak, & Szumilas, 2010; Staniak 2009; Stanny & Czarnecki, 2011). The last level showing the implementation of sustainable development proves to be the unit level, which consists of enterprises as well as households. The literature shows that sustainable development is also considered in terms of the variety of economic sectors, including the power-generating industry (Chu, & Majumdar, 2012; Edomah, 2016; Lund, 2007; Micuła, & Micuła, 2013), tourism (Iliopoulou-Georgudaki, Kalogeras, Konstantinopoulos, & Theodoropoulos, 2016; Maxim, 2016; Panfiluk, 2011), industry (Azapagic, 2004; Góral, 2013; Kurzak-Mabrouk, 2017; Lawless, Medvedev, 2015), transport (Chmieliński, 2015; Greene, & Wegener, 1997; Petranović, Vujanović, & Duić 2015; Richardson, 2005), agriculture (Czyżewski, 2012; Tilman, Balzer, Hill, & Befort 2011; Veisi, Liaghati, & Alipour 2016) and

education (Beynaghi, Moztarzadeh, Mozafari, Maknoon, & Leal Filho 2016; Kurzak, 2014; Velazquez, Munguia, Platt, & Taddei 2006; Wawak, 2015).

This shows that sustainable development has penetrated numerous sectors of the economy at many different levels. It is of the utmost importance that the guidelines at a higher level (e.g., national) be respected at a lower level (e.g., in a company carrying out business activity in accordance with the principles of sustainable development). It needs to be stressed that sustainable development should be implemented upwards from the bottom. Actions should be implemented at the lowest level in order to achieve the objectives at the highest level, where those objectives need to be consistent.

It should be remembered that every company carries out its activities with a view to profit in the first place. It is necessary to develop the concept of sustainable socio-economic development in enterprises, after carrying out a study of their immediate as well as the more distant environment. Large food companies make use of available market opportunities to the best of their ability and to the extent which the market allows them to do so. However, it is possible to stimulate certain activities of companies through legal provisions, probable sanctions, and potential benefits. At present, the environment has an impact on business activity, which forces companies to follow certain practices. Before defining and formulating appropriate objectives for the recruitment process, the company must set its priorities at the level of strategic business objectives. It is imperative at this stage that the company should set itself a vision in which it wishes to be a pioneer in the implementation of the principles stemming from the concept of sustainable social and economic development into its business activity. Society is becoming increasingly aware of the dangers of excessive consumption, the devastation of nature and the operations of businesses that are inconsistent with the concept of sustainable development. These changes mean that many of those businesses decide to meet the expectations of their environment by implementing these principles into their activities. In this case, the environment strongly influences enterprises, so that they, wishing to be competitive, implement pro-social and pro-ecological measures in their business operations. These include areas of cooperation with sustainable suppliers, achieving clean production, producing environmentally and socially friendly goods, as well as pricing, distribution, and promotion aimed at sustainable development, as well as dealing with post-production waste in accordance with the principles of sustainable development. The activities of companies in the field of the concept of sustainable development can be divided into those that are related to technologies and to people, however, those people still need to have knowledge of innovative environmentally friendly technologies. Therefore, for the efficient implementation of sustainable social

and economic development in enterprises, the key role is played by their employees, who should be oriented at sustainable development.

For the purposes of the paper, an analysis of sustainable management in large companies in the food industry with a special emphasis on the employed personnel was carried out and its findings were presented. Human resources should be managed in a way that will enable the implementation of the goals of sustainable development. Table 3.16 shows that an enterprise carrying out business activities in a traditional way functions differently than those implementing the principles of sustainable development.

Table 3.16. Differences between companies in terms of sustainability

Confronted area	Company implementing SD principles	Company not implementing SD principles in its activity
Vision	Long-term, focusing on the needs of future generations	Plan- and goal-oriented approach only
Purpose of the activity	Generating profit, growth and sustainable development, respect for stakeholders and the environment	Maximising profit, competitive struggle
Implemented values	Non-material, pro-ecological, pro-social	Material, rational
Environmental issues	Saving non-renewable resources; running a business in harmony with nature	Unrestricted use of all raw materials
Meeting priority needs	Satisfying the needs of all stakeholders through the integration of operations	Entrepreneurs themselves are the priority as such

Sources: author's own analysis based on Raftowicz-Filipkiewicz (2013).

The key difference between these companies is the objective which in a sustainable development-oriented enterprise focuses on intangible values, protecting the environment and creating the best possible conditions for people to work and live in, sometimes even at the cost of financial losses (material values) (Zimniewicz, 1999). Implementation of the principles of sustainable development in the operations of enterprises is intended to help them build a competitive advantage by undertaking a wide range of activities, including respect for natural resources, limiting the negative impact of their operations on the environment (through implementation of modern technologies and/or reduction of harmful emissions), supporting local communities in their operations, manufacturing pro-ecological and pro-social goods, investing in projects aimed at the conservation of the Earth and compliance with ethical standards in contacts with their stakeholders (Szadziewska, 2010). Despite

many theoretical assumptions, the author of this paper assumes that most companies take only incidental actions in the field of sustainable development carrying them out on a random basis, which is supported by the findings of the research. They are random activities because they lack a comprehensive approach. In order to achieve sustainable business goals which a company sets itself, it is necessary for that company to introduce sustainable human resources management, because only the personnel, both at the highest as well as at the lowest level, are able to properly implement the principles of sustainable economic and social development in the business operations of the company.

