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Wersją pierwotną Kwartalnika Naukowego „Organizacja i Zarządzanie" jest wersja papierowa

CONTENTS

IMAGE MANAGEMENT OF A PHYSICAL RECREATION INSTRUCTOR

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Abstract: The article addresses the issue of managing the image of a physical recreation instructor. It is necessary to undertake an analysis of the subject matter due to the dynamic development of physical recreation services, and significant competition in the provision of them. The article starts with discussing the concept of sport and its relation to the concept of physical recreation. Then, one of the forms of physical activity, namely hatha yoga, is discussed. Subsequently, the entities authorized to conduct physical recreation classes are presented, with particular focus on the physical recreation instructor, including the qualification requirements placed upon them, the tasks assigned, and the effects of their services. The article also discusses the results of surveys concerning the expectations of class participants towards instructors in terms of their professional qualifications, competencies and predispositions. Based on the survey results and the positions adopted in the literature, the methods for managing the image of a physical recreation instructor, including the legal risks of the instructor, are also presented. The article also draws attention to the possibility of adopting the academic yoga model in image management while discussing the assumptions and benefits accompanying this model.

Keywords: image management, physical recreation instructor, academic yoga.

1. Introduction

The sector of services in the field of physical recreation available on the market is developing dynamically. As a result, competition in the market of these services is growing. This in turn triggers the need for physical recreation providers to manage their image.

The objective of this article is, in particular, to discuss the issue of managing the image of a physical recreation instructor, being a professional provider of physical recreation activities in a particular specialization (i.e. hatha yoga). Attention will be drawn, among other things, to the issues concerning the professional qualifications and competencies of an instructor,

as well as their predispositions to pursue the occupation in question. What's more, the article will also address the issues related to the legal risk of a physical recreation instructor and their impact on the image management process. One of the models for managing the image of a physical recreation instructor in hatha yoga will also be presented, namely a model based on the assumptions and values of academic yoga. However, the considerations included in the article will begin with discussing the concept of sport and its relation to the concept of physical recreation.

Sport currently includes all forms of physical activity which, through casual or organized participation, have an impact on the development or improvement of physical and mental condition, the development of social relations, or the achievement of sports results at all levels. This definition of sport is contained in Art. 2 sec. 1 of the Sports Act of 25 June 2010. What is more, in accordance with sec. 1a of the said provision, competition based on intellectual activity which aims at achieving sports results shall also be considered sport. On the other hand, sport, together with physical education and physical rehabilitation, make up physical culture (Art. 2 sec. 2 of the said Act).

The above-mentioned concept of sport includes the concept of "physical recreation". The latter was previously regulated in the Act of 18 January 1996 on physical culture, which in Art. 3 item 8 provides that physical recreation is a form of physical activity, undertaken with the aim of rest and renewal of mental and physical capabilities. Thus, the purpose of physical activity undertaken within the meaning of the Act on physical culture was analogous to one of the objectives of physical activity provided for in the Sports Act. As indicated above, sport includes all forms of physical activity that bring results, for example in terms of mental condition. It can also be mentioned that the inclusion of physical recreation in the concept of sport, due to the broad approach to this concept by the legislator, is also indicated in the literature (Badura et al., 2011). What is more, in the very draft law on sport, it was pointed out that *The concept of physical recreation, isolated in the act on physical culture, is included in the broad definition of sport adopted in the draft act on sports* (Draft law on sports ...).

One of the forms of physical recreation currently covered by the Sports Act is yoga. As stated by M. Grabara, yoga is an ancient Indian system of physical exercises, consisting in slowly assuming a specific bodily posture, keeping that posture for a certain period of time, and then coming slowly out of the assumed posture. The postures assumed are called asanas, which denotes comfortable positions (Grabara, 2009). M. Grabara rightly remarks that yoga exercises do not constitute standard physical exercises. Their objective is to achieve better flexibility and agility. Moreover, they also result in significant health benefits for those who practice yoga (Grabara, 2009). J. Szopa points out that such exercises are aimed at achieving and maintaining the high mental efficiency of a person (Szopa, 2005), which corresponds to the definition of wellness (Krejčí, 2013). It is also assumed that yoga can be a form of improvement and preservation of health and agility (Sławek, and Śleboda, 2011, Roland, et al., 2011).

One of the existing paths of yoga, which is becoming more and more popular in Western countries, is hatha joga. It is based on a combination of different postures that relate to balance, strength and flexibility. Moreover, hatha yoga is based on the coordination of the "mind-body-breathing" system. Consequently, it is pointed out that it requires effort due to the need to maintain certain postures, as well as to control the body and breathing in a specific rhythm (Sławek, and Śleboda, 2011).

As mentioned above, one of the directional disciplines in which instructors of physical recreation lead classes is hatha yoga. Thus, instructors of physical recreation rank to so-called hatha yoga instructors.

The research conducted in connection with the preparation of this article and discussed in the follow-up is devoted to the profession of a yoga instructor. The aim of the study was, in particular, an analysis of the expectations that the trainers raise with instructors in terms of their professional qualifications and competencies.

It should be noted that carrying out the survey among people who were participants of classes conducted by an instructor dealing with a specific directional discipline enabled the precise attitude of respondents' to the questions addressed to them. The results of these studies, however, can be related appropriately to the general profession of a physical recreation instructor.

2. The entities authorized to conduct physical recreation classes

In accordance with Art. 41 of the Sports Act, a coach and a sports instructor are the entities authorized to conduct organized sports classes in a sports association or sports club participating in competitions organized by the Polish sports association.

The legislator accepted that one of the above-mentioned occupational titles can be applied for by a person aged 18 or more, who has at least general or sectoral secondary education, has the knowledge, experience and skills necessary to perform the tasks of a coach or a sports instructor, and was not convicted by a final judgement for intentional offence referred to in Art. 46-50, or specified in Chapters XIX, XXIII, with the exception of Art. 192 and Art. 193, Chapters XXV and XXVI of the Act of 6 June 1997 – Criminal Code.

In turn, the tasks of a coach and a sports instructor include, apart from conducting classes, passing on current theoretical and practical knowledge in the field of sports training and competition in a given discipline.

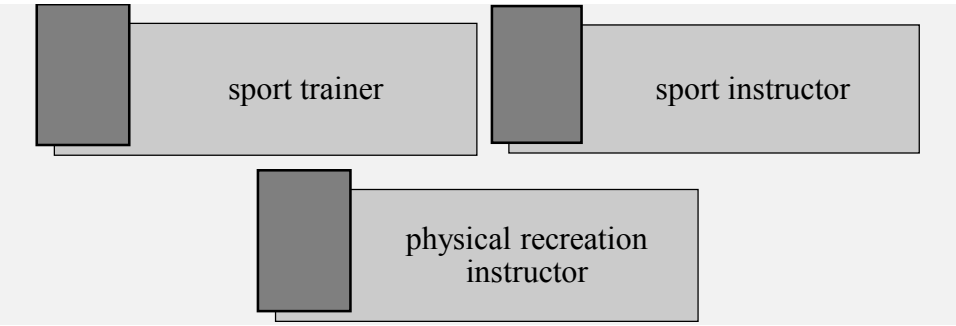

Figure 1. The entities authorized to conduct physical recreation classes. Source: authors'own elaboration.

At the same time, attention should be drawn to the fact of distinguishing the occupation of a physical recreation instructor in the Classification of Occupations and Specialities for the needs of the labour market, which constitutes an appendix to the Regulation of the Minister of Labour and Social Policy of 7 August 2014 with regard to the classification of occupations and specialities for the needs of the labour market and the scope of its application (as amended).

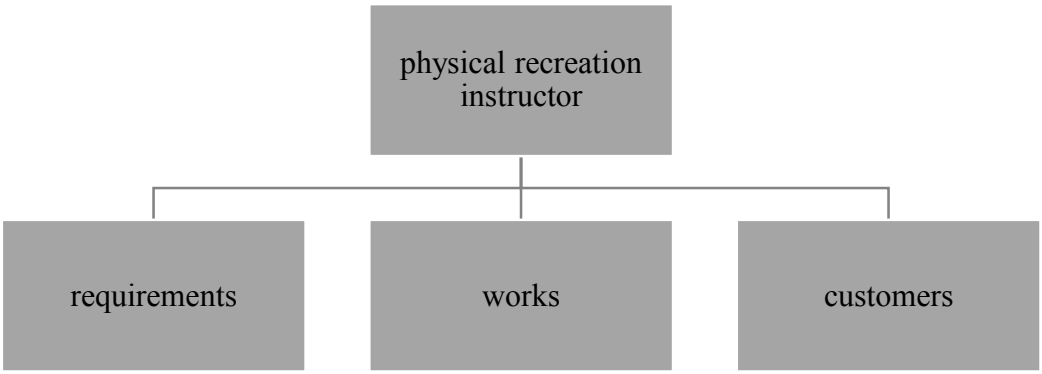

Figure 2. Physical recreation instructor – occupational characteristics. Source: authors'own elaboration.

According to the data contained in the National Occupational Standards of Competence, available on the website of the Ministry of Family, Labour and Social Policy (www.mpips.gov.pl), the occupation of physical recreation instructor was distinguished under number 342305. This occupation may be performed by a person aged 18 or more who has at least secondary education and good health status. It is pointed out that it is reasonable for a person seeking to pursue that occupation to complete a physical recreation instructor course in a given recreation speciality. It is a two-stage course, consisting of general and specialist parts. What is also important is that a candidate should pass practical and theoretical exams in order to confirm the acquired occupational competencies. It should also be mentioned that a person with an university degree in physical education and sports or tourism and recreation with an instructor's speciality in a specific discipline of physical recreation may become a physical recreation instructor.

In accordance with the description included in the National Occupational Standards of Competence, the profession of physical recreation instructor is of a service nature. The instructor's task is to conduct physical activities and to promote an active lifestyle. On the

other hand, the effect of classes is to maintain or improve the health and motor skills of class participants. The work of an instructor is also aimed at contributing to the strength recovery of class participants, their relaxation, and reduction of muscular tension associated with their work. In addition, the National Occupational Standards of Competence identify the following tasks of an instructor:

- diagnose the psycho-motor abilities of class participants,
- select recreational activities, taking into account the motor skills and needs of participants,
- plan recreational activities,
- conduct specialist recreational activities,
- keep documentation related to the effects and course of the classes,
- organize the work station in accordance with the principles of occupational health and safety, fire protection, ergonomics and environmental protection.

The classes conducted by a physical recreation instructor are characterised by a great diversity of participants in terms of sex, age, level of fitness, physical fitness and health.

Physical recreation instructors perform their tasks in clubs, recreation and sports centres run by institutions focused on health improvement, as well as in cultural centres, community centres and playgrounds. What is more, they are entitled to conduct recreational activities as part of holidays, as well as at camps and colonies.

3. Customer expectations regarding physical recreation instructors

In the context of the preparation of this article, survey studies were conducted among people practicing yoga for less than 6 months. The study was devoted to the ways of perceiving yoga instructors and the requirements placed on them by the respondents, in particular with regard to their education, qualifications, skills and predispositions. The group of respondents consisted of 50 people.

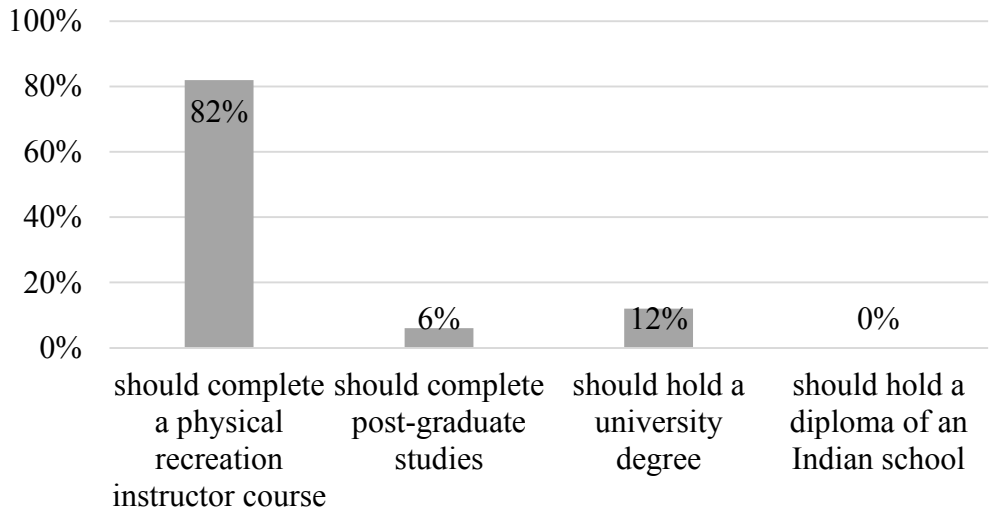

Figure 3. Requirements placed on yoga instructors in terms of occupational qualifications. Source: authors' own elaboration.

The results of the study with regard to the requirements placed on yoga instructors in terms of their occupational qualifications are presented in Figure 3. The study revealed that 82% of the respondents believe that a yoga instructor should complete a physical recreation instructor course. In contrast, 12% of the respondents stated that those who conduct yoga classes should hold a university degree in the field of physical education or physiotherapy. On the other hand, only 6% of the respondents indicated that a yoga instructor should complete post-graduate studies. None of the persons participating in the study indicated that a yoga instructor should hold a diploma from an Indian school.

Analyzing the results presented above, it can be concluded that a significant number of yoga class participants take note of whether an instructor has obtained education in the field of physical recreation (relevant courses completed). However, it is unimportant for the respondents whether the instructor completed an Indian school course.

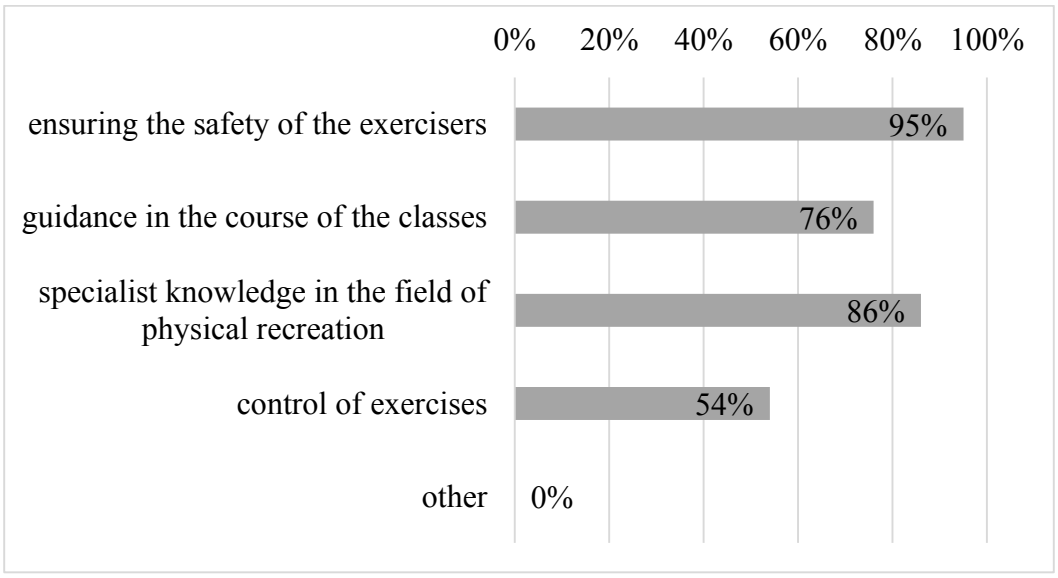

Figure 4. Requirements placed on yoga instructors in terms of qualifications. Source: authors' own elaboration.

Figure 4 illustrates the results of the study concerning the requirements placed on yoga class instructors in terms of their qualifications. It should be said at the outset that in the question referring to the subject matter, the respondents were given an opportunity to select multiple answers.

It was revealed in the survey that the qualifications that ensure the safety of exercises matter most to yoga class participants. This response was chosen by 95% of the respondents. It should be noted that, as clarified in the survey, ensuring safety should be understood as an ability to match exercises to the abilities of class participants, and first aid competencies.

Another important aspect is the specialist knowledge of an instructor in the field of physical recreation. This competence was indicated by 86% of the respondents.

In turn, according to 76% of the respondents, instructors should show guidance competencies when conducting the classes. Such competences include, among other things, an individual approach to class participants, motivating participants to perform exercises, giving tips, or making the activities more diversified.

Next, the respondents indicated that the competencies they require from an instructor include proper control of the exercises performed, including constructive criticism and correction of exercising errors (54% of the respondents).

With regard to the fact that safety related to the exercises performed is of the utmost significance for almost all class participants, it can be noted that it is rightly pointed out in the literature that a sense of security is one of the most universal values people are guided by (Sławek, Śleboda, 2011, Fiske, 2004).