2. Literature background

At present, the climate is undergoing a number of significant changes as the oceans are becoming acidified and the disappearance of biomes can be measured by the lifespan of one human generation. The direction of these changes shows that the Earth may become even less hospitable for future generations (Richardson, Steffen, & Liverman, 2011), as man-made degradation undeniably poses a threat to the planet's endurance (Rockström et al., 2009). Unsustainable patterns of production and consumption are determined by the underlying values held by communities, social norms and everyday choices (Steinberg, 2015). The Earth as a system consists of forests, savannahs, deserts and man-made environments, including cities and farmlands which, in terms of measurements, do not require as many logistic challenges as freshwater or marine systems.

The LPI (Living Planet Index) data set of this system is the most comprehensive one and is based on 4,658 monitored populations, including 1,678 terrestrial species and 45% of the total LPI species database. Over the last few centuries, the Earth's system has been reshaped as a result of human predatory activity (Ellis, & Et al., 2010), which has had a major impact on biodiversity (Newbold et al., 2016). The terrestrial LPI confirms this by showing that the population has declined by 38% since 1970, with an average annual decline of 1.1%. However, since 1970, despite widespread human modification, the terrestrial system has recorded a smaller decline in population than the marine and freshwater systems. Moreover, the designated protected areas cover 15.4% of the land area (including inland waters) (Juffe-Bignoli et al., 2014).

Since it is companies that consume most of the global non-renewable resources and thus become the most responsible for environmental degradation, it is essential that an intensification of sustainable development measures be undertaken in this respect. A sustainable company produces safe, sustainable goods, but at the same time also introduces into its system only basic goods/ materials characterized by sustainability. In its business activity, a sustainability-

oriented company aims at satisfying the current market needs of entities and their stakeholders while protecting, maintaining and strengthening individuals/ basic units and sources of natural resources that are expected to serve future generations. A sustainable company respects the principles of the concept of sustainable development, and therefore, apart from economic objectives, also pursues ecological and social objectives (Grudzewski, Hejduk, Sankowska, & Wańtuchowicz, 2010). Sustainable production activity is all about creating safe, economical and long-lasting products that are produced in a clean production process. A safe product cannot be harmful to the life or health of the consumer. An economical product, depending on its intended use, should use little electricity, water, gas, etc., and be durable so that it can be used for a long time. For the development of such products, an analysis of their entire life cycle should be carried out, both in terms of production, introduction onto the market, use of these products, as well as social and environmental aspects of their disposal. Disposal of goods is one of the greatest environmental dangers, as in the USA alone over 90% of purchased goods are disposed of after less than 2 months of their use (Belz, & Peattie, 2010). The way to change the world is to solve the biggest global problems of modern times, which are the problem of environmental protection and problems affecting society (Kotler, Kartajaya, & Setiawan, 2010). Thus, to a very large extent, it is companies that should be committed to sustainable development in particular.

So far, there are not many publications on sustainable human resources management. This topic is addressed by Cohen (2011), Haugen (2014), Muller-Christ (2011), Bossink (2012), Epstein and Buhovac (2014), Jones (2010), Ehnert (2009), and Pabian (2016). Cohen considers sustainability-oriented management in terms of sustainable production and business services, power, water, food supply and sustainable cities, and the whole planet. Such management, through the functions which it engages in, includes planning, organization, leadership, and control, thus contributing to the smooth running of a sustainable enterprise – a unit focused on balancing intergenerational needs. The sustainability-oriented executives and managers responsible for the implementation of such processes and functions have the necessary expertise in the area of sustainable development and run companies whose paramount objective is to achieve not only economic but also environmental and social goals. And in order to skilfully deal with environmental and social problems, a proactive approach should be pursued in all management functional areas. Therefore, it is essential to commit human resources and financial resources to pursue the goals set out in sustainable development policies as shown in Table 3.17.

Table 3.17. Forms of activity in management functions

Planning	Organizing	Motivating	Controlling
Planning should take into account the concept of pro-ecological and pro-social activity at the stage of formulating the company's mission, which is the basis for setting goals Sustainable development principles should be implemented in strategic, tactical and operational plans The concept should permeate the broad directional planning for the whole company and the narrower, functional, one as well. In this concept, long-term plans should extend as far as 50 years into the future. Sustainability takes precedence over the interests of businesses in terms of objectives. It is necessary to respond swiftly to market requirements; however, the principles of the concept of sustainable development should always be taken into account as well.	It is an advantage for an enterprise to have managers who care about sustainable development and who will skillfully handle all levels of management in this respect. Sustainability-centered management focuses on responsible production which is the cornerstone of the development of their businesses Sustainability oriented managers take care of the manufactured product range and are also involved in social activity. Managers only employ environmentally and socially sensitive employees, and choose the most environmentally and people-friendly technological equipment and materials	In terms of sustainability, it is necessary to influence employees so that they do their jobs in accordance with the set objectives, taking into account the discussed concept A key role is played by the attitude of the management, their beliefs, concerns and their way of motivating employees in the spirit of sustainable development This role will be best performed by those who, in addition to having leadership qualities, are aware of environmental and social risks. It is necessary to initiate educational programmes to prepare staff for the transformation of conventional enterprises into sustainable entrepreneurs and then manage them skillfully. In terms of sustainability, motivation applies to the following areas and relationships: - employee – enterprise - employee – direct superior - employee – work environment	In terms of sustainability, controlling means monitoring and correcting actions. Control shows the degree to which the economic, environmental and social objectives have been achieved in the company, in individual departments, units, and in individual work stations. Controlling procedures provide insight into the implementation of the actions within the scope of sustainable development, to what extent they have positively influenced the environment or have solved people-related problems, whether the results are adequate to the outlays incurred, whether the measures have affected the degree of sustainability of the enterprise or its profitability, competitiveness or market image, or whether it will be possible to use the so-far unused company's inherent potential in the future It is necessary to control the impact of the activity on the financial results of the company, as the activity involves financial outlays, but also contributes to revenues, savings and elimination of fines and sanctions.

Source: author's own compilation based on Pabian (2013).

Management through the functions which it performs determines how the company's structures are organized, thus setting goals for actions and implying sustainability, which consequently makes it sustainability-oriented management and ensures that its staff is also focused on sustainability-centered issues. Ecological and social sensitivity of employees, supported by their proactivity, is the key to effective actions undertaken by enterprises in the field of sustainable development. Qualified, sustainability-oriented employees understand the practices underpinning their work, which is reflected in the company's strategies and development, and their activities contribute to the achievement of economic objectives and the long-term balancing of intergenerational needs. In addition, there is every likelihood that it will deal with the increasingly present environmental and social problems of the future.

In the company, people are involved in the production of goods, and the human resources which they themselves create include all members of the organization ranked from senior managers and executives to blue-collar workers. Precise management of human resources (Lussier, 2008), consisting in attracting, retraining and retaining employees, is aimed at creating the most suitable and reliable personnel, i.e. filling all positions in the company with responsible and competent people. Sustainability-focused personnel should be present in all areas of the company's activity and at all levels of management. The move towards sustainable production operations and decisions faces numerous obstacles in the environment. One of them is the inability of man to assess the extent of environmental and social risks. Another obstacle is the widespread stereotype of permanent economic and production development which indicates that high sales are a sign of success for the state and that a lack of sales is a sign of failure. It is therefore important to emphasize the importance of environmental and social awareness, which is important for the transformation of non-sustainable production enterprises into those that are focused so.

The most important resource of each enterprise is human resources (Certo, & Certo, 2009). In these companies, sustainability-focused staff is involved in every area of business activity. Presidents and CEOs, by being committed to sustainable development, contribute to the success of their companies and turn into effective leaders. Table 3.18 shows the activity of sustainable development focused personnel, oriented towards achieving the triad of sustainable development objectives, in all areas of their activity.

Table 3.18. Area of activity of sustainable personnel

Meeting the company's objectives	Work performance	Behavior
All managerial levels define strategic, tactical and operational objectives and plans, and then supervise their implementation (they are environmentally and socially sensitive), monitor the clean production process, select technologies that have the least negative impact on the environment and society by eliminating harmful components, protecting non-renewable raw materials and cooperating only with environmentally sensitive suppliers	Employees working in positions other than managerial positions perform tasks at the operational level, processing raw materials in a cost-effective way, operating machines in a socially and ecologically responsible manner, comply with deadlines, instructions and work health and safety rules. They are creative when modernizing their workplace to be people and environment-friendly, and report to their superiors suggestions for technical, technological and organizational improvements that are in line with the concepts underpinning sustainable development.	The behavior of sustainability-centered employees goes beyond business and work relationships and processes when communicating with superiors, subordinates and co-workers, outside formal procedures, when expressing their opinions on various issues that may improve people' health or protect the environment.

Source: author's own analysis based on Pabian (2011).

Sustainability oriented personnel employed in the company must be fully pro-ecological and pro-social. They are trained and their skills and knowledge become enhanced. However, during the recruitment process itself, emphasis should be placed on the recruitment of personnel who, being sustainability-oriented, demonstrate pro-ecological and pro-social attitudes.