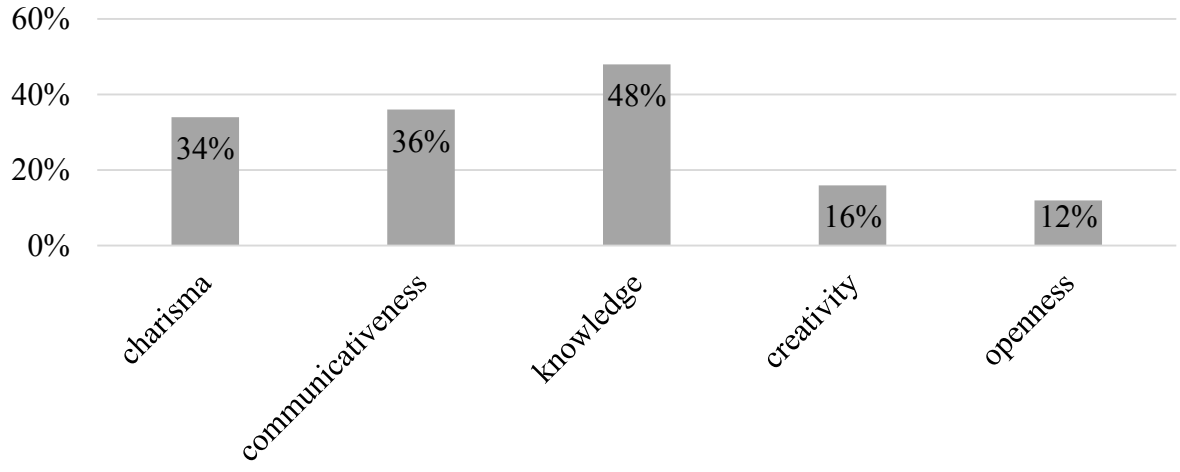

Figure 5. Requirements placed on yoga instructors in terms of predispositions. Source: authors' own elaboration.

With reference to the predispositions to be expected from a person conducting yoga classes, it should be pointed out that knowledge is particularly appreciated. This predisposition was indicated by nearly half of the respondents (48%). Here, consideration should also be given to the fact that the study results discussed above show that such knowledge is related to the completion of a physical recreation instructor course. A significant proportion of the

respondents do not require an instructor to complete higher education or postgraduate studies, nor hold a diploma from an Indian school.

The next predispositions indicated as desirable by the participants of the study were communicativeness (36%) and charisma (34%). Creativity and openness were indicated by 16% and 12% of the respondents.

The results of research in the area of predispositions that should be manifested by a yoga instructor are illustrated in Figure 5.

4. Image management of a physical recreation instructor

The existing literature on the subject indicates that image can be perceived as the sum of views, impressions and attitudes that a particular person or group has towards an object. Importantly, the object in question can be an enterprise, a product, a brand or a person (Sokołowicz et al., 2011; Barick, and Kotler, 1991).

Keeping in mind the above-mentioned definition of image, it can be stated that the image of a physical recreation instructor consists of all views, impressions and attitudes shown by his/her customers (including potential customers) in relation to him/her and his/her services.

It could also be mentioned that the literature correctly points out that image is not a faithful reflection of reality. This is because it emerges as a result of perception – a process which is undoubtedly characterised by the subjectivity of the perceiver (Dewalska-Opitek, 2010).

The study revealed that the customers expects an instructor to demonstrate professional knowledge in the field of physical recreation, provide appropriate guidance through the exercises, and supervise their execution, as well as ensure the safety of the participants in connection with the activities they undertake.

Therefore, all the above-mentioned requirements should be taken into account in the process of image management for a physical recreation instructor. It is particularly important for an instructor to self-improve in a given discipline and adhere to all the accompanying rules. Implementation of such assumptions in the process of image management will result in the perception of the instructor as a professional in a given field.

The above is also confirmed by the literature. As is rightly pointed out, an instructor is obliged to constantly acquire knowledge regarding the principles according to which a class should be run, the types of exercises, as well as the impact of these exercises on the human body. It is also necessary for the instructor to have significant knowledge of biological sciences, i.e. physiology, anatomy, biomechanics, as well as the human motor system. There is no doubt that an instructor is obliged to choose exercises and amounts thereof which are appropriate for a particular type of class or the level and ability of its participants. Moreover, the instructor must possess knowledge on how a given exercise should be performed in order to be correct,

on top of knowing why a given technique is correct. The instructor should also enforce the proper exercise form on the participants (Dix, et al., 2013; Cieślicka, et al., 2011; Napierała, et al., 2009).

When discussing issues related to image management for a physical recreation instructor, it is also impossible to overlook the fact that it is necessary for the instructor to have an appropriate predisposition for communication. This is also confirmed by the conducted survey. An ability to make precise and clear utterances allows the physical recreation instructor to correctly convey information, guidelines and instructions to the participants of his classes. This in fact is necessary in order to properly perform the exercises and understand the instructor's remarks and corrections, especially in relation to exercise techniques (Dix, et al., 2013).

Both the professional knowledge of the instructor and his/her communication and leadership predispositions influence the safety of the people performing the exercises and eliminate the potential negative effects of the activity they take up.

Keeping in mind the survey results, the fact that the image of a physical recreation instructor is also influenced by his/her other predispositions, such as creativity, charisma and openness, cannot be overlooked.

His/her attitude towards the participants of his/her classes is also important in the process of the image management for a physical recreation instructor because it is important for an instructor to be friendly and helpful to the participants, regardless of his/her personal issues (Dix, et al.,2013). A pleasant atmosphere in class, synonymous to the instructor's skill in this area, undoubtedly has an encouraging effect on the participants and increases their willingness to attend systematically (Nowak, and Chalimoniuk-Nowak, 2016). However, taking into account the fact that participants of the classes express a wish to rest from work and stressful situations, a negative attitude and an instructor's dissatisfaction may result not only in opting out of the services provided by a given instructor, but also abandoning the activity completely.

At this point it must be noted that the legal environment surrounding the physical recreation instructor also plays an important role in the process of their image management. The legal environment should be understood as all legal norms regarding the activity and services provided by the instructor. These norms relate to various branches of law, including civil law, intellectual property law, labour law, administrative law and tax law.

Considering the framework of this article, attention will be paid solely to issues related to civil law, namely the tort risk which lies with a physical recreation instructor. This risk is particularly related to an instructor's due diligence in performing his/her duties. Moreover, this risk is related to the possibility of charging the instructor with improper class management (malpractice).

In relation to the above, it should be pointed out that the instructor is able to avoid the risk involved, which, for example, may be understood as a resignation from providing the services,

or a reduction of this risk. In the latter case, the instructor should strive to minimise the risk of being charged with improper class management.

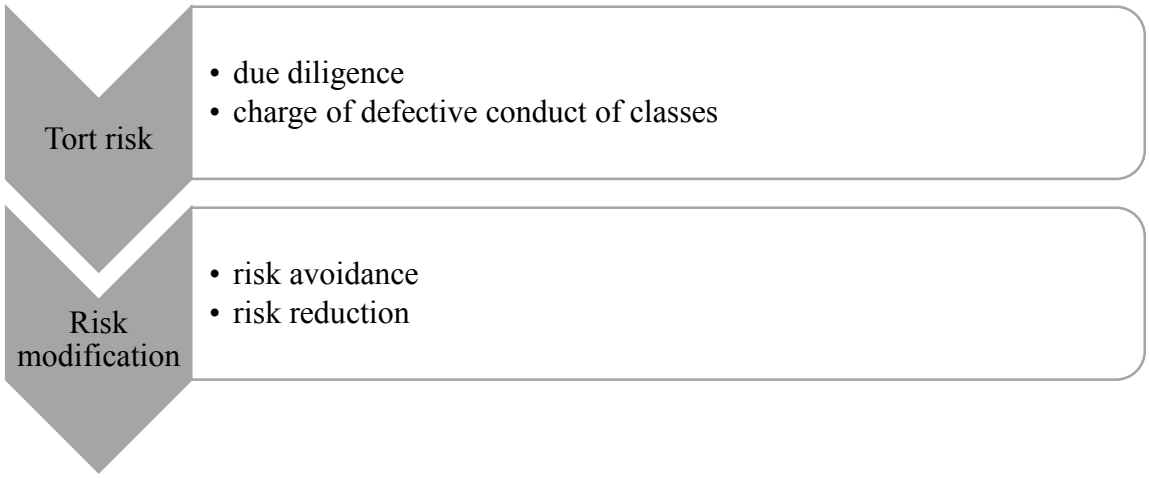

Figure 6. Tort risk and its modification. Source: authors' own elaboration.

Taking into account the factors affecting the image of a physical recreation instructor, including those connected to tort risk, it is worth paying attention to one of the yoga teaching models, namely academic yoga. J. Szopa and M. Dziadkiewicz point out that academic yoga is a body workout system based on relaxation techniques and hatha yoga physical exercises. Its aim is to maintain and improve psychophysical health. The methods used to work with the body and mind are measurable, repeatable and experimentally proven. What is important is that academic yoga is based on scientific achievements in such fields as anatomy, kinesiology, biochemistry, biology, biomechanics, philosophy, physiology, kinanthropometry, kinetic psychotherapy, physiotherapy, physical culture, medicine, neurophysiology, psychology, rehabilitation and sociology (Szopa, Dziadkiewicz).

According to the authors, it is justified to base the process of image management for a physical recreation instructor on the academic yoga model. This is because the assumptions of academic yoga steer away from the traditional market model of yoga based on the guru-student channel. Academic yoga is based on the following values:

1) focus on the health and safety of participants,
2) critical discussion,
3) freedom of opinion,
4) basing the message on scientific research,
5) utilisation of physical recreation methods which are repeatable and experimentally proven,
6) lack of ideological indoctrination.

The main assumption of academic yoga is to ensure the health and safety of the people participating in the exercises. Furthermore, as is clear from the above, the assumption of academic yoga is especially to enable the participants to partake in discussion and exchange of views on the exercises performed. What is also important is that the channel of communication

between the instructor and the participants is based on scientific research results, whilst the methods of physical recreation are repeatable and experimentally proven.

Bearing in mind the above, it can be pointed out that academic yoga instruction is based on three pillars.

The first and most important pillar is based on ensuring the health and safety of the participants. It is carried out through assessing the proposed class elements through the prism of participant safety standards developed by physical recreation science.

The second pillar is a process approach to class planning and teaching. It boils down to resigning from sport competitions and instead focusing on participation in classes, improvement of the psychophysical well-being of the participants, their self-acceptance and the development of social bonds between them.

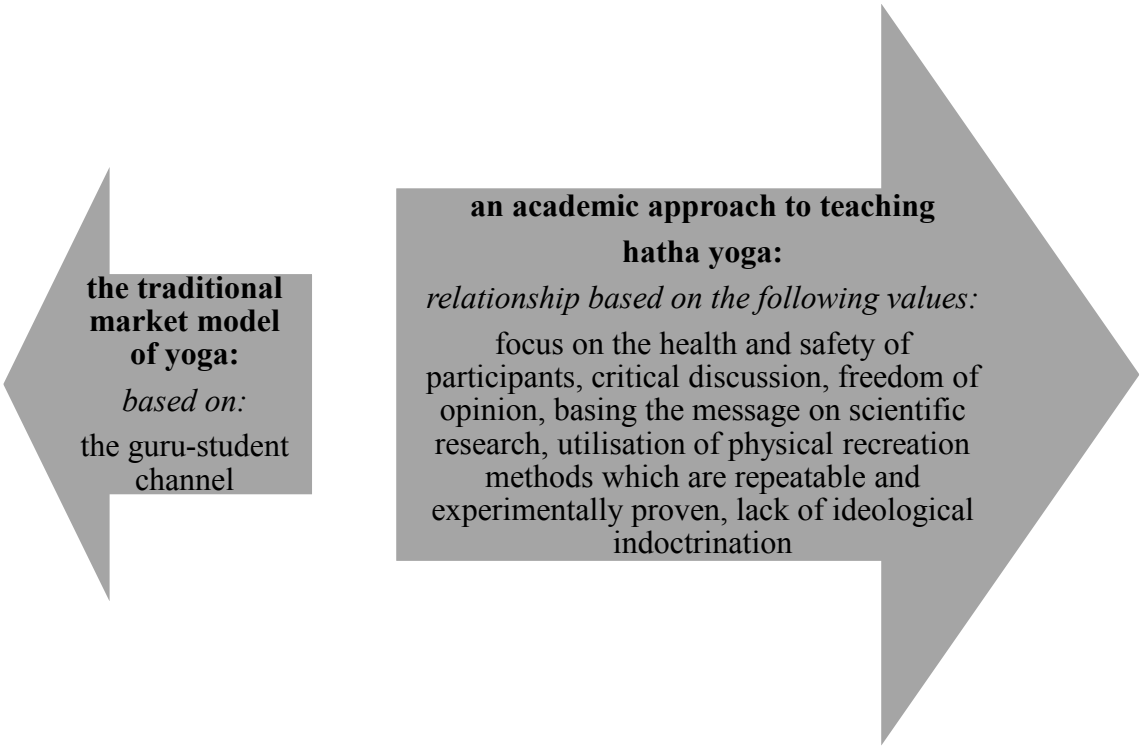

Figure 7. Models of yoga instruction. Source: authors' own elaboration.

At the same time the third pillar involves: allowing the academic framework of critical discussion on the method of class execution, tolerance for the views of the participants, involving openness to various "Indian" branches of yoga, basing the teachings on scientific research rather than the vision of teachers in charge of shaping individual Indian yoga branches, and also basing the teachings on the no ideological indoctrination principle.

5. Summary

According to the authors, assumptions regarding the image of a physical recreation instructor in accordance with the principles of academic yoga fulfil an important need of market participants, which is to ensure safe classes of simultaneously high quality. Furthermore, these assumptions defy the stereotypes associated with hatha yoga instruction, related to the cultural otherness of the areas where yoga was created, as well as the surrounding ideology.

The assumptions of academic yoga make it an active strategy for minimising the legal risk associated with the tort liability of a physical recreation instructor. This is because it satisfies the condition of due diligence as defined by Art. 355 in conjunction with Art. 471 of the Civil Code, in particular by meeting the participants' health and safety standards, as well as protecting the dignity and psychophysical integrity of the participants, in addition to implementing procedures aimed at the constant improvement of service quality in accordance with the methodology of physical recreation.

The use of academic yoga assumptions in managing the image of a physical recreation instructor should result in further research in this area. Research should be devoted in particular to the satisfaction and pleasure of participants of the classes, which will be conducted by instructors with qualifications and predispositions which are consistent with the expectations hitherto revealed. The subject of further research may be aspects of the legal risk of instructors' activity, including regarding the number of cases of liability for tort incurred by these instructors.

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DIRECTIONS OF DEVELOPMENT OF METALLURGICAL ENTERPRISES IN THE ERA OF INDUSTRY 4.0

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Abstract: Industry 4.0 is a collective term meaning the integration of intelligent machines and systems, and the introduction of changes in production processes, aimed at increasing production efficiency and introducing the possibility of flexible changes in the assortment of products. Industry 4.0 is focused on the continuous improvement of manufacturing processes through the use of self-learning robots and personalized production. The aim of the article is to identify key directions of improvement of the heat treatment process of cylindrical products in the context of applications of Industry 4.0 solutions. The analysis of individual stages of the heat treatment process using an example of a metallurgical company became the basis for determining key organizational and technical problems at individual stages of product manufacture.

Keywords: enterprise transformation, Industry 4.0, heat treatment process.

1. Introduction

In a modern, highly competitive production environment manufacturing companies face the challenge of dealing with large amounts of data, the need to make quick decisions (even outside the workplace), and to make the production processes flexible (personalized product) (Dais, 2014). The contemporary nature of production is shaped by the paradigm shift from mass production to production at the customer's request. Industry 4.0[1] (a term used since 2010) is currently one of the most frequently discussed topics among practitioners and scientists, which makes it a priority for many research centres and enterprises. Industry 4.0 marks the fourth industrial revolution, in which it is assumed that this is a vision of intelligent factories built of intelligent cyber-physical systems. The implementation of this idea should allow the

[1] The name entered in Germany (German government and industrial centres initiated the Industrie 4.0 programme (industry 4.0) with its main idea: Smart Factory). Klaus Schwab, founder of the World Economic Forum in Davos, in his book The Fourth Industrial Revolution published in February 2016, gives examples of changes in the industry at level 4.0.

development of intelligent production systems, which, in addition to the aforementioned autonomy, will have the characteristics of self-configuration, self-control of self-repair and self-learning (quoted after: Schwab, 2016).

This article is based on a literature study and case example analysis, which served to propose improvements in the production process, taking into account the new solutions of Industry 4.0. The theoretical part of the article presents the general assumptions of production at the level of Industry 4.0, comparing its key components. In the practical part, the individual stages of the heat treatment process of rolled products in a metallurgical enterprise are presented. The technological process adopted for the analysis became the basis for determining organizational and technical problems at individual stages of product manufacture On the basis of the obtained results, in order to improve production the directions of improvement of the heat treatment process in the context of applications of Industry 4.0 solutions are indicated.

2. Industry 4.0

Industry 4.0 was initiated 8 years ago in Germany, and for several years has been strongly promoted by the governments of industrialized countries around the world, and leaders in some industries have already implemented pilot cybernetic production systems (production of equipment: household appliances, cars, machinery and equipment). The changes initiated in the 21st century will take place over decades in enterprises, as the creation of new cyber-production solutions will require many investments (Saniuk, and Saniuk, 2017).