3. The research methods used

The research problem is aimed at presenting the problems concerning the recruitment and employment of personnel in large food industry enterprises. The question addressed is whether the people to be employed are sustainability-oriented, as only this particular attitude is most likely to facilitate implementation of sustainability-oriented personnel management. The aim of the research is an attempt to answer the question whether companies undertake activities in the recruitment process aimed at attracting personnel with orientation or beliefs that reflect the concept of sustainable social and

economic development. The aim of this research determines the decision to proceed with this scientific research.

The conducted scientific research made it possible to identify the answers to the following research questions: Is the employment of personnel in large enterprises (Act, 2004) of the food industry carried out in accordance with the principles of the concept of sustainable development? Are the staff employed in large food companies sustainability-oriented? Can workers employed in large food industry enterprises be managed sustainably in order to contribute to the transformation of companies into enterprises operating on the basis of sustainable development? In order to conduct the research properly, it was necessary to identify and follow the key activities consisting of four stages (Stachak, 2013):

- a substantive study was prepared;
- factual knowledge was gathered;
- the generalizations made were formulated;
- the scientific text was edited.

In order to gather the relevant information, it was necessary to choose one of the following available methods comprising a questionnaire, an individual in-depth interview, a focus group interview, an observation, a survey-based interview, a questionnaire-based interview, and an experiment. In order to collect information, a personal interview was used for the purpose of this research, which was conducted in accordance with a questionnaire prepared in advance. In this method the form whose purpose is to organize and order the information in the prepared questions is used. The interviewer directly contacts particular respondents to obtain appropriate answers to the questions given in the form (Stachak, 2013). The answers given in the interview provided the required data. The questions asked related to important facts about the activities of the companies taking part in the research. The obtained answers were noted in full on the form. Another way to indicate the questions relevant to respondents is to use instructions to indicate the set of questions which they should address (Frankfort-Nachmias, & Nachmias, 2001).

The questionnaire was divided into two main parts. The first part covered the analysis and characteristics of the given enterprise, while the second part was to show what actions were carried out in the enterprise relating to the recruitment process and characteristics of candidates for employee positions, in accordance with the principles of sustainable development, and whether the enterprise had implemented sustainable development management. Once a well-defined set of questions had been compiled, it was necessary to select appropriate companies for analysis. The statistical calculations helped to select a representative selection of companies to be surveyed, thus fully reflecting the credibility of the questionnaire.

A representative sample of large enterprises from the food industry was selected for the questionnaire. According to the data obtained from the Polish Central Statistical Office (GUS)[2], as of 31 May 2018, 244 large food industry enterprises were operating in Poland. Out of these, 16 were selected by way of nonprobability sampling (not in a random sampling), which means that the selection was made on an individual basis tailored to the research. In order to make the research sample representative, the following statistical calculation was used for the finite population (when the size of the analyzed population is known)

$$n=0.25/((d^2/ualfa^2)+(0.25/N)) \quad (1)$$

where:
n - the minimum sample size,
d - maximum error of estimation,
ualfa - the value read from the tables of the standardized probability distribution,
N - population size,
d should not exceed 20% and ualfa - 10%.

Table 3.19. Selection of a representative sample for the research from among 244 companies

Case	Population	Maximum error of estimation (d)	Alfa	Ualfa	Minimum sample size (n)	Minimum sample size when rounded)
1	244	0.001	0.1	1.644853627	243.912011	244
2	244	0.01	0.1	1.644853627	235.5043948	236
3	244	0.05	0.1	1.644853627	128.2959922	129
4	244	0.02	0.1	1.644853627	213.2314794	214
5	244	0.1	0.1	1.644853627	52.95818872	53
6	244	0.2	0.05	1.959963985	21.85830375	22
7	244	0.2	0.1	1.644853627	15.8137264	16
8	244	0.1	0.05	1.959963985	68.91289858	69

In order to carry out the analysis correctly, primary data were used. Knowing the representative research sample, the companies were selected at random, in which the study was conducted. This is information obtained by the researcher specifically for this purpose (Churchill, 2002). Communication with the respondents took the form of a personal interview, during which the answers to the questionnaire for the personal interview were filled in. The survey was conducted in 16 large food industry enterprises operating in the Polish market.

2 Based on the information from the GUS office these are the data for the enterprises employing over 250 people.

Figure 3.12 shows the geographical distribution of the surveyed companies.

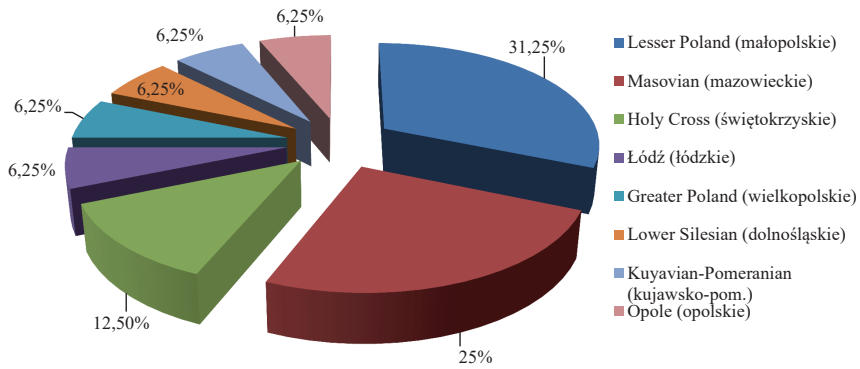

Figure 3.12. Geographical distribution of the companies included in the research in relation to the highest-level administrative subdivision of Poland into voivodships

Source: author's compilation based on the author's research.