The scope of the introduced changes in enterprises of various industries depends on their resource capabilities and awareness of the role of new production methods in business development. The company must sense, on the basis of research, intuition and experience, when to introduce changes to adapt production to the new requirements of Industry 4.0. In Industry 4.0, it is about increasing the share of robots and industrial manipulators in the manufacture of products, and the use of the Internet to control and communicate devices and man with devices, as well as to integrate all processes inside and outside the enterprise within the value chain using cybernetic solutions (Cyber-Physical Systems – CPS, production cyberphysical systems or Cyber-Physical Production Systems – CPPS) and general data availability (Schwab, 2016; Pentek, 2015; Jaspemeite, 2012; Kagermann, Wahlster, Helbig, 2013; Astor Whitepaper). The development of Industry 4.0 is driven by the openness of solutions – easy access to information, technologies, patents and licences (Schönegger, 2013[2]; Evans, 2012). Robotic

[2] Interview with Stefan Schönegger, general director of the organization Ethernet POWERLINK Standardization Group (EPSG). https://www.br-automation.com/pl/o-nas/customer-magazine/2013/201306/czwarta-rewolucja-przemyslowa-zalezy-od-powerlink-i-opensafety/.

production lines became the basis for new forms of organization of enterprises, referred to as smart factories (Mario, Pentek, Otto, 2015).

The production technology used is referred to as Advanced Manufacturing due to the automatic search and implementation of the best solutions for machine learning by the existing company resources and customer needs. Production planning and supervision of processes is transferred from employees to computers with a wide use of data from control and control systems (DCS / SCADA). Production control, based on digital modelling, allows taking into account every aspect of customer requirements at each stage of production. Production control systems are linked through the CPS with a digital product description, which allows the quick adaptation of the entire process of writing, from product design to production planning, development of manufacturing technology to production, and Internet service (IoS) to the expectations of the customer who has based on the course of the trial (Gracel, 2016, 2017, 2018; Olszewski, 2018; Buxmann et al., 2009).

Smart factores, in which cyber-physical systems control physical processes, create virtual (digital) copies of the real world and make decentralized decisions, and through the Internet of Things (IoT) in real time communicate and cooperate with each other and with people. IoT is the equipping of all possible devices (home, production) with remote control systems (remote control of devices and communication with them at any place and time) (Lee, Jay, 2013; Magruk, 2016). IoT enables multilevel communication inside and outside companies (Hersent, Boswarthick, Elloumi, 2012; Chui, Löffler, Roberts, 2010; Kaliczyńska, Dąbek, 2015). The smart factory is intended to enable the entire production process to be carried out with a minimum of employees. The process of communication of production robots with clients is carried out through cloud computing – a collection of data storage, data processing and big data. Inside the Smart Factory there is automatic material transport, and the direct processing of materials on production lines. There are already devices on the market that are considered innovative (for Industry 4.0), e.g. CNC machines for machining, and their use by connecting robot arms as feeders for machine feed (integration of the robot with the machine), and transport devices (conveyors, self-tracking vehicles) in the production process create the beginnings of a smart factory.

Innovative materials are used for production, e.g. a customer can change clothes made of plastic, designing them on 3D printers. 3D printers are an important component in the Smart factory. Customers use them in the design of products according to their physical characteristics, such as surgical prostheses and expectations, e.g. clothing. Warehouse management is also the automatic replenishment of inventories in warehouses or their complete liquidation (e.g. Alibaba – the largest commercial network in the world, no warehouses).

Personalized production – tailored to the individual customer's requirements, as it is now based on the pull strategy, that is from the client's order to its implementation. The difference, however, is that the client designs a product made using 3D printers. Owners of smart factories and production lines can completely eliminate factors that cause increased costs, such as:

production delays, inventory, machine and equipment defects, production defects and errors, hardware deficiencies, human errors (Soldaty, 2017). Robot work is more flexible than the existing machine park, so there will be fewer downtimes and failures – thanks to prediction in the maintenance, based on the analysis of sensor data, allowing the identification of anticipated problems, and on algorithms to optimize inspections and repairs (Vavra, 2018). The use of machine learning, cloud computing and feedback information as part of robotic calibration based on real robot experiments (i.e. historical data also understood as Big Data) provides an unprecedented competitive advantage for the company, as it decreases employee engagement in setting up the production line and setting optimal performance parameters (parameters are set by the central computer system based on data). The level of technological complexity of a smart factory means that the management of such a factory requires, first of all, analytical skills. Computers count profitability and improve the production process, but the management team participates (although to a smaller extent than in the past) in controlling and supervising devices. K. Schwab indicates that the biggest challenge for leaders during the fourth revolution will be the delegation of operational matters, focusing on strategic thinking and disruptive thinking (Schwab, 2016).

The entire product development process is integrated with the process of its development and modification (Digital End-to-End engineering along the entire value chain (Digital End-to-end engineering across the entire value chain). Real-time end-to-end work supports resource planning at every stage of production and cooperation within the value chain. Deeper integration with suppliers will enable the use of cloud technology and track & trace solutions that will enable the management of the supply process (Lasi, Fettke, Feld, Hoffmann, 2014).

The aspects of product quality will also change. The product adjusted to the individual needs of the customer will have different quality artifacts than mass products (one can talk about a personalized product) (Kagermann, 2014). Quality is first and foremost the precision of the product made by robots. Quality, understood as the physical characteristics of the product, will be perfectly stable (accurate, the same, reproducible). Customers in new solutions can order products in line with their own expectations, e.g. they can order a bag, which they will design with the help of a wizard via the Internet, and the company will produce it without the need to carry out onerous changes on the production line (Plattform Industire 4.0). Precise and faster than ever recognition and adjustment to market needs takes place by combining external information from the value network with data on the functioning of the company, flexible configuration of manufacturing systems, and integration in the value network. The service process is faster because customers order products online (Matwiejczyk, 2018) – chatbots about sales and service use and handling complaints (using the John Lewis department store network). Figure 1 shows the components of Industry 4.0.

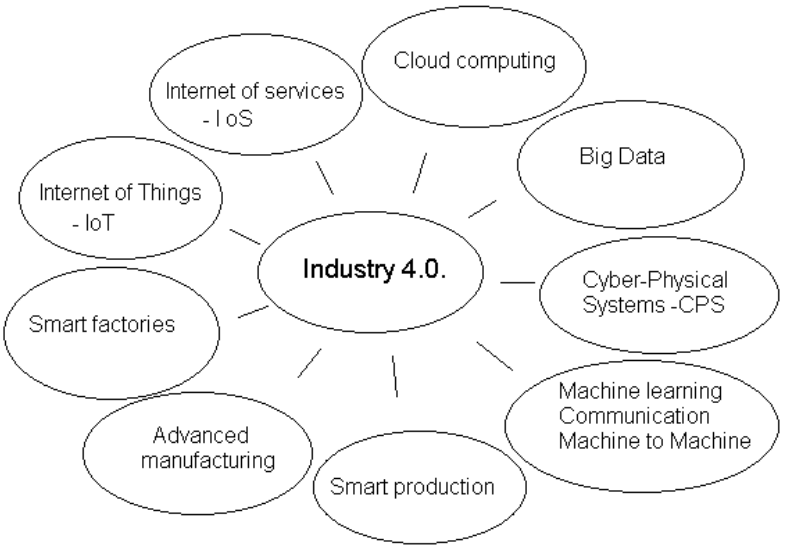

Figure 1. The components of Industry 4.0. Source: authors' own elaboration – literature study.

Enterprises undertaking implementation in the production of solutions characteristic for Industry 4.0 first select a part of production that will act as a cyber-physical system. This stage of action is referred to as pilotage. The implementation of a pilot production system based on the requirements of Industry 4.0 requires guaranteeing financial resources from the enterprise. Plants joining the implementation of production solutions defined as Industry 4.0 should be equipped with a technical and IT infrastructure serving the production process (selected devices), which will allow further automation and computerization of production. Investments in advanced technologies and in the software supporting them are a necessary condition for new production. Because investments in 4.0 industry are not a one-off but a continuous process, after the pilot project of robotics of the production line, the companies go to the next one, which requires further investment projects to be taken into account in the long-term (Gajdzik, 2018).

3. The heat treatment process of metallurgical products in a metallurgical company

In the case under consideration, the production enterprise produces square and flat bars of various sizes and narrow tolerances (even in small production batches) from semi-finished products purchased from the smelter. The most important products include: steels for turbines, stainless steels for the production of knives, tool steels and nickel alloys. In the enterprise, steel is rolled hot using a duo mill set in the line of a flat bar and a continuous line. Rolling mills cooperate with heating and cooling aggregates, allowing the enterprise to obtain an article with specific physical and chemical properties (heat treatment allows the improvement of the material and gives it appropriate properties according to the client's wishes), e.g. increasing hardness, resistance to high temperature, durability and plasticity.

The entire process is controlled by the use of devices controlling the parameters of the machines' operation and the control of the parameters of the products obtained, starting from planning the heat treatment of the material, to the final product. The individual parameters of devices and product features are processed by the computer system, until the results of laboratory tests are released. The process of controlling the operation of equipment at this stage is burdened with the probability of human error, which is incorrectly entering data from the plan in the computer system, which results in an inaccurate heat treatment plan at the entrance to the production system.

Each heat treatment process is planned by a specialist for production planning – the main technologist. The technological process is taken into account (depending on the species, it is necessary to perform a heat treatment up to 6h or 24h after the rolling), the order resulting from the dates confirmed to customers, the scope of furnaces work, and process optimization.

Based on the heat treatment plan, the employees prepare the material and load arrangement. The furnace operator, based on the heat treatment plan, enters data into the system and supervises the entire technological process. It carries a lot of responsibility, because a small mistake can lead to large losses of repetition. At the stage of material preparation (according to the production card), there may also be an error when allocating the load to a given order. The production card includes: card identification number, melting number, steel grade number, reference standard, required heat treatment, batch format, finished dimensions, possible range of deviations, type of required surface, and required product weight. Employees use standards that give guidance in the minimum and maximum chemical composition, but the employee assigns the batch itself based on the number of the melt. The furnace is loaded evenly, symmetrically in relation to its length and width. Employees carry out visual inspections, assessing cracks or other surface defects of the material.

Material with surface defects is withdrawn and is not hardened. For softening annealing it is necessary to bind the material in several places with a wire in order to avoid spillage. The faculty employees use pyrometers to control the temperature of, e.g., tempered material. During rolling, cracks, discontinuities or scratches on the mill are possible. Unnoticed defects during rolling can lead to material destruction. In the heat treatment department, the rolled material is marked with appropriate labels by employees. These labels are designed to determine the grade of steel. They are a very important element because their identification allows further production processes. Labels improperly marked by employees, from the moment of rolling, or improper identification of material by an employee, cause the process to be repeated. During annealing, the material may not exceed the permissible mass depending on the dimensions – e.g. max 3 tonnes for the dimensions of the rolled product 30x30 mm.

In the heat treatment department there is a work organization system: 2+1, namely 2 employees are assigned to supervise the processes (stacking material for thermal improvement), and one employee is designated to cut samples in the laboratory on several saws at the same time. Shortages in the crew (random, sickness and holiday factors) disrupt the

organization of work. Workers' absences can't be replaced by new employees in a short time because professional experience is required. The machine park owned by the company is in need of repairs (the company records crane failures and furnace failures). Incorrect operation of the crane, such as: jamming and temporary stops causes a delay during hardening, as a result of, for example, sub cooling of the material. Furnace failure, mainly burner failure, causes temperature differences above 15°Celsius, which results in different temperatures in the furnace zones, and ultimately affects the uneven heating of the charge (material) during the process.

4. Analysis and evaluation of the production process of steel products

4.1. Application of the Ishikawa chart for the assessment of the technological process

The example production process shown was analyzed using the Ishikawa chart. The use of Ishikawa's structure to assess problems in the production process under investigation has become a form of non-compliance presentation in the following areas: men (employees), machine, method (technology), material and management. Figure 2 presents the results of the analysis – Ishikawa diagram.

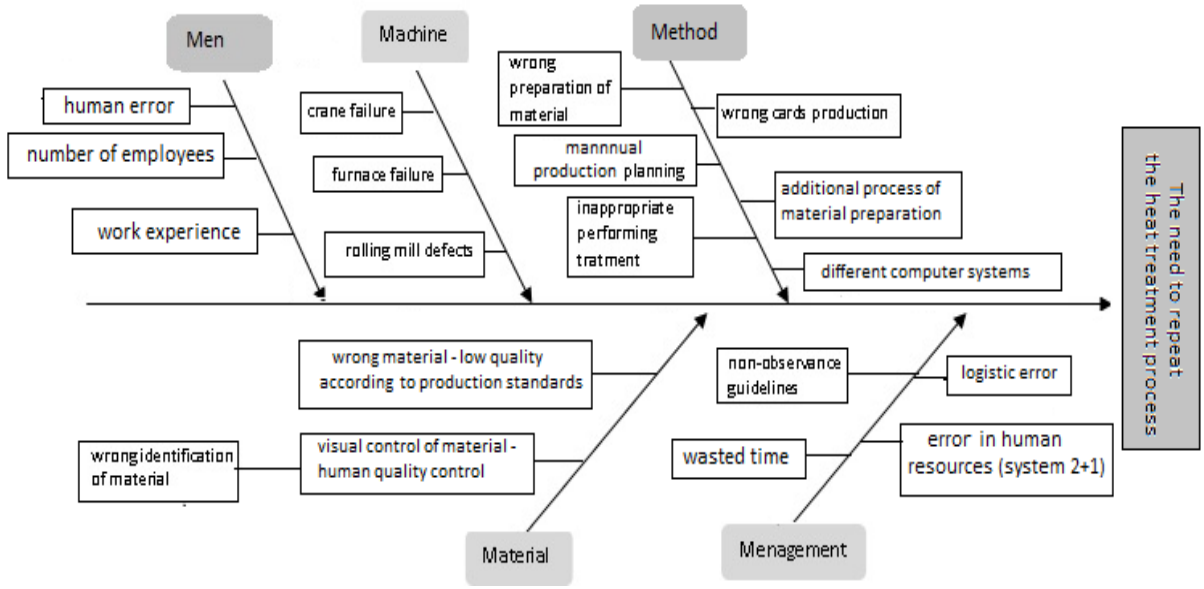

Figure 2. Ishikawa diagram – presentation of incompatibility of the analyzed production process. Source: authors' own elaboration.

4.2. Spot evaluation of non-compliance in the technological process

In the next step of the analysis, individual incompatibilities were assessed. The following incompatibility scale has been adopted: 1 – very small, 2 – small, 3 – average, 4 – large, 5 – very large. The assessment was made by the employees of the company with the participation of external experts. The evaluation team consisted of five people. Final assessments were agreed by

team members during the discussion to eliminate the indication of extreme evaluations by study participants. On the basis of the frequency of non-compliance or problems in the correct course of the process, the severity of non-compliance was also indicated. The weighted value was calculated. The results of the assessment are summarized in Table 1.

Table 1.
Evaluation of non-compliance of the analyzed production process

There was a discrepancy	The causa of non-compliance	Assessment of non-compliance (1-5)	The severity of non-compliance	Weighted value
Erroneously entered data into the computer system from the heat treatment plan by employees	men	3	0.05	0.15
Visual assessment of the batch material by the employee (scratches, cracks or other surface defects) – inaccurate assessment of the quality of the batch material	men	3	0.05	0.15
Manual input of data from the heat treatment plan by the oven operator to the computer system (temperature, process time) – extending the working time	men	2	0.05	0.10
Error when allocating the batch to a given order because the standard gives guidelines in the minimum and maximum chemical composition, and the employee allocates the batch based on the smelting number	men	2	0.05	0.10
Inaccuracies (or missing information) in the description of material coming out of the milling line in the circulation card, and improper or incomplete marking of the material (stamped)	men	2	0.10	0.20
Incorrect batch material (scratches, cracks or other surface defects)	material	2	0.10	0.20
Rolling defects occurring during rolling: cracks, discontinuities or scratches of the rolling mill	method	3	0.10	0.30
No compatible data transfer system from the heat treatment plan to the furnace's computer system - time delays	method	2	0.05	0.10
Crane failure: jamming and temporary stop, resulting in delays during hardening, resulting in e.g. sub-cooling of the material	machine	5	0.15	0.75
Furnace failure: torch failure and temperature differences above 15°, which results in different temperatures in the zones of the furnace and ultimately affects the uneven heating of the charge (material) during the process	machine	5	0.15	0.75
Time delays (logistic) during the process – errors at the batch material control stage	management	4	0.05	0.20
Time delays (logistic) during the process – errors in the labelling of the material and labels, no system for monitoring the completeness of filling labels and entering marks for heat treated material	management	2	0.05	0.10
Shift system in the 2+1 system: problems with employee turnover during holidays, sick leave	management	1	0.05	0.05
			1.00	3.15

Source: authors' own elaboration.

The maximum value of non-compliance may be 5 points. In the example, the weighted non-compliance value is 3.15. Many discrepancies in the analyzed process refer to the human factor. Individual errors caused by human work were evaluated at a relatively low level of validity. The highest evaluation of the significance of discrepancies for the correct course of the process

involve machine park failures (threat to stop production). The evaluation of the distribution of individual non-conformities (the arithmetic average of indications in a given category of assessment) is shown in Figure 3. On the basis of the arithmetic mean of assessments of the significance of non-conformities for the course of the process within particular categories, the highest category was obtained by machine. The second position is occupied by men, the next methods, the next material, and the last management.

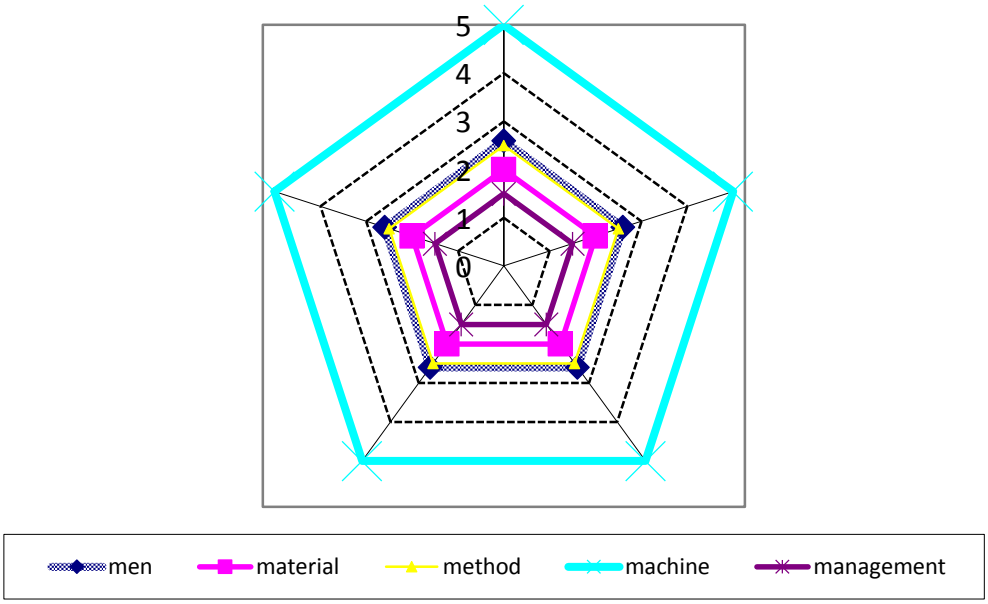

Figure 3. Evaluation of the significance of nonconformities for the proper course of the analyzed process. Source: authors' own elaboration.

5. Application of Industry 4.0 solutions in the heat treatment process

Analyzing the process, it was found that its course (precision of the product) depends to a large extent on man. The most important reason for the problem of re-heat treatment is "human error". In order to minimize it, it is proposed to increase the degree of process automation (in the initial stage – preceding the start of the enterprise to implement Industry 4.0 solutions) and to design robots replacing human work (the actual phase of implementing Industry 4.0 solutions). Robotization in the form of robotic production sockets with robot and human co-operation. The company should consider the purchase of a machine with enhanced intelligence in its investment plans.

For the "technological process" significant incompatibility was the inaccurate preparation of the material for heat treatment, in which the employee prepares the material based on the heat treatment plan, the position of the charges, and in which it is easy to overlook material defects, scratches, cracks or other surface defects. To eliminate this incompatibility, the company should use computer system solutions to broaden the scope of data analysis using

advanced data processing and analysis software. The analysis should be carried out in real time (EMI) using advanced production control algorithms.

For the component "material" the most important incompatibility was the improper preparation of production cards in the allocation of the charge (material for processing) – the activity performed by the employee. The improvement proposal is to develop the structure of a computer program, analyzing the selection of a melt for a specific order. Computer programs equipped with robots with surface material rating sensors contribute to eliminating faulty material. The introduction of robots is also necessary at the stage of rolling the product, in order to obtain more precise parameters of the rolled product (the defects noticed by man during rolling may result during the heat treatment in the extension of the defect). The robots will eliminate the existing types of failures. At the current stage of production automation the company should increase the scope of machine operation monitoring, create the file "Failures", and in the next stage of changes eventually replace the existing machines with new ones. The gradual replacement of the machinery park with devices with a greater degree of automation, and robotics equipped with remote visualization and monitoring of the production process with extensive statistical analysis of production parameters should be considered strategic goals of the enterprise.

After agreeing with the company's management, a schedule for the implementation of individual investments was agreed – table 2.

Table 2.
Time of completion of individual investments

Investment	up to 5 years	5-10	10 and more
Implementation of the data extraction program from the heat treatment plan – advanced data processing and analysis software. Real-time analysis (EMI)	x		
Purchase of a device evaluating the parameters of batch material, installation of diagnostic sensors on individual devices, assembly of RFID gates	x		
Advanced algorithms ensuring the maintenance of the assumed product quality (incompatible incorrect batch material). Expansion of the statistical quality control system. Iinstallation of sensors measuring production parameters and the whole production line		x	
Analysis of production data – advanced data processing and analysis software. Real-time analysis. Advanced algorithms eliminating errors at every stage of production		x	
Creation of a data centre on the course of the process – data should be collected in one place - data centre (leaving the collected data in separate files will make it difficult to use them due to the multiplicity of computer systems) – Information and Communications Technology – ICT		x	
Tools supporting maintenance and preventive activities in the machinery park. Failure algorithms. Remote support systems. Maintenance management systems (CMMS, EAM)	x		
Intelligent logistics. Mobile interfaces – multifunctional equipment that increases communication efficiency of production employees. Support for augmented reality		x	
Integration of machines and computer systems, self-learning machines, communication: machine-machine, machine-worker			x
Replacement of automated devices for intelligent work. Integration of devices at IT (information technology) and OT (operational technology) levels			x

Source: authors' own elaboration.

For the analyzed company the following approach was proposed in the implementation of Industry 4.0 solutions. The implementation of changes should start with the entries in the company's development strategy. One of the strategic goals of the company should be striving to achieve production at the level of Industry 4.0. A managerial position should be created in the organization's structure – Industry Director 4.0 – as the person responsible for the implementation of the strategic goals defined as Industry 4.0.

Strategic goals for Industry 4.0 and included in the company's strategy should be passed on to tasks that should be included in the company's investment plans. The Act of 28 July 2017 on Amendments to the Personal Income Tax Act and the Corporate Income Tax Act, also referred to as the Act on Robotization (Official Journal of the Republic of Poland, 28 July 2017, item 1448) enables enterprises to implement an annual one-off settlement of expenditures on fixed assets (innovative) up to 100,000 PLN (Article 1 of the Act). The management company of the investment plan should select the task that will be implemented first (Industry 4.0 pilot program – task 1). The pilot programme can be implemented on an already existing technical and IT infrastructure of the company provided that it allows for further automation and robotization of the production cycle. After the implementation of the pilot programme and its completion, go to the next task. Works at the operational (IT) level and IT level (IT) must be linked – the correlation of IT and OT systems. (Figure 4 – the path of implementing Industry 4.0 solutions in the enterprise).

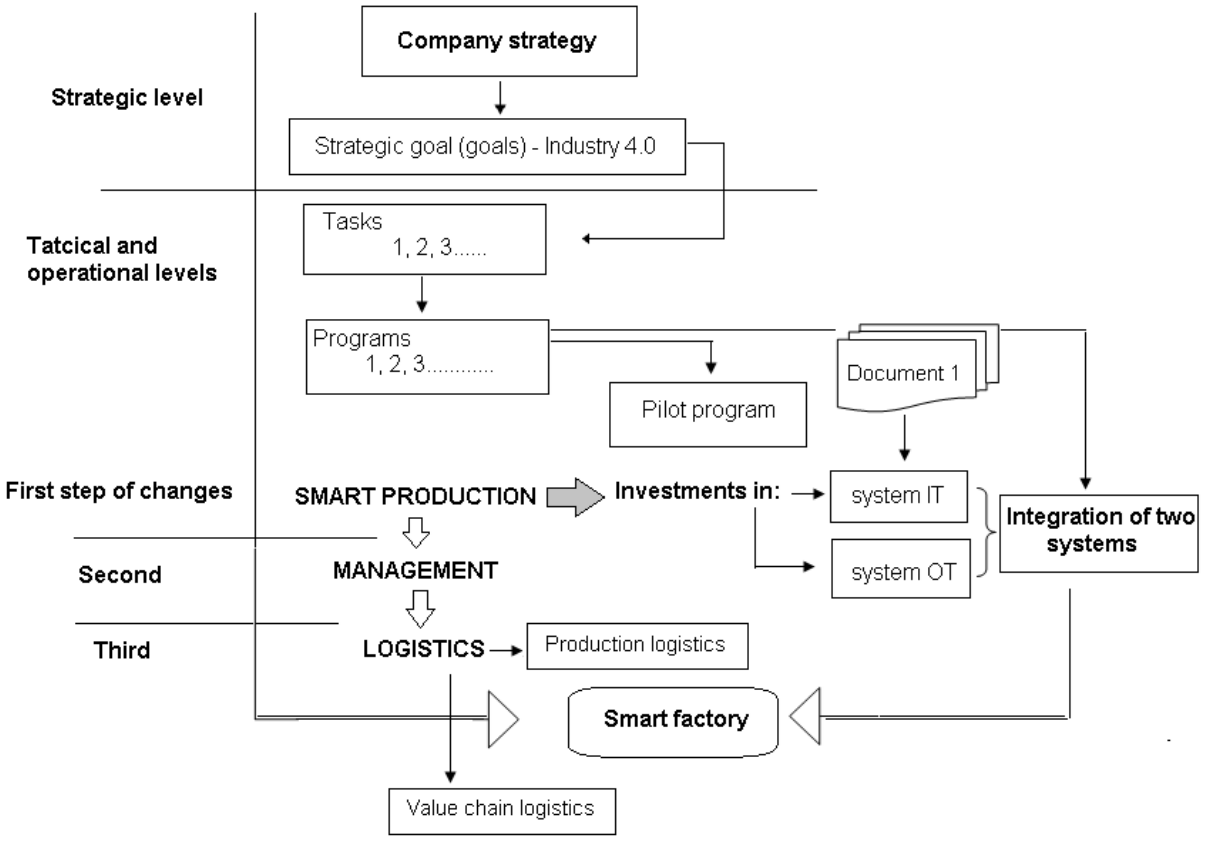

Figure 4. The path of implementing Industry 4.0 solutions. Source: authors' own elaboration.

The company's entry into industry 4.0 requires not only changes in production, but also in management and logistics. Production, management and logistics are three important components of changes in the company's pursuit of reaching 4.0.

Changes at the management level should include the concept stream Management 3.0 – referred to as modern management. It is a collection of constantly evolving practices, games and ideas for better management with fewer managers. According to the assumptions of this concept, the most effective management systems are network systems, the key element of which involves dependencies between people (and in Industry 4.0 – the relationship between the "intelligent machine" and the human). These are systems in which the leader ensures proper care for the team, streamlining its operation, and the members naturally adjust to each other (Bauer, and Erdogan, 2016).

It will be necessary to change HR programmess, taking on new staff – an increase in the demand for engineers who can combine automation and robotics with IT, and forecasting and simulation engineers.

The improvement of logistic processes concerns both internal logistics (production logistics) through the purchase and assembly of autonomous vehicles and conveyors or other self-steering devices for internal transport of materials and products, as well as external logistics within the supply chain. Cooperating enterprises will create a network of values (in the value chain in the sense of M. Porter, in which a product or service moves one-dimensionally to subsequent organizational units, each adding value) (Porter, 1992). It will be a multi-dimensional structure in which the source of values is the combination of network links, based on interoperability (devices, platforms) (Jeschke, 2016; Pfohl, Yahsi, & Kurnaz, 2015; Angeleanu, 2015).

6. Conclusions

The problem being investigated, which is the necessity of performing repeated heat treatment processes, negatively affecting the entire production process, was analyzed and evaluated on the basis of the Ishikawa diagram. Due to the fact that we are currently at the threshold of the industrial revolution, solutions to the problem resulting from the transformation of the production enterprise to Industry Factory 4.0 have been proposed. The implementation of modern technology, techniques and management methodologies appropriate for Industry 4.0 should cover the entire production process as well as management processes. It can be argued that only in such a case will there be a sufficiently strong effect of complementarity and synergy, indispensable in the world of the fourth industrial revolution for the transformation of the studied enterprise from its current status to Factory 4.0.

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CONSTELLATIONS OF CONDITIONS AFFECTING EMPLOYEE JOB SATISFACTION IN SMALL AND MEDIUM POLISH ENTERPRISES. A QUALITATIVE COMPARATIVE ANALYSIS

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Abstract: Nowadays, SMEs operate in an increasingly competitive environment, full of threats from competing companies. One of the big challenges facing small and medium enterprises is human resource management. People spend most of their hours at work, and job satisfaction plays a vital role in an efficient work environment. Employee job satisfaction is a very complex construct, and is considered a critical factor in the organization's success. The purpose of this article is to examine how various, selected factors, such as: identification with the strategy, leadership style, job security and awards, simultaneously affect employee job satisfaction in Polish small and medium-sized enterprises. The sample of the study includes employees of Polish small and medium enterprises. Based on data from 274 surveys with Polish small and medium sized enterprises' employees, fuzzy-set Qualitative Comparative Analysis was used to investigate several combination of conditions affecting job satisfaction. The results presented in the article confirm that a high level of job satisfaction can be achieved through many constellations of conditions. Small and medium-sized enterprises can adopt in practice these specific factors in several constellations to obtain a higher level of employee job satisfaction.

Keywords: employee job satisfaction, SMEs, fuzzy – set qualitative comparative analysis.

1. Introduction

Satisfaction in everyday work is important in the life of every person, because we spend most of our time working and engaging in some business to make a living. Job satisfaction is one of the most complex areas that managers face when managing their employees. The satisfaction of employees with their work is also one of the main goals of both large, and small and medium-sized enterprises, because it translates into the broadly understood success of the company.

Studies on job satisfaction are numerous because initial research into the context of attitudes related to work began before World War I and was developed in Great Britain, Europe and America. The first mentions and definitions of job satisfaction date back to the 1930s.

According to Fisher and Hana (1931), job satisfaction is an internal factor, and can be considered as an emotional adaptation to working and employment conditions. So, if the work is fun for employees and makes them happy, they will be satisfied with their work. According to Hoppock (1935), job satisfaction is a complex and multidimensional concept, related to psychological, physical and social factors, that makes a person state: "I am satisfied with my work". There are various definitions of job satisfaction. First of all, it can be defined as concerning one's feeling or state of mind related with the work (Chughati, and Perveen, 2013), and "an employee's positive attitude towards the company, co-workers and, finally, the job" (Sypniewska, 2014).

The employees' attitude and opinion can be positive or negative towards work. Job satisfaction is a general expression of workers' positive attitudes built up towards their jobs, because when workers are satisfied with their jobs, they form positive and pleasant attitudes towards them. On the other hand, if employees are dissatisfied with their jobs, they form negative and unpleasant attitudes towards them (Armstrong, 2003). Job satisfaction is an attitude which is related to attitudes towards life and service quality (Illes et al., 2009). Locke (1969) defined job satisfaction as a positive emotional feeling, the result of a person's evaluation of his or her job experience by comparing what he or she expects from his or her job and what he or she actually gets from it. Employees' opinions and attitudes about the organizations they work for are very important, and their performance depends on their satisfaction at work. If the economic benefits, the job's own specific characteristics, the social status, and the job expectation employees hoped for are appropriate to employees' desires, job satisfaction is achieved. The positive attitudes of employees towards the whole business environment as a result of their experiences of the work-environment are called job satisfaction. Satisfaction of employees (Job satisfaction-JS) is an emotional condition of the individual about his/her position at work (Warr, and Inceoglu, 2012). The final effect of his/her work depends on his/her satisfaction, which is expressed in the profit that the employee creates. According to Moyes et al. (2008), employee satisfaction may be described as how pleased an employee is with his or her position of employment.

Job satisfaction is very complex phenomenon which is influenced by numerous factors and has been widely studied in the literature. Previous researches were usually focused on the relationship between a single factor or determinant and job satisfaction, and resulted in partial views on job satisfaction, i.e. single variables which affect job satisfaction, without taking a global view to indicate how different factors simultaneously affect job satisfaction.

The aim of this paper is to investigate and indicate the constellation of different conditions which lead to employee job satisfaction in Polish SMEs. Accordingly, this empirical study adopts a Qualitative Comparative Analysis using fuzzy sets (fs/QCA) to explore the connections between employee job satisfaction and chosen conditions, such as: integration with the strategy, leadership style, job security and awards. These factors were selected based on a critical literature analysis. First, briefly reviewing the literature on a set of conditions, namely

the variables influencing employee job satisfaction, is done. Then the methodology of research (fuzzy set Qualitative Comparative Analysis) is presented. The results of the analysis and the conclusion are discussed in the last section. These empirical studies are part of a research area whose results related to other factors and their relationship with employee job satisfaction are presented in publications (Gębczyńska, and Kwiotkowska, 2018a, 2018b, 2019).

2. Theoretical background

There are many factors that contribute to the fact that employees are satisfied or dissatisfied with their work. These factors are divided into two groups: those relating to the organization and those relating to the personal characteristics of the employees. In the article, based on a critical review and analysis of the literature, from the group of factors related to the organization, the following were selected: identification with the strategy, leadership style, job security and awards. These factors will be discussed below.