The information material collected for the purpose of the research was obtained from the persons responsible for the promotion of the companies' offers. They were presidents and, in other cases, directors of relevant departments. The examination of the collected information was followed by an assessment of the degree to which the employment process is carried out in accordance with the principles of the concept of sustainability-oriented management. The research was conducted in the period from 1st October to 30th December 2018 by using personal interview based on a questionnaire.

In Poland, the number of business entities operating within the food sector including the production of beverages and tobacco products totals 16,873, which constitutes over 11% of the entire manufacturing industry, while in 2014 it constituted 8%, which places the food sector in 5th place in the market. Sold production of the entire manufacturing industry amounts to PLN 1,220,552.6 million, including that of the food industry (together with beverages and tobacco products) at PLN 243,089.2 million, which amounts to 20%[3] of the total. This indicates that the sold production of food products constitutes a significant part of the sold production of the Polish manufacturing

3 http://stat.gov.pl/.

industry. In recent years, the volume of sold production of the food industry has been increasing, confirming the rationale and purpose behind this research. In Poland, there are 206,926 enterprises registered in the manufacturing sector of business activities, whereas in 2014 there were 187,520 of them. According to the GUS data, the number of persons employed in 2017 increased in comparison to the respective number in 2014. The increase in employment is also reflected in the export of industrial and food products. The data prove that exports in millions of PLN in 2017 increased in comparison with that in 2014. The data are given in Table 3.20.

Table 3.20. Overview of the key features of the food industry

Business entities	2014				2017			
	Manufacturing industry	Manufacture of foods	Manufacture of beverages	Manufacture of tobacco products	Manufacturing industry	Manufacture of foods	Manufacture of beverages	Manufacture of tobacco products
Number of business entities	187520	14142	483	33	206926	16239	592	42
Sold production of manufacturing industry (current prices - mln PLN)	995888.2	187777.8	19860.5	4331.9	1220552.6	217749.7	19009.7	6329.8
Number of employed persons (in thous.)	2517.8	415.1	24.6	5.9	2673.7	413.4	23	6.1
Export of manufactured goods according to PKD (Polish Classification of Business Activities) (current prices - mln PLN)	437246.7	42430.8	1667.4	1389.3	529603.4	56298.1	2130	2361.6

Source: author's compilation based on http://stat.gov.pl.

The production of food products poses a very serious threat to the natural environment in which all consumers live, hence the reason for choosing large enterprises carrying out their business activity in the food industry.

Summing up this short overview of the data on the food industry in Poland, it should be stated that this is an interesting research area, both economically and geographically. Since it is a rather extensive area, it is necessary to carry out research on the personnel employed in enterprises in order to ensure that enterprises make attempts at negative impact both on people and environment.

4. Discussion and results

The conducted research resulted in acquiring information on the characteristics of the analyzed companies and the rules of their operations in relation to the recruitment of employees. The first general characteristic of large food industry enterprises that participated in the research is the length of time over which they have conducted their business activity (Figure 3.13).

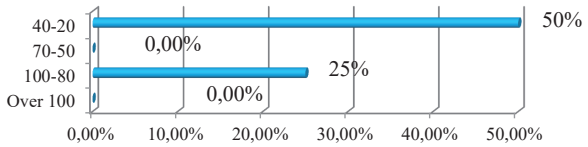

Figure 3.13. The time period of conducting business activity in the enterprises included in the questionnaire

Source: author's analysis based on own research.

Another general characteristic, according to which enterprises were classified is the number of employees (Figure 3.14). They were large food industry enterprises employing more than 250 people.

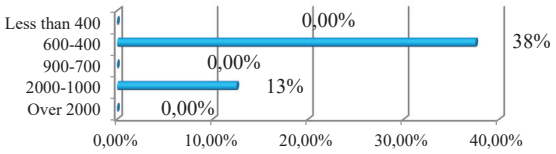

Figure 3.14. Division of the examined enterprises in terms of the number of employees

Source: author's analysis based on own research.

Another general characteristic of the research sample is the geographical area where the analyzed enterprises conduct their business activities. Among them, 93.75% of those enterprises operate in an international market, whereas only 6.25% in a local market. The last characteristic of the research sample is the type of customers at whom the company targets its offer (Figure 3.15).