In an increasingly competitive world, employees' organizational commitment and job satisfaction have become important components of human resource management. Organizational commitment is a psychological link between employees and their organizations, which makes it less likely for employees to voluntarily leave the organization (Allen, Meyer, 1996). Organizations must clearly define their goals to support the involvement of their employees and their identification with strategy and organizational goals (Patterson et al., 2005). Bart, Bontis and Taggar (2001) link employee job satisfaction to the organizational mission and strategy. Therefore, on the basis of literature analysis, one of the factors was defined as "identification with the strategy" (also called clarity of organizational goals). Clarity of organizational goals – a concern with clearly defining the goals of the organization (Locke, 1991). The management and applied psychology literatures generally define goal clarity as "the extent to which the outcome goals and objectives of the job are clearly stated and well defined" (Sawyer, 1992). According to goal setting theory, an employee performs better if the goals that guide work are clear, specific, and challenging rather than vague, ambiguous, and unchallenging (Latham et al., 2008; Rainey, & Jung, 2015). So if you know better what is expected of you, the course of action that you should take to achieve the goal becomes clearer and more likely to reach the goal, which translates into greater satisfaction with the tasks performed and job satisfaction. Both identification with the strategy and job satisfaction are highly related to the development of an organization. So the improvement of employees' identification with the strategy and goals related to realizing the enterprise's strategy is always a priority for organizations.

Leadership is a social influence process in which the leader seeks the voluntary participation of subordinates in an effort to reach organizational goals, a process whereby one person exerts

social influence over other members of the group, a process of influencing the activities of an individual or a group of individuals in an effort towards goal achievement in given situations, and a relational concept involving both the influencing agent and the person being influenced (Bhatti et al., 2012).The success of organizations depends on the involvement, efforts, and commitment of their workforce. One of the factors for organizational success is the manager's leadership style. At the present time organizations are more concerned about developing, understanding and modifying their leadership style in line with the firm's strategy, structure and system. Leadership style has deep relevance and influence on the human resources of a firm in terms of attracting people to achieve the goals of organizations (Skansi, 2000). The employee satisfaction level on the job can be determined by the leadership style. The attitude of the manager and how he or she approaches his staff affects the team. The leadership style always directly or indirectly affects the job satisfaction of the employees in their organization. Research indicates that transactional leadership style and transformational leadership style have a positive relationship with employee job satisfaction in small and medium enterprises (Sakiru et. al, 2013). Transactional leadership is dependent on leader-follower exchanges. Followers execute based on the drive and trend from the leaders, and leaders absolutely reward the efforts. The standard is an outcome which may be undesirable, like disciplinary action if followers neglect to adhere to instructions, or it may be encouraging, like commendation and acknowledgment if aides adhere to the committed path established by the leader and achieve the given objectives (Sakiru et. al, 2013).

A transformational leader encourages his/her subordinates to achieve organizational goals and objectives, and to reach their potential by providing the mandatory resources (Ansari, and Arastoo, 2008). Transformational leadership style positively effects employees' job satisfaction (Asghar, and Oino, 2018). In addition, transformational leaders motivate and encourage their subordinates to enhance their learning in terms of skills set and knowledge. They also act as role models and provide an encouraging work environment for their subordinates (Hassan et al., 2013).

Employees are a real treasure and the most valuable resource for any organization, and each organization wants to get the maximum benefit from its resources. Employees can only perform well if they are satisfied with the organization, and this happens if there is job security. One of the most consistent findings in the job satisfaction literature is that the effect of job security on job satisfaction is large and significant (Kraimer et al., 2005). Job satisfaction comes from different factors, some of which include a pleasant work environment, friendly management, a good salary package, job security, organizational justice and career opportunities (Aquino, et al., 1999). Researches have shown that job security induces the organizational commitment of workers, which refers to the degree to which a worker identifies with his/her work or organization and its goals, and willingness to maintain membership in the organization (Apkan, 2013). Researches on job security also show that it relates with job satisfaction while job insecurity relates with job dissatisfaction (Ashford et al.,

1989) and negative physical health (Roskies, and Louis-Guerin, 1990). When the employee is not satisfied with his or her job, he or she starts looking for a new one and becomes less involved in performing his or her duties. Job satisfaction arising from job security is a major factor affecting the quality of the employer-employee relationship (Nikolaou et al.,2005). Job security is an employee's assurance or confidence that they will keep their current job. Silla et al. (2009), in their research among 639 workers from six organizations, found that high perception of job security will also result in higher job satisfaction. Research by Wolff (2008) reported that job insecurity showed a strong relationship with negative physical health such as fatigue, insomnia, and pain in the body. Employees with a high level of job security have a low probability of losing their job in the near future (Sageer et al., 2012).

There are different factors that are used to motivate employees, and one of these is to recognize their work by saying thank you. Reward is a broad construct that has been said to represent anything that an employee may value that an employer is willing to offer in exchange for his or her contributions (Chiang, and Birtch, 2008). The reward is also defined as all cash, non-monetary and psychological payments that the organization provides to its employees (Bartol, and Locke, 2000). Rewards are divided into two groups: intrinsic and extrinsic. There are a wide variety of intrinsic rewards available which increase the satisfaction and overall job-related productivity of employees. Researchers who work on different intrinsic factors suggest that these factors have a significant impact on the job satisfaction of employees. Some of these rewards come in the form of job involvement, participate in decision making, job autonomy, task significance and recognition. These rewards have their merits in creating a highly satisfied workforce. Extrinsic rewards are the social and organizational rewards. Social rewards refer those that can be derived from interaction with others on the job. Organizational rewards are tangible rewards like pay, promotions, and other job related benefits. Researchers' findings show that extrinsic rewards are significantly more correlated with job satisfaction as compared to intrinsic rewards. Rehman et al. (2010) found that extrinsic rewards have a strong relationship with job satisfaction as compared to intrinsic rewards. Flynn (1998) argued that rewards and recognition programmes maintain high spirits among employees, boosts their morale, and create a linkage between the performance and motivation of the employees. Research results also indicate that the system of organizational awards plays a key role in increasing employee satisfaction. Organizations focus on financial rewards, and non-financial rewards are increasingly overlooked (Chiang, and Birtch, 2008). Gerald and Dorothee (2004) indicate that rewards for work are a strong indicator of job satisfaction, and rewards are largely related to professionalism and job satisfaction, and job satisfaction depends both on financial and non-financial rewards, so organizational reward systems should include both of them.

3. Methodology of research

A methodology for obtaining summarizations from data that are associated with cases, developed by the social scientist Charles Ragin, is the fs/QCA (Ragin, 2000). In recent years, the use of the fuzzy set Qualitative Comparative Analysis (fs/QCA) in business and management research has increased (Ozdem, and Sezer, 2019; Berger, 2016; Fiss, 2011; Kwiotkowska, 2015, 2017; Ma et al., 2019). It is a more recent and extended version of the QCA that may be used for contextual analysis, which investigates how causal relationships are dependent on contextual conditions, and is furthermore much closer to statistical approaches (Stokke, 2007; Denk, and Lehtinen, 2014; Mas-Verdú et al. 2015). The Fs/QCA is a diversity-oriented approach which proposes different alternative paths to understand the construct of an outcome, and is furthermore well suited for observing complex phenomena (Kent, 2005; Shipley et al. 2013; Henik, 2015).

This study employs fuzzy sets (fs/QCA) to explore the connections between employee job satisfaction and selected conditions, such as: integration with the strategy, leadership style, job security, and awards. Unlike reliance on symmetrical (correlation – based) methods, fuzzy set QCA uses Boolean algebra to specify and test causal recipes (Fiss, 2007; Ragin, 2008a; Woodside, 2015). The process of QCA starts with defining the property space which comprises all configurations of conditions leading to an outcome. Given that the property space delimits potential explanations of the outcome, the conditions should be chosen carefully and anchored in extant theoretical knowledge (Ordanini et al. 2014). Next, the Quine-McCluskey algorithm provides a logical reduction of statements (Ragin, and Fiss, 2008). In this study, all four conditions are assumed, on the basis of a comprehensive review of the literature, to contribute to employee job satisfaction. Scholars have called for using the fs/QCA to supplement regression analysis when the relationships between the dependent and independent variables are not symmetrical but asymmetrical (Kent, 2005; Ragin, 2008; Woodside, 2013). Unlike more quantitative methods which are based on correlation, the fs/QCA seeks to establish logical connections between the combinations of causal conditions (conjunctural causation) and an outcome, which results in rules that summarize the sufficiency between subsets of all the possible combinations based on their causal conditions (or their complement) and the outcome (Mendel, and Korjani, 2013). When causality in the research phenomenon is both multiple – when an outcome has more than one cause – and conjunctive – when these causes work together to produce the outcome, the fs/QCA represents an appropriate method. The fs/QCA aims to show conditions that are sufficient but not necessary to cause an outcome (Woodside, 2013). Thus, rather than estimating some net effects of independent variables, the fs/QCA employs Boolean algebra logic to examine the relationships between an outcome and all binary combinations of the independent conditions. This methodological approach provides the opportunity to detect relevant configurations that guarantee a high performance in the outcome conditions (Fiss, 2011; Henik, 2015). In this study, computer program fs/QCA version 2.5 by Ragin and Deavey was used (Ragin, and Deavey, 2009).

The sample of the study includes employees of Polish SMEs, and the fieldwork contains information from 363 surveys (November 2016 – February 2017). After the exclusion of incomplete questionnaires, data for the analysis comprise 274 valid surveys (a response rate of 75.48%). The survey includes four scales (integration with the strategy, leadership style, job security, and awards) in the form of statements to which respondents indicate their level of agreement/disagreement on a five-point Likert scale. All item loadings are higher than 0.7. An extensive review of the relevant literature supports the validity of the scales (see Table 1).

Table 1.
Scales measurements

Construct	Adapted from	Cronbach Alpha
Integration with strategy (clarity of organizational goals)	Construct was measured by 5 items from Patterson et al. (2005)	0.87
Leadership style	Construct was measured by a 20-item Leadership Style Questionnaire, developed by Northouse P.G. (1997)	0.92
Job security	Construct was measured using 11 items from Kraimer, Wayne, Liden, Sparrowe (2005) and Clark (2005)	0.93
Awards	Awards practices were measured using 6 items (Tessema, Soeters, 2006)	0.82

Source: author's own study.

From a psychometric perspective, one single-item overall measure capturing job satisfaction was used. The use of single-item measures to operationalize this construct (Cronbach Alpha = 0.929) compares favourably with the use of multiple-item measures (Dolbier et al., 2005). The research model is presented in Figure 1, and it is verified in the process of scientific research.

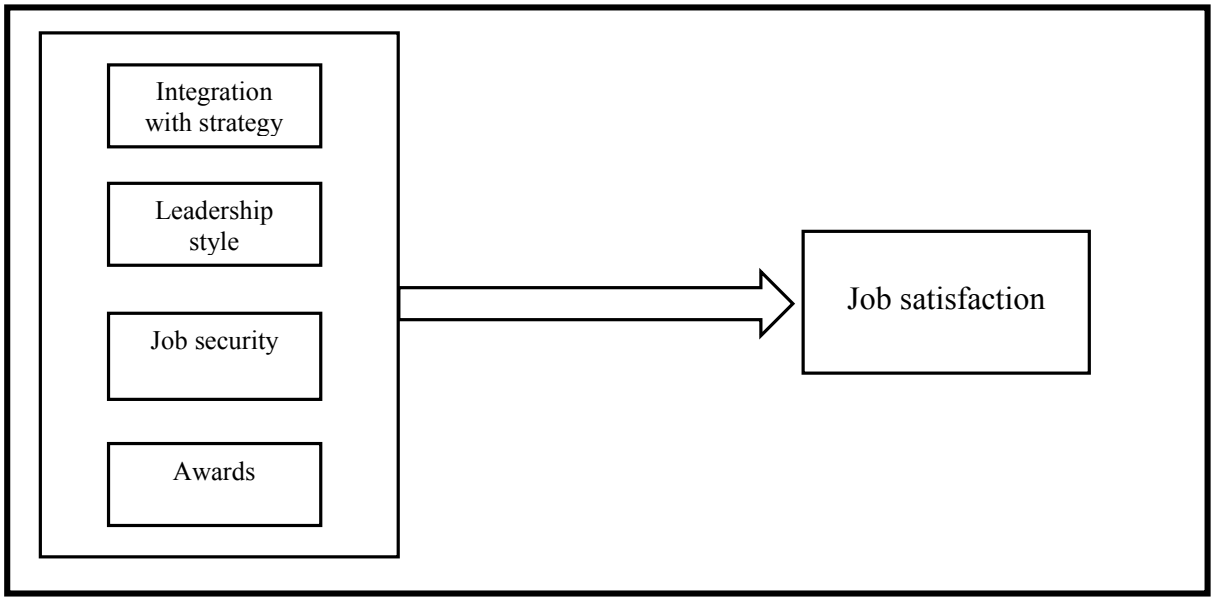

Figure 1. Conceptual model. Source: author's own study.

4. Results

The results are presented in Table 2. In this table each column represents a constellation of causal conditions with their corresponding raw coverage, unique coverage and solution consistency. The numbers at the bottom of the table represent the coverage and consistency of the solution as a whole. The parsimonious and intermediate solutions were presented and analyzed (Ragin, and Fiss, 2008). Full circles (●) indicate the presence of a condition, while barred circles (⊖) indicate a condition's absence. Furthermore, core and complementary conditions are distinguished by the symbols' size: larger circles indicate core conditions that are part of parsimonious solutions. Smaller circles indicate complementary conditions that only occur in intermediate solutions. Each panel represents the alternative causal combinations or recipes for the outcome (Ragin, 2008b). These are consecutively numbered C1 and C2.

Table 2.
Constellation of conditions leading to job satisfaction

Condition (factors)	Constellations	
	C1	C2
Integration with strategy (clarity of organizational goals)	●	●
Leadership style		●
Job security	●	●
Awards	●	⊖
Consistency	0.88	0.90
Raw coverage	0.31	0.34
Unique coverage	0.04	0.05
Solution consistency	0.89	
Solution coverage	0.57	

Source: author's own study.

In brief, consistency measures the degree to which cases sharing a given condition agree in displaying an outcome. Raw coverage measures the overall coverage of a combination that may overlap with other combinations. Unique coverage refers to coverage uniquely due to a combination. Solution consistency measures the degree to which membership in the solution (the set of solution terms) is a subset of membership in the outcome. Lastly, solution coverage refers to the combined coverage of all combinations leading to the outcome (Ragin, 2008a).

According to the results of the analysis, the solution yields coverage close to 57% and consistency of 89%. The first constellation of the conditions C1 combines integration with strategy, job security and awards. Table 2 indicates that there is one core condition associated with job satisfaction, namely integration with strategy, which is complemented by peripheral conditions associated with job satisfaction – job security and awards. This constellation indicates that clearly stated and well defined outcome goals and objectives of an organization, with an employee's assurance or confidence that they will keep their current job and all the cash,

non-monetary and psychological payments that the organization provides to its employees, lead to job satisfaction.

The second constellation of conditions C2 combines identification with strategy, leadership style and job security with absence of rewards. Interestingly, as in the previous solution, the results show that there is one core condition associated with job satisfaction, namely identification with strategy. In terms of peripheral conditions associated with job satisfaction, the QCA suggests that the core condition, absence of awards, must be complemented by leadership style and job security. This constellation indicates that an individual employee's identification with the well-defined outcome goals and objectives of the organization, and involvement in a particular organization, with the attitude of the manager and how he or she approaches his staff, and with a high level of job security, and with low probability of losing their job in the near future, lead to job satisfaction, even if achieving financial or non-financial awards is difficult. Results indicate that if the leadership style is present, there are no rewards, and the presence of rewards is associated with the occurrence of job security. This arrangement of conditions in different constellations may suggest that the presence of leadership style compensates for the absence of awards, while the total absence of leadership style is compensated by the presence of rewards and job security.

5. Conclusion

Examining the factors and determinants that create paths to explain and understand the job satisfaction phenomenon is important from the organizational point of view, because it can indicate the future directions of strategic activities that can help achieve a higher level of job satisfaction. Use of the fs/QCA is an original contribution to the wide range of research on job satisfaction, by studying the effect of all of the selected conditions simultaneously.

It is worth noting that in these two constellations the identification with strategy is an important and core factor by which employees achieve a high level of job satisfaction, so an individual employee's identification with the well defined outcome goals and objectives of the organization, and his/her involvement in a particular organization, affect employee job satisfaction. Thus, the identification with strategy is a necessary (but insufficient) condition for a high level of job satisfaction. A high level of job satisfaction requires the peripheral conditions associated with job satisfaction, namely job security and awards, or leadership style and job security without awards.

Employee job satisfaction is highly related to the performance and development of an organization, so the improvement of employee job satisfaction is always a priority for organizations. The results of research have practical implications for managers of SMEs, because they may provide them with a more holistic understanding of the factors that lead to

job satisfaction, by investigating simultaneously the influence of chosen factors. Use of the fs/QCA in this research provides managers with two constellations of conditions affecting employee job satisfaction. Small and medium-sized enterprises can adopt in practice these specific factors in two constellations to obtain a higher level of employee job satisfaction.