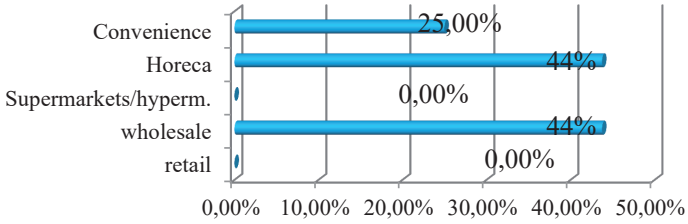

Figure 3.15. Division of the sampled companies according to the customers of the manufactured

Source: author's analysis based on own research

The analysis of the findings of the conducted questionnaire shows that it needs to be noted that not all large food production companies are engaged in the manufacture of food products that contribute to sustainable development, which is shown in Table 3.21.

In 4 enterprises an ecological range of products is produced at the level of about 5% of the total production, and in one enterprise it constitutes 10% of all products offered. These products are ecologically certified. They are free of preservatives, artificial colorings, flavorings and are completely safe for human health. Some of the products are fat-free for diabetics and those into fitness, while others reduce blood pressure and have a positive effect on the heart, circulatory system, eyesight or bones. The remaining 68.75% of the companies do not have an eco-friendly range of products in their offer; however, they still contribute significantly to sustainable development. The goods produced by them come mainly from local suppliers/are mainly based on produce from local suppliers, which is beneficial for the development of the domestic economy. Out of these companies, three are just about to introduce a health-oriented range of products in their product offer. 10 companies offer most of the health-oriented range – more than 50% of the manufactured range. The above data show that on average, 1.94% of large food industry enterprises produce organic products and 45.68% generate pro-social products.

Table 3.21. Enterprises producing food products contributing to the achievement of pro-social and ecological aspects of the concept of sustainable development

It.	Ecological	Pro-social	Description
1	Does not manufacture	Ca. 80% of the manufactured range of foods has pro-health properties	The manufactured products do not contain preservatives, artificial colors or flavors. The company procures its raw materials from local suppliers
2	Does not manufacture	Ca. 50% of the manufactured range of foods has pro-health properties	The products manufactured do not contain preservatives. The company purchases 80% of its raw materials from Polish suppliers.
3	Does not manufacture	Does not manufacture	The company purchases 80% of its raw materials from Polish suppliers.
4	5%	Ca. 10% of the manufactured range of foods has pro-health properties	The company buys its raw materials from local suppliers.
5	5%	Ca. 90% of the manufactured range of foods has pro-health properties	The products manufactured do not contain palm oil, are not genetically modified, do not contain preservatives or artificial colors. The company obtains 35% of its raw materials from Polish suppliers (farmers)
6	Does not manufacture	Ca. 80% of the manufactured range of foods has pro-health properties	Approximately 80% of the manufactured range of foods has pro-health properties
7	Does not manufacture	Ca. 1% of the manufactured range of foods has pro-health properties	The company procures its raw materials from local suppliers. The company avoids adding artificial additives and preservatives to its products
8	Does not manufacture	Ca. 50% of the manufactured range of foods has pro-health properties	The company does not use preservatives, artificial flavors, colors, E47, and also eliminates palm oil, which is only found in the stuffing

It.	Ecological	Pro-social	Description
9	Does not manufacture	Ca. 80% of the manufactured range of foods has pro-health properties	The products do not contain preservatives, colorings or artificial sweeteners and are made only from high-quality fruit purchased from reliable suppliers. The sugar in the juice is of natural origin obtained from fruits. The company procures 20 % of its raw materials from local suppliers.
10	Does not manufacture	Does not manufacture	The company purchases 90 % of its raw materials from local suppliers. Health-promoting products are natural/organic.
11	Does not manufacture	Ca. 20% of the manufactured range of foods has pro-health properties	The company sources 100 % of its raw materials from local suppliers. The company purchases 70 % of its raw materials from local suppliers.
12	Does not manufacture	Does not manufacture	The products are produced without preservatives, artificial flavors, colorings and come from certified crops.
13	6%	Ca. 50% of the manufactured range of foods has pro-health properties	The company sourced 98 % of its raw materials from local suppliers.
14	Does not manufacture	Ca. 80% of the manufactured range of foods has pro-health properties	All products are GMO-free. The company purchases 95 % of its raw materials from local suppliers.
15	5%	Ca. 60% of the manufactured range of foods has pro-health properties	The manufactured products are mostly natural/organic and rich in many nutritional values.
16	10%	Ca. 80% of the manufactured range of foods has pro-health properties	The products are free from preservatives and come from natural fisheries. The company purchases 10 % of its raw materials from Polish suppliers.

Source: author's compilation based on own research.

The impact of the offer of the analyzed 16 companies on sustainable development is significant. To sum up, about 5% of the manufactured

products have certificates confirming that they are environmentally friendly organic products, while a large part of the manufactured range has many pro-ecological and pro-social properties.

Moving on to the second part of the survey looking into recruiting and employing sustainability-oriented employees, the questions asked during the interview were used to characterize the extent to which large food industry enterprises are involved in recruiting and employing these workers.