The results of this research should be considered in light of limitations, the most critical of which relates to the data source. The data in this study come from a limited research sample – Polish SMEs. Future research could replicate this study in other companies and countries or regions. Second, this study considered and examined a few factors of job satisfaction selected based on critical analysis of the literature. In future, light should be shed on other variables (e.g. age, gender, education) for further understanding of job satisfaction.

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RESOURCE-WISE DETERMINANTS OF FORMULATING AN ORGANIZATION'S STRATEGY

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Abstract: The aim of this article is to show that the models of management created by authorities are a live issue. This particular case pertains to the principles of Professor Karol Adamiecki, which refer to a resourceful approach to strategic management. The starting point for the analysis involves challenges of strategic management. These arise, in particular, from a reassessment of strategic and competence-related potential resources in the organization. In this paper material and immaterial resources, core competencies, and capabilities of the organization in the context of classical models of strategy are discussed.

Keywords: core competencies, core capabilities, resources, strategies.

References to Karol Adamiecki's theory – introduction

Karol Adamiecki, a professor at the Warsaw University of Technology and a business practitioner, enriched the science of organization and management with three laws: division of labour, law of concentration, and law of harmony, which are all still valid. He recognized that technology, economics, and theory of organization are based on natural laws or axioms[1]. The professor's laws are to this day the subject of discussion and often fierce polemics. According to K. Adamiecki's point of view:

- Harmonization is reflected in the fact that each process, each project, should be considered not only from the point of view of engineering solutions, but also from the economic point of view – generating certain costs.
- The relationship between the market and the enterprise is governed by the law of supply and demand. Organizational activities of managers must take this into account.
- Another economic law that is important from the point of view of management is the principle of least effort. This means that one should strive to achieve the greatest

[1] The founder of scientific management, F. Taylor, believed that the laws in an organization are created by man.

possible useful result with the least amount of effort and resources (energy, work, physical resources) (Czech, 2009).

- Planning is intended to provide guidance on how to organize activities and terms of cooperation, but also allows us to look comprehensively at every economic entity.
- Leadership and management, alongside capital and labour, are essential economic factors.

The achievements of all management schools are used in contemporary organizational studies. Approaches used in particular fields are not contradictory. On the contrary, they complement each other. There is an ongoing discussion about integrating methods, techniques and analyses that are used today with those used by the classical and behavioural schools and systems theory. It is a methodical collage of all the achievements of organization and management sciences. Also, Karol Adamiecki's contribution cannot be omitted here.

Strategic management is already an age-old discipline, and some even predicted its end and exclusion from organization and management sciences. However, I think that "rumours about its (strategic management) death are premature". The essence is that, similarly to knowledge management or project management, it has its roots in classical theories and can also be found in K. Adamiecki's theories. Strategic management requires careful searching for such options (strategic choices) that have their reflection in the organization's resources. This means building a competitive position using key competencies, distinctive skills or higher-order advantages. K. Adamiecki's laws of harmony, concentration and division of labour refer to a comprehensive look at the company that links it with the environment while also taking into account the strategic architecture of the organization, its vision of the future, and the perspective of time (although not in the modern sense) (Szplit, 2013).

Challenges for strategic management

Strategic management is facing difficult challenges (and I think it always has, due to its specificity) resulting from many phenomena, both in the outside environment and inside enterprises, that force slightly different management methods, functions, and people, and different approaches to strategy, organizational structure, communication methods, and managerial skills. The intangible assets of the organization, and notions such as intellectual capital, staff and company creativity, customer loyalty, the ability to innovate, and to flexibly adapt to changes in the competitive environment, are gaining new significance. The most important source of change in the post-industrial society and of the creation of strategies in the company is knowledge, which is what capital and work were once. In the information society, it is knowledge, not the material goods, which is the dominant form of production (Zacher, 2008). The new capitalists are the capitalists of knowledge (Drucker, 1993, p. 20; Beyer, 2013).

Analytical methods used in strategic management are developing dynamically. Both scientific research and companies themselves contribute to this. Scientists, experts and business practitioners are looking for new solutions and more effective methods of strategic analysis together. The dynamic development of knowledge management shows that mainly intangible assets create value for the client. In the world of information, modern technologies, and product and organizational innovations, it is knowledge that guarantees victory. Knowledge helps companies become faster, more effective and competitive than their rivals in the market. Knowledge is recognized as the most important resource of the organization. It creates added value, it is unique, difficult to imitate, and it is the basis for building key competencies (Nonaka, Takeuchi, 2000, p. 24-25; Barney, 1991). The arguments for knowledge management come mainly from strategic management, and from the need to meet the increasing turmoil of the environment and growing competitiveness in the globalized world.

Project management specialists, in turn, indicate that this concept gives an opportunity to adjust the way of conducting business in a turbulent environment, and to link the operational and strategic areas of the company. Companies are looking for answers to questions about increasing business efficiency, maximizing company value, and achieving compliance of initiated projects with a strategy in improving project activities. "Projects are in fact a carrier for change and a tool for strategy implementation" (Trocki, Sońta-Drączkowska, 2009).

I would describe the challenges for strategic management as a growing "eclecticism". Drawing on achievements from other sciences, especially if we look at the methods used in strategic management, has been a characteristic feature of this discipline from the very beginning. This is nothing special, but is rather inscribed in the very essence of organization and management. Using the achievements of economics, sociology and psychology of organization, management, and exact science is common. Interdisciplinarity, which particularly concerns the methods and tools for studying the environment – technological and economic trends, demographic and social phenomena, regulatory solutions, is also expressed in referring to other sciences.

The purpose of the article is to show the importance of the organization's resources in the process of formulating and implementing strategies, and defining a dynamic approach to towards managing assets. Intelligent enterprises realize many strategies which require unique material resources and competencies. While deciding to change business models, companies have to gain brand new tangible and intangible resources. What is more, they need to investigate possibilities to acquire the necessary assets.

Company resources

In the resource-wise approach, the company is treated as a set of unique resources. A classic, rational, well-established distribution of resources:

- tangible – financial, physical in the form of land, machinery and equipment,
- intangible – human, market (relational) and structural capital.

According to the Skandia Navigator (Edvinsson, Malone, 2001, p. 107 et seq): human capital + structural capital = intellectual capital.

Human capital is the combined knowledge, skills, innovation, and abilities of individual employees of the organization to perform tasks efficiently. It also includes the organizational culture, company values, and its philosophy.

Structural capital consists of: computer hardware, software, databases, organizational structure, patents, company logos, relationships with key clients, and everything that is the company's capability and supports the productivity of employees (*everything that stays in the office when employees go home).* The Navigator performs two basic functions: it allows you to measure intellectual capital and to make specific decisions based on indicators. Measurement takes place in five main areas – finance, customers, processes, employees, development – using 150 indicators. In Skandia, it is called "visualization", the perception of areas invisible in traditional financial reports. Making a decision is referred to as "navigation", that is, determining the position and direction of actions and changes (Edvinsson, Malone, 2001, p. 107 et seq).

An interesting and well operationalized model of measuring the intellectual capital of a company was proposed by A. Sopińska and P. Wachowiak (Sopińska, Wachowiak, 2005, p. 61 et seq). In their methodology they refer to the company's strategic balance sheet and analysis of key success factors. The measurement is made using the weighted score and the assessment profile. The size of the intellectual capital in a particular enterprise is compared to the ideal size of intellectual capital in the sector.

The Skandia classification was used to distinguish the criteria used to measure intellectual capital. In each of the areas – human, organizational, and market capital – 15 criteria were used for the assessment. The criteria are universal and standardized. Although they are both quantitative and qualitative, they have been weighted, which allows them to build intellectual capital profiles, and then evaluate and compare them with the intellectual capital value of the "ideal enterprise in the sector". Listing the profiles of these areas also allowed the authors to create a "cube" of the company's intellectual capital. For strategic management in an enterprise, the following conclusions arise from the application of this method – "organizational development is conditioned by:

- updating and consolidating knowledge,
- efficient communication,
- innovation,

- full and accessible knowledge about clients,
- effective implementation of research,
- high quality of products,
- expanding product portfolio,
- permanent personal relationships with clients,
- committed and effective employees" (Sopińska, Wachowiak, 2005, p. 85).

R.W. Griffin shows what specific human, financial, physical and information resources such organizations as universities, cities or local grocery stores have. In a university, human resources include: academic staff and auxiliary personnel; financial: tuition and government subsidies; physical: buildings, computers and other equipment; information: publications, research reports, etc. The city has human resources in the form of police officers and municipal workers (in Poland, municipal guards should be distinguished); tax revenues and government subsidies are financial resources; physical resources are municipal buildings and various types of equipment; information resources are statistics and economic forecasts. Grocery store: sellers, accountant (human resources), profits, owner's investments (financial resources), building (store room) and shop shelves (physical resources), price lists from suppliers, advertisements in the press (information resources) (Griffin, 2004, p. 5). The only conclusion is the diversity of resources and the need to refer them to a specific organization.

Resources in the context of key competencies and distinctive abilities

Building a competitive advantage can and must be based on appropriately selected resources (broadly understood – physical, tangible and intangible assets) and the company's ability to use them in an innovative and efficient way.

The fundamental premise is to understand the source of the organization's success in the environment resulting from its unique resources and skills. The value of these assets may result from the fact that they are rare, impossible to imitate, and managed effectively. The sources of competitive advantage may lie in the diversity of the company, limited mobility of resources in the market, and barriers to competition (Stabryła, 2000, p. 27). In this kind of approach to researching the company's resources, the concepts of key skills by G. Hamel and C.K. Prahalada, key abilities by G. Stalka, P. Evans and L.E. Shulman, and distinctive skills by Ch. W. Hill and G.R. Jones are the most popular (Gierszewska, Romanowska, 2016, p. 165).

G. Hamel and C.K. Prahalad state that the key source of a comprehensive and lasting competitive advantage of an enterprise is its key competencies (Hamel, Prahalad, 1999, p.165-167). In turn, Ch.W. Hill and G.R. Jones call them distinctive skills (Hill, Jones, 1992, p. 36). Participating in profits from the market of tomorrow requires developing today the company features that will help to achieve this. The key competencies are the right combinations of technological and production skills that allow the company to compete effectively and enter

into areas of activity seemingly not related to their basic skills (Sopińska, 1998). Prediction skills (defining the character and directions of future changes) can become a source of competitive advantage while creating the future:

- The aim of competing is, in the first place, acquiring or developing the constituent skills that create a specific key feature. This may apply to technology, or the company's ability to cooperate through alliances.
- A higher level of competition requires the integration of knowledge from many fields and the accumulation of diversified skills in order to create new features of competitiveness.
- Acquiring and maximizing market shares, competing in the market with key products (Gierszewska, 2003, p. 146).

J. Kay believes that four key capabilities contribute to the long-term success of the company: architecture, reputation, innovation and strategic assets (Kay, 1996, p. 29, 99-102). *Core capability*, or key ability, is the ability to transform key competencies into a specific customer benefit. Architecture is the company's external and internal connections that define relationships with employees, suppliers, customers and competitors. The architecture enables the company to gain organizational knowledge, set up procedures, and flexibly respond to changing operating conditions. There is an internal architecture between the organization and its employees and between the employees themselves, the external architecture between the organization and its suppliers and customers, and the network architecture between a group of cooperating companies. Reputation is the customers' perception of the company. Customers form their own opinion when they acquire information about the company and its products. Any form of marketing can have a specific effect in building the reputation, and not necessarily a positive one. However, such activities as advertising, promotions, company participation in fairs, sponsorship, winning prizes, and charity activities can help build a lasting competitive advantage based on reputation. Innovation means creating better products, seeking more cost-effective solutions in the field of techniques and technology, as well as in organization and management (Adamik, 1997).

A competitive advantage based on innovation can be maintained in the long term provided that it is supported by other capabilities. Innovation itself is generally quickly subject to imitation, even though it is protected by patent and copyright law in many industries. Strategic assets are very specific sources of competitive advantage. According to J. Kay, they include natural monopoly, irreversible costs and exclusivity. A natural monopoly may result from the fact of exploitation of deposits of raw materials located in a given region, or from the standard of products that only one manufacturer (owner) possesses. Irreversible costs are connected with capital investments incurred by the company for managing a given market. One can build a sustainable competitive advantage on these investments only when rivals also have to incur the costs, e.g. creating a service network by a car dealer. Exclusivity as a strategic asset is based on licences or concessions, and generally results from legal regulations.

Key competencies are a synergy effect of unique resources that create the value of the company, and the organizational skills associated with the ability to coordinate and effectively use these resources. The attributes of key competencies are:

- difficulty to be imitated by competitors,
- lack of substitutes,
- "invisibility". They are not easily identifiable for competitors, e.g. by benchmarking,
- durability, if they contribute to the company's success and its long-term development, and have a longer "life" than regular competencies,
- advantage over the competencies possessed by competitors (Gierszewska, 2003, p. 153).

Strategies and resources – classic strategy models

The evaluation of competitiveness and building a strategic position of the company through the prism of assets that are rare, unique, durable, difficult to imitate, etc., needs new methods of evaluation and valuation of these resources, but not only that (Gierszewska, Romanowska, 2016, p. 167)[2]. This is well illustrated by the resource strategy model proposed by M. Romanowska (see Figure 1).

It is not the possession of resources that is the condition necessary to build competitive advantage or strategic advantage, but the ability to manage them. "Treasure Master" can manage his resources in such a way that he transforms them into key competencies and can implement very costly strategies such as quality leadership, industry diversification and vertical integration. His weakness is that he cannot use the resources of the environment. "Rich Dilettantes" are those who have valuable resources but can lose them, leading to the crisis of the company or marginalization of the market position, because they cannot manage and protect them. "Errand Boys" do not have their own resources, which means they have nothing to manage. However, they have such "agility and cleverness" skills that they are often sought-after subcontractors or network participants, e.g. of franchise parties, and also of alliances. "Business Architect" is a real shark in developing effective strategies based on other people's resources. He does not have his own valuable or unique resources, but he is able to acquire them from the environment – from competitors through alliances, or from suppliers and clients through partnership cooperation (Romanowska, p. 233- 235).

[2] It can be said that lawyers classified these resources (especially the intellectual capital of the organization) to know what to protect and how, and the "accountants" have developed many methods and measurement tools: based on market capitalization, return on assets, direct measures and point cards.

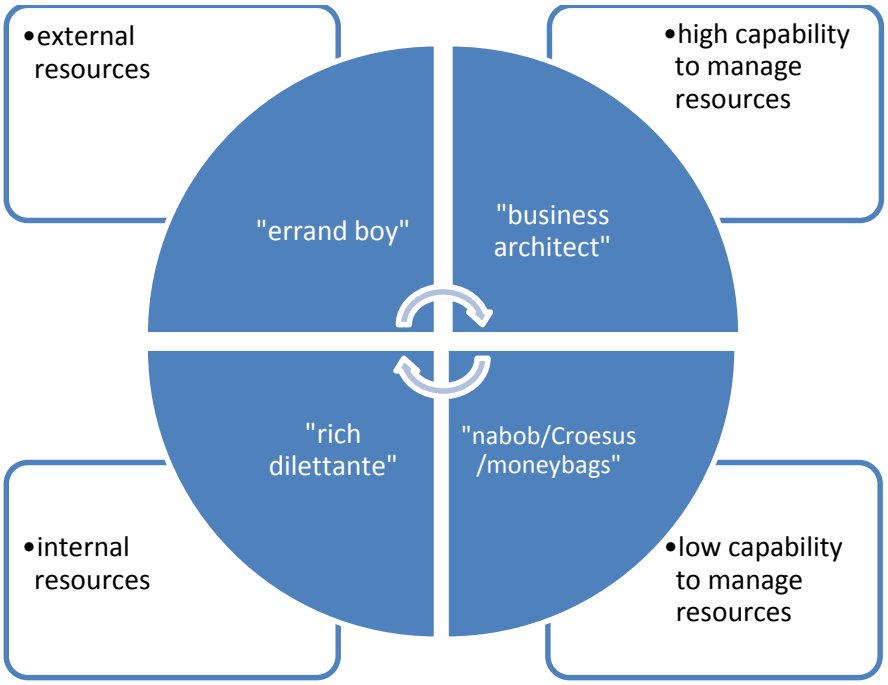

Figure 1. Model strategies of resource management. Source, study based on: Romanowska, p. 234.

Classic models of strategies include H.I. Ansoff's development strategies and M.E. Porter's competitive strategies, both very well known and used, and not only in strategic management. Using them as examples, it is worth showing what resources are important in the implementation of specific strategies.

H.I. Ansoff's model – product/market strategy

According to H.I. Ansoff, strategic decisions are distinguished by the fact that they concern products, markets and resource allocation at the level of the whole enterprise. These are also decisions that cannot be described as routine, because they do not appear automatically. The author recommends that a company's attractiveness should be assessed by taking into account factors of growth, profitability, and opportunities and threats that exist in the environment. The measure of the future competitive position is based on the assessment of (Ansoff, 1985):

- the extent to which the company invests (technologies, knowledge), strategic planning and strategic management capabilities,
- the uniqueness of a strategy based on key competencies,
- the extent to which the company invests in the possibilities of implementing the developed strategy.