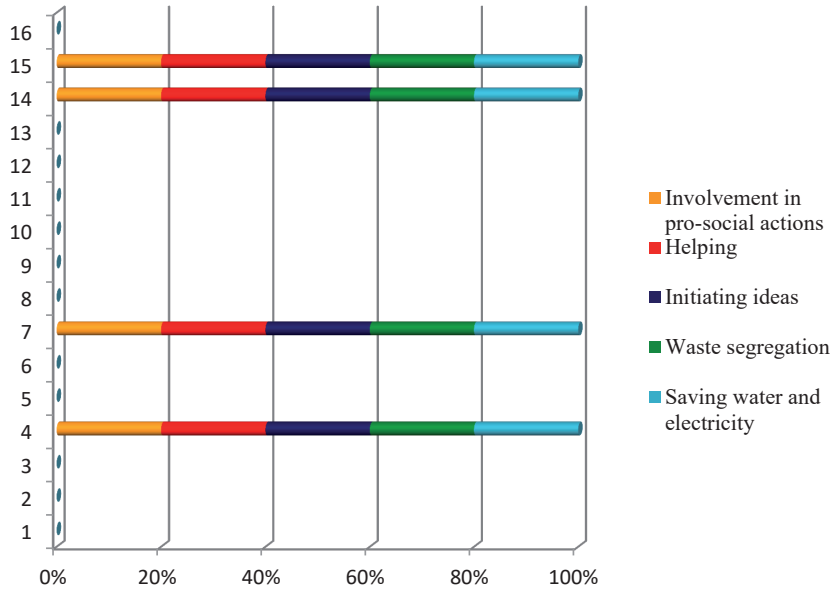

Figure 3.16. List of characteristics taken into account in sustainable recruitment and employment processes

Source: author's analysis based on own research.

The issues addressed in the questionnaire were expected to reflect the commitment of potential employees to social and environmental issues in their previous workplace and private life, Figure 3.16. This made it possible to determine how many employees are characterized by pro-ecological and pro-social sensitivity. The conducted research shows that only 25% of large food industry enterprises, during their recruitment process, in addition to the necessary qualifications and professional experience pay attention to the ecological and social sensitivity of a candidate for a job. They are asked about their involvement in pro-social actions, willingness to help other employees and social groups that require such help the most, initiating

innovative solutions in the company's department in accordance with the principles of sustainable development, waste segregation, saving water and electricity. A key element of this is that recruitment officers do not seem to have sufficient knowledge and competence in the area of sustainable development. The inquiry found that in half of these companies, employees participate in training courses in their area of expertise, but not in courses from the field of sustainable development. It is therefore concluded that the lack of adequate training and experience of employees in enterprises in the field of sustainable development means that little emphasis is placed on recruitment accounting for sustainable development. Due to the fact that only 25% of large food industry enterprises take into account the principles of sustainable development during the recruitment process, it must be concluded that only these recruits have the characteristics of sustainability. Offering jobs to employees oriented at sustainable development principles is more than just respecting legal requirements under applicable legislation. Failure to comply with legal regulations results in relevant consequences. The implementation of sustainable development principles into the business activity of enterprises is based on pro-social behavior towards the employed personnel and therefore is more than mere compliance with the applicable law.

Among the remaining 75% of employees who are not subject to the recruitment process under the concept of sustainable development, it is impossible to determine how many are environmentally and socially sensitive. Due to the traditional recruitment process, these features are not known to the management. Synthetic analyses of the results of the questionnaire carried out in the large food industry enterprises has allowed creating a model of an ideal employee who has been employed in the enterprise in a sustainability-oriented recruitment process. These features appeared interchangeably in the analyses. The employee who is involved in activities for sustainable development has knowledge of the concept, is environmentally and socially sensitive, decides to pursue numerous innovations in this area of activity, which confirms his/her openness and commitment to sustainability. Ecological and social sensitivity means that such an employee takes care of and, if necessary, responds to problems that arise in this area. This attitude is confirmed by numerous areas of concern in which the employee is involved. It can be pointed out in relation to these concerns that such an employee participates in projects of pro-ecological and social character, equips the workplace and its surroundings in accordance with the principles of sustainable development (i.e. submits requests for replacement of old equipment with electricity-saving and environmentally friendly office equipment), as well as engages in processes and generated goods and services (strives to reduce post-production waste) and the work which he/she performs is carried out in accordance with the concept (eliminates

unproductive operation of machines/equipment). Next, there is sustainability-focused management that is active by encouraging employees to implement the principles of sustainable development, supervising their training and awareness in this area and strongly motivating them to take relevant actions, aiming at making them formal procedures

5. Conclusions

In everyday practice in the area of employee relations, it is important to promote attitudes of trust and honesty in interpersonal relations and respect for diversity both on the global and local levels. In fact, this means that in their activities, companies place emphasis on equal treatment policies, irrespective of gender, age, disability, health, race, nationality, ethnic origin, religion, beliefs, non-religiousness, political views, trade union membership, psychological and sexual orientation, gender identity, family status, lifestyle, employment form, scope and basis, other types of cooperation, and all other grounds likely to give rise to discrimination, but unfortunately there are only 30% of those. In its own interest, the company should ensure that its employees are hired during an objective and transparent selection and recruitment processes, that they feel comfortable, that they are constantly developing and that they are subject to reliable regular appraisal.