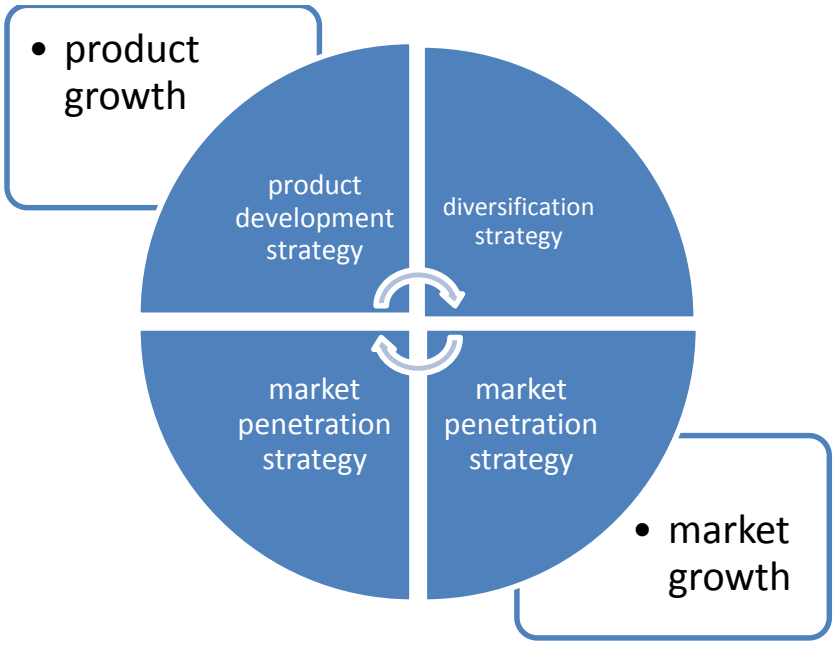

Figure 2. H.I. Ansoff's strategy model. Source: study based on: Ansoff, 1965.

Penetration strategy is chosen by enterprises with limited strategic potential and a lack of resources that enable expansion. Penetration strategies are often chosen by organizations experiencing a crisis, implementing the process of deep restructuring of resources. This strategy is also characteristic in the initial period of activity in the market, when an enterprise entering the sector is looking for a way to develop and build its strategic potential.

Product development strategy is the choice of a strategic option aimed at investing in a product and technology. This means developing the product portfolio, increasing usability, looking for opportunities to diversify product performance traits, improving the quality of products, their reliability, durability, and brand building. As a result of these efforts, the organizations create products that are difficult to counterfeit or imitate. Building a product development strategy requires a very good knowledge of the needs and expectations of customers, and the possession of key competencies and distinctive abilities.

Market development strategy means focusing on the development of new areas of the company's operations, gaining new customers, while maintaining the existing industry specialization. Market development strategy may mean the necessity of changes in sales methods, product availability, service, forms of payment, specialization, and production of custom-made products (*tailor made*). It also requires the ability to build partner relationships with customers and suppliers, and alliances in new markets.

Diversification is the choice of a strategic option focused on the simultaneous development of products and markets. This is the most expensive of the possible ways of company development, requiring a very large strategic potential and diversified resources. Companies with surplus capital that they can invest, skills that allow functioning in new markets, and high technological potential may decide to undertake diversification. Diversification can be concentric or conglomerate, also called pure.

Concentric diversification is the development of the company towards new, but similar to the existing areas of products and markets. For example, the product portfolio is supplemented, the application of organizational and technological knowledge is extended, the production potential is used more efficiently. Conglomerate diversification means the entry of an enterprise into new areas of activity, to geographically new markets, targeting services at different from existing customer groups. In order to implement such a strategy, it must acquire or develop existing resources, including key competencies.

M.E. Porter's U-Curve

The concept of M.E. Porter's five forces became the inspiration for the author to create a strategy model called the U-Curve. The criteria for distinguishing the strategy are market share and profit rate. The strategies of cost leadership, differentiation, and focus (concentration) respond to the challenges arising from the development of competition in the sector, relations with suppliers, customers, and substitutability. Enterprises that are not determined to use specific strategic choices and implement intermediate strategies are described by M.E. Porter as "enterprises that are stuck".

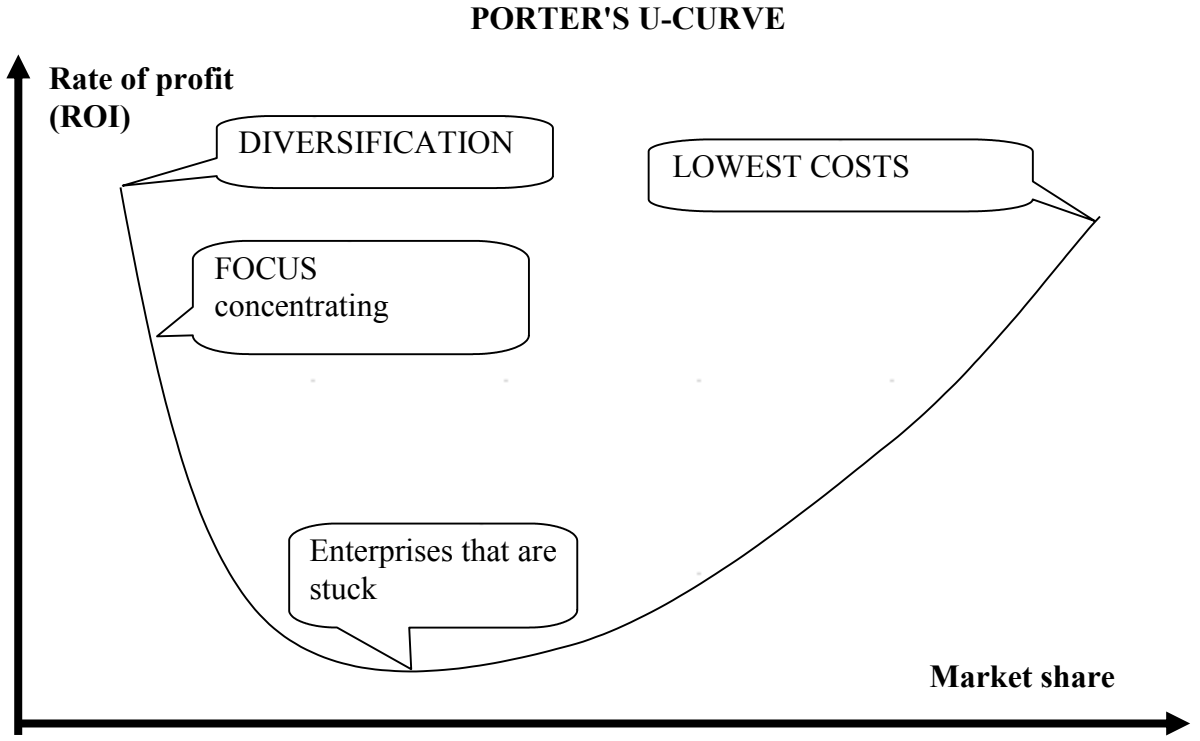

Figure 3. Competition strategies according to M. Porter. Source: author's own study: M.E. Porter, 2000, p. 54.

Cost leadership strategy is focused on a constant reduction of manufacturing costs. This means aggressive investment in new technologies, equipment and tools that ensure production on an effective scale. The following actions are necessary: improvement of products in terms of cost reduction and process improvement, strict work control, effective distribution and service (which often equals minimum after-sales service). Reduction of unnecessary costs is achieved by gaining experience, controlling direct and general costs, and avoiding customers of marginal importance. Companies striving to occupy the position of a cost leader must conduct very accurate analyses of the organization's interior, and build "cost centres – profit centres" structures. Enterprises implementing the strategy of the leading cost position use the effect of learning curve, economies of scale, and access to cheap sources of subsidies. Such strategies are effective in mass production, where standard technologies are used and there are not many ways to differentiate the product. The strategy of the lowest costs requires mainly material resources and structural capital.

In the product differentiation strategy companies base their activities on constantly introducing new products to the market, and building distinctive features in the field of marketing. Their strengths are research and development, and their position in the market is most often associated with the brand of the product built on the traditions of the company. Diversification of a product or service consists in creating something unique, special for the customer.

Differentiation of products is based on their selected features, such as product design, its usability features (durability, reliability), specific associations (fashion, snobbery, prestige, power or position in society), brand, service, payment method, price and availability. The choice of functional features that differentiate a given product should be made in such a way that the set of features is complicated, expensive or time-consuming to counterfeit. Enterprises implementing such strategies have the ability to coordinate various approaches in the field of organization management, to acquire resources, and to influence the client. The strategy of differentiation requires having and developing unique, difficult to imitate, and mainly intangible resources. The strategy of differentiation requires the company to look not only for product innovations based on technologies, but also for ones resulting from the management methods.

Focus strategy (focusing, concentration) is based on recognizing the specific needs of a narrow group of clients, also defined as the niche marketing strategy. It combines the advantages and disadvantages of the cost leadership strategy and diversification strategy. The company decides to target a specific market segment or a selected group of clients, e.g. buyers with unusual needs. The choice may also apply to the market in the geographical sense. The products are "tailor-made", that is, adjusted to the expectations of recipients. This requires having unique skills, often specialized equipment, specific technological skills, knowledge and information. The focus strategy is based on finding dissatisfied customers, market niches, or market segments poorly served by existing suppliers of products. The use of

the focus strategy does not necessarily mean that the company constantly repeats its activities. On the contrary, it requires constant monitoring of changes in the market, customer expectations, and changes in technology. Organizations are looking for ways to create new applications for manufactured products, looking for more efficient distribution systems, and striving to reduce costs in order to reduce prices.

Individual business strategies are always a unique construction, and M.E. Porter's competitive strategies models should be treated as inspirational. The creator himself, over the course of thirty years, expanded the way of thinking about competitive strategies. He introduced the concept of activity as a foundation of advantage over rivals. This concept is an integral element of the value chain, i.e. the path that the company follows to create a product or service. If a company achieves the ability to perform activities at a lower cost than its competitors, or to perform them in an exceptional way, resulting in creating an excess of value for the buyer, then in effect it gains an advantage in the market. The operational efficiency of the company means doing similar activities more efficiently than rivals, and the durability of this advantage results from the entire system of activities (Porter, 2001).

M.E. Porter, as an economic researcher, advisor and leading scientist, could not ignore the changes in enterprises' construction strategy caused by the development of information and communication technology and increasing globalization (Porter, 1987). Information technology can significantly affect the possibilities of reducing costs at every link in the value chain. It affects the differentiation strategies, as the key determinant of differentiation is the role that the company and its product plays for the buyer. New technologies, such as the Internet, enable more effective customization of products to individual customer needs (new distribution channels, network marketing, direct communication).

M.E. Porter has also introduced new dimensions in the search for sources of sustainable competitive advantage and strategic position (Porter, Wayland, 1995). The choice of position based on:

- access to specific groups of clients requires a different market segmentation, a different configuration of activities in the value chain,
- diversity of products. The company offers various types of products not configured for specific market segments,
- the needs of specific customer groups, similar to traditional thinking about choosing a market segment.

The basic competitive strategies remain valid, and businesses can use their combination in practice. However, they need to know what resources are needed to implement them and how to manage them.

A few questions at the end instead of a summary

Is it still possible to analyze resources, and in what categories necessary to implement strategies formulated and implemented by enterprises? It is possible, but it is impossible to exhaust the issue. Here are some examples:

What resources must an organization that chooses the blue ocean strategy have?

Do agile, clever, intelligent, networking organizations need to have both standard and unique resources?

Do outsourcing and offshoring carry the risk of losing key resources and competencies?

Is a partnership with suppliers and clients that is based on trust included in the intangible resources of enterprises?

Why do hidden champions, despite being hidden for many years, still achieve a global scale and possess extraordinary skills while pursuing strategies of exceptionally strict specialization?

What resources can defend local companies against the entry of "giants" in the market? Who is clever, who can adapt, or who is on friendly terms with global competitors?[3] (Dawar, Frost, 2006).

Can a global enterprise transform into a transnational one based only on its existing resources?

For a dozen or so years D.P. Norton and R.S. Kaplan considered the measurement of intangible assets, such as organizational culture, knowledge management system, employee qualifications, the holy grail of accounting (Norton, Kaplan, 2004). Has this changed?

These are not necessarily rhetorical questions, but they will remain so in this text. However, the company needs to know what the relationship is between the resources it has and the potential of its competitiveness (Stankiewicz, 2001, p. 104). There are three situations. First, when resources are greater than the potential, which means that the organization does not use all its resources and behaves like a "rich dilettante". Second, when it has resources smaller than the competitiveness potential necessary for it to function in the market. The third situation is ideal because there is a balance between resources and the potential necessary to compete in the market. However, the logical consequence of adopting the resource management concept is to study the potential of a company through the prism of its resources and the ways of managing them.

[3] This is a reference to N. Dawar and T. Frost's local marketing strategy model.

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KEY COMPETENCIES IN THE MODERN BUSINESS SERVICES SECTOR

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Abstract: Along with the dynamic development of the business services sector in Poland, both in terms of quantity (increase in the number of employees) and quality (increase in handling complex processes), the competence of employees and candidates to work becomes an important determinant of this process. The article analyzes reports on the sector of modern services and the labour market in the scope of desirable competencies of employees in the context of upcoming technological changes (Industry 4.0). As a result of the analysis, a catalogue of meta-competencies was identified, which are key from the point of view of the development of the business services sector and other branches of the modern economy.

Keywords: modern business services sector Poland, metacompetencies, soft skills, competencies, labour market needs.

1. Introduction

The sector of modern services for business (*Business Service Sector,* BSS*)* has been developing for over ten years very dynamically in Poland. This sector includes the activity of outsourcing centres of business processes (*Business Process Outsourcing*, BPO), Shared Service Centres (SSC), IT centres (*Information Technology*, IT) and research and development centres (*Research and Development*, R&D).

It is estimated that by 2020 there will be over 340 000 people working in this sector (ABSL, 2018). Whereas until now it was believed that the main locations for this sector in Poland were only the largest cities, such as Kraków, Warsaw, Wrocław, Trójmiasto, Katowice Agglomeration or Łódź, the process of the growing importance of smaller regional centres is now noticeable (Bydgoszcz, Lublin, Szczecin, Lublin, Olsztyn, Białystok, Opole, Kielce, as well as smaller cities) (ABSL, 2018). In other words, this sector is becoming more and more part of the economic image of Poland (ABSL, 2019).

Resources of cheap labour are no longer the main factor determining the attractiveness of Poland for investments in this sector. Over recent years business processes served by service centres in Poland have become more and more advanced (ABSL, 2018). The cost factor is slowly becoming secondary in comparison to the factor related to the quality of human capital in Poland's investment attractiveness for this sector. This is evidenced by high salaries for specialists working in centres implementing modern business services (ABSL, 2018). Undoubtedly, the structure of processes supported in this sector is changing towards knowledge intensive (ABSL, 2019), and thus generates added value for the Polish economy.

A characteristic feature of this sector is its high level of internationalization, understood both as foreign capital links and by the geographical structure of recipients of services provided. The effect of this phenomenon is access to and use of the most advanced technologies to support business processes, which in turn forces the sector (service centres) to have a high level of flexibility and adaptability.

Along with the development of the economic reality described as Industry 4.0, questions about the role and function of Society 4.0 appear more and more often in the public debate, and, connected with it, the competencies expected by the present and future labour market. The business services sector uses the latest technologies. Starting from the widespread implementation of the technology of automation of repetitive business processes, using computer programs – robots simulating human work, or Robotic Process Automation (RPA), through learning systems (Machine Learning – ML), to the implementation of solutions. Of course, at the present moment (end of 2018) it is difficult to imagine, in the short term, the replacement of man by technology in this sector. Nevertheless, technological progress is inscribed in the development of the modern services sector, and that is why it is important to track trends in this area.

The purpose of this article is to present key competencies for the business services sector. This work analyzes the available reports on the modern services sector in Poland, and the trends of the Polish labour market, as well as selected literature on the subject.

2. Metacompetencies for the modern services sector

For many years, key competencies of candidates for work in this sector, in addition to language competencies (vide internationalization), indicate metacompetencies such as: flexibility, openness, adaptability, ability to work in a group, independence or developed analytical skills. Table 1 presents a list of common metacompetencies expected from candidates for work in the BPO/ITO sector in primary positions defined on the basis of surveys commissioned by the City Hall of Krakow in 2012 (Bilans…, 2012).