The findings suggest that this is the fault of the directors and managers at the highest level who lack a sustainability-oriented approach and are not pro-environmentally or pro-socially sensitive, as they cannot see in such actions the possibility of gaining a competitive advantage or achieving success. The vast majority of employers do not recruit in accordance with the principles of sustainable development, so their employees do not show pro-ecological and/or pro-social sensitivity. These workers are also not trained in the area of this ever-important concept. The questionnaire has shown that there is no sustainability specialist in any of the enterprises, nor is there an individual department responsible for sustainable development.

In 25% of the companies, the directors involved in the implementation of sustainable development principles in the recruitment process implement environmental and social activities in the company objectives and strategic plans giving them a priority by being involved in such activities. The key task for management is to convince staff at lower levels that sustainability is certain to deliver tangible benefits such as an improved company image, which will translate into a more favorable assessment of their products. Consequently, this will prove that they are of higher quality because they are labeled by a strong brand.

As a result of the research and analyses carried out, it is concluded that the investigated companies are not fully committed to innovative sustainable management. Only 25% of them pay attention to their pro-social and pro-ecological sensitivity when recruiting employees. In these companies, managers try to integrate the concept of sustainability into their daily work routines, but not quite fully. Overall, it can be said that at present, large food industry enterprises only selectively undertake to implement sustainable measures in their operations, but this trend is nonetheless becoming apparent. Most of them declare that they plan to develop in this direction, but it will not include the whole business activity, but only its individual elements. In most cases, the management has no knowledge in the area of the discussed concept, which means that the principles of sustainable development have not been implemented in the business activity as yet.

Growing social problems and a deteriorating state of the natural environment make it necessary for companies to conduct business activity pursuant to the concept of sustainable development. Entrepreneurs should be determined to put the idea of sustainability into practice without delay, since the side-effects of their activities result in the over-exploitation of raw materials and generation of waste, causing an imbalance on the planet that has a negative impact on society. It is necessary for enterprises to start operating following the concept of sustainable development, to a much greater extent than the one discussed in the paper based on the research. Such activities cannot be only occasional in character just in order to enhance the company image or because it is just becoming more and more fashionable to be "eco". The transformation of a company must cover all its resources and areas of activity in order to focus not only on economic issues but also on environmental and social aspects as well. A company has a chance to become a sustainable enterprise only when such a decision is followed by the full commitment and financial support of the board and management to the principles of sustainable development. Only suitably qualified staff are able to contribute to the effective achievement of the set objectives. These people decide on the pace of changes and their scale, which is determined by their knowledge in this area, ecological and social sensitivity, readiness to implement innovations and their entrepreneurship skills. Their task is to encourage and motivate employees to be ready to take actions related to implementation of sustainable development, and then necessitate the recording of all regulations in an appropriate corporate document. It is essential to recruit suitably qualified workers and to train the employed staff in relation to sustainable development. It is necessary to transform traditional businesses into those that will pursue sustainable business activities in order to balance intergenerational needs. These actions must be integrated at all levels and in all areas of business activity of enterprises. The findings of this research have

a significant contribution to science because so far such research has not been carried out. The concept of sustainable development is beginning to spread over a growing number of activities carried out by companies. Large food businesses undoubtedly contribute to many environmental and social risks, and it is, therefore, essential that they employ workers who are environmentally and socially sensitive. The results of the research sadly show that in large enterprises, sustainability-oriented staff do not prevail. This is certain to result in a slow process of implementing the concept of sustainable development into business operations unless the said human factor is allowed to contribute to the acceleration of this implementation. The research results are innovative in their character as to date this problem has not been addressed in scientific analysis.

The recruitment of employees, in line with the principles of sustainable development, combines environmental, economic, and social aspects. However, it is rare for companies to engage in sustainable development in this area because they are not familiar enough with its principles and have many doubts about it. The questionnaire conducted among directors of the large food companies showed that such doubts and concerns included 59.7% issues related to a decrease in short-term profitability, 53.9% issues related to the conflict between economic (financial) and pro-social objectives, and 41.4% issues concerning increases in prices of their products on offer (Certo & Certo, 2009). Although sustainability began to emerge as early as the late 20th century, many directors are still unable to support the efforts towards this concept by hesitating to engage in such projects for fear that this would result in a reduction in the resources available for strictly commercial projects (Kuehn, McIntire, 2014). It is the business owners who need to accept and implement the principles of sustainable development into their business activities in order to be able to recruit and manage their employees in accordance with these principles. It is concluded that the recruitment and management of personnel following the concept of sustainable development is being necessitated by the deteriorating state of the natural environment and the threats posed to the modern world and future generations.

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