Table 1.
List of basic metacompetencies expected from candidates for work in the modern services sector (common for the BPO and ITO sectors)

No.	Name of competence/expectation	Definition
1	Initiative	Starting new activities and accepting related responsibilities
2	Innovation	Generating ideas, creating and implementing new solutions that improve work
3	Written communication	Preparation and presentation of written communications, preparation of clear written reports
4	Oral communication	Presentation and communication of information in verbal form, fluent use of speech
5	Orientation towards goals	Activities aimed at achieving short- and long-term goals set for the workplace
6	Orientation towards client	Satisfying the client's needs and expectations, taking into account the client's perspective in offering solutions
7	Organizing one's own work	Behaviours aimed at optimizing one's own work, and timely execution of tasks.
8	Care about quality	Acting in accordance with the rules, regulations and procedures of the organization. Accuracy and meticulousness in the implementation of tasks
9	Impact on others	Impact on others, persuasion through objective argumentation and other means of influence, self-confidence in passing on their point of view
10	Cooperation	Effective group work, focus on achieving group goals
11	Involvement	Enthusiasm and passion for work, "can do" attitude, taking care of the company's image
12	Intercultural 'sensitivity'	Putting into practice the knowledge of intercultural differences, adapting its activities to different cultural patterns
13	Support for MS Office, OpenOffice or Google Docs	Using the basic capabilities of office software packages in an effective way
14	Mathematical skills	Conducting various mathematical operations
15	Learning	Ease and speed of acquiring new knowledge
16	Adaptation	Ease and speed of action in changing conditions
17	Coping with stress	Ease and effectiveness of action in difficult situations
18	Analytical skills	Ease, speed and reliability of information retrieval and processing
19	Honesty	Observance of recognized moral norms
20	General knowledge on outsourcing	Possessing basic knowledge about the outsourcing industry and the context of the operation of such companies
21	Availability of time	Flexibility in the field of working hours, overtime and the possibility of picking them up later
22	Mobility	Accepting travel offers related to the performance of official duties or learning (conferences, training) outside the workplace
23	Computational thinking	The ability to process a large amount of data-based reasoning information (especially drawing conclusions from so-called Big Data)
24	Interdisciplinarity	Ability understood as the ability to read and understand concepts in many disciplines
25	Managing cognitive load	Ability to maximize cognitive functioning and assimilate many stimuli using various tools and techniques
26	IT sector literacy	Knowledge of broadly understood IT solutions used to work in the sector

Source: authors' own elaboration on the basis of: Bilans kompetencji branż BPO i ITO w Krakowie, Raport końcowy z przeprowadzonych badań, Kraków 2012, s. 28 and Future Work Skills 2020, Institute for the Future for the University of Phoenix Research Institute, 2011.

At this point, it is worth paying attention to the fact that despite the widespread knowledge of this set, repeatedly articulated by the sector as desirable competencies, universities in Poland have not yet included them in education programmes dedicated to the modern services sector.

This can be confirmed by the analysis of three study programmes created with a view to educating staff for this sector. At the University of Szczecin, majoring in Finance and Accounting, a specialization was created for the first degree of study: Accounting and finance in BPO/SSC business services. At the Częstochowa University of Technology, the following specialization was created in the same field: New business services in Finance and Accounting (full-time studies, 2nd grade). Meanwhile, the Warsaw School of Economics offers modern business services – BPO/SSC – manager of modern business services as part of post-graduate studies. While in Szczecin, the programme of study provided 30 teaching hours for learning metacompetencies within such subjects as: Customer relations, Work in a group. In Warsaw only 10 hours have been allocated for Business communications, and in Częstochowa general subjects concerning the education of those competencies were not included.

3. Universal metacompetencies

The set of metacompetencies listed above is to a large extent convergent with management competence grids constructed in the 1980s. For example, in the network of universal competencies for senior management staff by Thornton and Byham (1982) there are listed: verbal presentation, verbal communication, written communication, analysis of organizational problems, detection of organizational problems, analysis of external problems, detection of problems outside the organization, planning and organization, delegation (tasks, powers, responsibilities), control, development of subordinates, sensitivity, influence on the individual, influence on the group, perseverance, negotiation skills, sense of analysis, assessment skills, creativity, risk taking, decision-making skills, technical and professional knowledge, energety, openness to business, initiative, resistance to stress, adaptability, independence, motivation (Lévy-Leboyer, 1997). V. Dulewicz, in his set of "super-competencies" (1989), also distinguishes interpersonal competencies, among them managing co-workers, persuasion skills, ability to make decisions, sensitivity to matters concerning interpersonal relations, and verbal communication (Lévy-Leboyer, 1997). The managerial competencies are very precisely and in detail defined by McCauley and others (1989). This list contains a number of skills necessary for the manager's job, but also those close to previously distinguished metacompetencies required in the business services industry. The authors point out above all that having many abilities is an advantage, which determines the ability to adapt to changing situations and conditions, flexibility, manage complex work systems, make decisions, learn new things quickly, and focus on teamwork (Lévy-Leboyer, 1997). The Lafarge-Coppée analytical grid

(1995) contains, among others competencies such as the ability to analyze and synthesize complex problems, the ability to make decisions, emotional balance, stress resistance, the ability to draw conclusions, availability, and an inspiring way of influencing others (Lévy-Leboyer, 1997). The Bouygues management personnel identification card shows, among others, respect for goals, adaptability, independence, resilience, balancing in stressful situations, openness, availability, creativity, integrity and honesty (Lévy-Leboyer, 1997).

It is not hard to notice that the specified competencies of senior management staff overlap to a large extent the above metacompetencies of employees of the modern business services sector. Does this mean that the level of requirements from an employee in the industry is at managerial level? Does this sector require managerial competencies? Or perhaps a contemporary manager is required to have other metacompetencies that are needed in management in conditions of uncertainty and risk, in an intercultural environment, in a dynamically developing business reality. Probably it is that way, but the basic, universal competencies have not ceased to be important. The relocation of a group of managerial competencies to employee positions in the modern business services industry illustrates current trends in the demand for so-called soft skills, which are also very important in management.

It should also be added that the demand for a set of soft (social, psychosocial) competencies does not only apply to the modern business services industry. The deficit of these competencies is observed in many industries. Employers often emphasize that university graduates are equipped with professional competencies, but they lack skills in soft competencies, including interpersonal competencies and social communication, or the ability to work in a group. This is confirmed by, among others, such research as: "Diagnoza zapotrzebowania na kwalifikacje i kompetencje absolwentów szkół wyższych Mazowsza wchodzących na rynek pracy. Raport z badania" (Diagnosis…, 2012), "Kompetencje Polaków a potrzeby polskiej gospodarki. Raport podsumowujący IV edycję badań BKL z 2013 r." (Competencies…), "Analiza kwalifikacji i kompetencji kluczowych dla zwiększenia szans absolwentów na rynku pracy. Raport końcowy" (Analysis…, 2014), in which we read that employers seek employees with the minimum "hard" competencies, such as: knowledge of foreign languages, the ability to create websites, and the ability to operate specialized programmes, but the final employment is primarily determined by "soft" competencies, i.e.:

- a number of cognitive competencies (analytical, heuristic abilities, ingenuity, critical thinking),
- interpersonal competencies (including: communication and media, as well as related to the skill of team creation, teamwork, and above all interdisciplinary),
- self-organizing competencies (work using the project method, on-time implementation of tasks, independence in decisions, resistance to stress, self-organization of work, flexible response to changes) (Analiza…, 2014).

The ManpowerGroup report “Niedobór talentów 2014” ("Talent shortage 2014") also indicates that the shortage of soft skills is one of the reasons for the problem of recruiting candidates for work. In the 2018 report, ManpowerGroup states that an appropriate combination of soft competencies and processes and technologies is the only way to implement a business strategy, create values and improve people's quality of life (Badanie…, 2018). Also, from the World Bank's report "Skills, not Just Diplomas" (Sondergaard, Murthi, et al., 2012) it results that the demand for communication and cognitive skills is increasing, among others: the use of knowledge in practice, problem solving, ability to work in a group, time management, communication. Similar conclusions can be found in the report “Bilans Kapitału Ludzkiego” ("Balance of Human Capital") (PARP, 2015), where it is indicated that the greatest shortage occurs within self-organization (time management, independence, decision making, initiative manifestation, resistance to stress and self-motivation) and interpersonal competencies (Polski…, 2015). The majority of employers assessing graduates think that they are well educated in theory, but they lack soft skills, which extends the process of adaptation to the workplace and limits their independence (Oczekiwania…, 2016).

However, the self-assessment of soft competencies, according to the report “Bilans Kapitału Ludzkiego 2017. Raport z badania ludności w wieku 18-70 lat” (Balance…) looks optimistic: "Poles assess the following competencies/predispositions the best: easy contact with people, independent work organization, communicative communication and clear transmission of thoughts, willingness to take on responsibility for performing tasks, group work and making simple mathematical calculations" (Bilans…, 2017).

The demand for social competencies, while possessing both hard, professional competencies, is currently very large. This is confirmed by numerous reports and analyses regarding the labour market in Poland. According to the reports of a global HR company (Hays, Salary Report 2019. Trends in the labour market), entrepreneurs are increasingly pointing to the growing demand for soft skills. According to this report, regardless of specialization, key competencies include teamwork, creativity, and communication skills (Hays, 2019). According to the Manpower report, the *Rewolucja umiejętności 2.0* (Skills Revolution 2.0) of 2018, soft and digital competencies are the most sought after and appreciated by employers (Mannpower, 2018). Also, according to the pracuj.pl portal, among the competencies that in the coming years will be the most sought after in the labour market, the competencies from the group of "soft" competencies, such as: innovation, creativity and creativity are indicated (https://porady.pracuj.pl/…). Debates about the competencies of the future were also held at the World Economic Forum in Davos. In 2018, Jack Ma referred to, among others, such 'soft' traits as creativity and the ability to cooperate and inspire each other. He pointed out that these are features that differentiate us from robots, so they should be cultivated so as to survive and maintain control over automation (Bettman, 2018). In 2017, participants of the Forum distinguished such competencies as: comprehensive problem solving, critical thinking, creativity, people management, cooperation with others, emotional intelligence, inference

and decision making, service orientation, negotiation, and cognitive flexibility (https://porady.pracuj.pl/…). Again, it can be said that these are managerial competencies. Again, the question arises whether a modern worker, who is not involved in management processes, who is only an employee of a hierarchical organizational structure, should have such competencies as a certain minimum competence? In a hierarchical structure, not necessarily, but taking into account new management trends and a strong flattening of the organizational structure, this question could be answered in the affirmative. Turquoise organizations, defined by Frederic Laloux (Laloux, 2016), and in Poland, strongly promoted by Andrzej Blikle, are organizations without managers, in which an employee can act "in the conditions of freedom, trust, partnership and cooperation" (Blikle, 2014). These are the conditions necessary to release the layers of creativity and innovation. A prerequisite for the creation of such organizations in the industry of modern business services is that they are metacompetencies required from employees. However, this is not synonymous with the fact that all organizations from the modern services industry are turquoise organizations. We cannot derive such dependence logically.

4. Metacompetence catalogue for the business services sector

A number of the metacompetencies indicated at the beginning of these considerations fall within the general competencies specified by the co-author of the article, understood "as efficient, effective and satisfying (personally and for the environment) functioning, both in the space of the global society and the local community (space is understood here not only geographically and physically, but also socially, interactively and communicatively), which should be mastered by everyone at least to a basic degree" (Kuzior, 2014). In the set of general competencies so understood, we can find:

1. Information and communication competencies – skillful searching for and using information, selective use of Internet resources and other available sources of information, efficient and correct language in terms of the transmission and reception of messages using written and oral statements, using elements of non-verbal communication (including facial expressions, kinesiosics, proxemics).
2. Psychosocial competencies resulting from the combination of personality traits and the ability to function in a social environment, which include: self-awareness, self-control, assertiveness, resistance to stress, empathy, planning and organization of one's own time and that of others (whether time management and self-management in time), creativity, entrepreneurship, self-motivation and the ability to motivate others, interpersonal competencies (the ability to quickly establish interpersonal contacts, cooperation and communication skills), and others.

3. Ecological and sozological competencies are environmental attitudes based on ecological awareness, manifested in predispositions for protective, preventive and corrective actions, consisting in the ability to see mutual influences of the anthroposphere and biosphere, and the ability to counteract the negative effects of anthropopressure.
4. Economic competencies in the individual dimension are knowledge and the ability to see economic dependencies in order to cope in the economic market and the labour market, perceiving the need for applying generational and intergenerational justice rules, and following the principles of sustainable development.
5. Ethical competencies – honesty and responsibility in all aspects of human activity, following the principles of good (both in individual and social dimensions) focus on subsidiarity, solidarity, respect for one's own dignity and that of others, respect for basic human rights, and tolerance and respect for people and the environment.
6. Intercultural competencies expressed in positive tolerance, understood as openness to otherness, the desire to learn and understand "the other" and perception of cultural diversity not as a threat, but as an opportunity for more comprehensive development of people and societies, while defining the limits of tolerance towards people and cultures that violate basic human rights. These competencies must be connected with competencies related to at least communicative knowledge of foreign languages.
7. Gender competencies, understood as the ability to perceive problems related to sex discrimination, knowledge of the causes and negative effects of discriminatory practices, a permanent disposition and willingness to undertake activities promoting equal rights and equal opportunities policy, and the ability to use anti-discrimination tools and practices (Kuzior, 2014). The fact that this is still a problem was clearly and expressively articulated by the Prime Minister of Canada Justin Trudeau at the World Economic Forum in Davos in 2018, exposing the necessity of eliminating the free work of women, and the fight against sexual abuse against women. Malala Yousafzai, a laureate of the Nobel Peace Prize in 2014, at the Forum in Davos, argued for the need for universal girls' education, combined with the education of boys so that they would know how to respect women's rights (Kroczewska, 2018). Gender competencies refer to respect for all disadvantaged groups, including, for example, the disabled.

The author of the above classification recognizes that the basis of all the above-mentioned general competencies is ethical competence. They are fundamental for individual development and for making a specific contribution to the development of society and multiplying the common good. Their possession determines the right human position in the socio-cultural and economic space (Kuzior, 2014). Formed ethical competencies also fulfill other functions, such as: shaping a reflective, critical attitude, strengthening the ability to think logically, using reason as a tool for dialogue, stimulating independent thinking and articulating one's own position on various issues (Martinkovičová, 2018). The above list of general competencies can be

considered as a catalogue of basic metacompetencies for the business services sector. In turn, specific maturity competencies for the industry in question must first of all take into account the understanding of IT processes (digicomp), and in the framework of the already categorized general communication and information competencies, e.g. process mapping. For the BSS industry there are also important competencies in the field of entrepreneurship.

The following conclusions emerge from the above considerations: the industry of modern business services requires from ordinary employees competencies belonging to the managerial competence set; enterprises belonging to this industry can be based on the turquoise management model. They are predisposed to it by a high level of employee competencies; employees who take over a part of the responsibility for the functioning and success of the company and can develop their own creativity for their own benefit and the company's own benefit. Having employees with such competencies is a necessary condition, but not enough to implement a turquoise management model in the organization.

5. Summary

The issues raised in the article are particularly important due to the dynamically developing services sector, including business services. As shown in the research reports quoted above, despite the large number of graduates leaving the walls of universities, employers find it difficult to find employees possessing the required competencies. This paradoxical situation is mainly due to the fact that the competencies acquired during the studies do not reflect the needs of the labour market. There are significant deficits of the so-called transferable competencies (transferable skills), that is, those that are useful in various work positions. The OECD defines them as universal, over-subject competencies. This includes, inter alia, the abilities of self-organization and the still deficient interpersonal and communication skills. As mentioned, these competencies belong to the so-called soft skills, which are necessary mainly in the services sector. And the rapidly growing business services sector in the coming years will need more and more staff equipped with these competencies. According to the estimates of the ABSL association in the first quarter of 2018, in this sector there were 1236 BPO, SSC, IT, R & D service centres in Poland, while there were 279 thousand employees, of which over 50% were women (ABSL, 2018). The above ABSL data should, however, be treated as the lower threshold of the estimate due to underestimation of smaller entities. According to GUS (Central Statistical Office) data, over 450,000 employees were employed in enterprises representing PKD (Polish Classification of Activities) sections covering this sector (GUS, 2018). It is worth paying attention to one feature of this sector: the advantage of large, organizational structures that have been developed. Data collected by ABSL confirm that, in contrast to the highly fragmented enterprise sector in Poland, the BSS sector is dominated by medium and large entities: shared

service centres employ on average 332 people, BPO centres – 278 people, and R&D centres – 200 people. The consequence of this phenomenon should be the ease of establishing cooperation between stakeholders in this sector, which are on the one hand enterprises, and on the other, educational institutions, in order to undertake joint actions to adapt educational programmes to the competence needs of the sector. While currently the initiatives of such cooperation have a rather incidental character – mainly due to the ease of companies finding employees from this sector – it is necessary to have systemic cooperation at the moment of depletion of easily available job candidates (university graduates). A certain confirmation of this phenomenon may be the results of cyclic tests carried out by ABSL regarding the sector in question. One of the questions of the annual survey among managers of service centres concerns business plans. Thus, in the study of 2018, 74% of the surveyed companies intended to expand the scope of their operations, which was a result 10% worse than the results of the analogous study from 2017. The authors of the study interpreted this phenomenon as a progressive process of "maturing" the modern business services sector in Poland (Potencjał…, 2019). Nonetheless, another reason for a certain slowdown in the dynamics of the sector's development may be the lack of access to job candidates with appropriate competencies. Therefore, it seems that one of the key factors determining the development of the BSS sector in Poland (measured, for example, by the estimate of the number of employees referred to at the outset) will be the cooperation between the sector and universities aimed at incorporating the competencies identified in this article into educational programmes.

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POSSIBILITIES OF APPLYING THE CONFIGURATIONAL APPROACH TO BUSINESS MODEL RESEARCH

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Abstract: The issue of business models is a current and more and more deeply analysed field of scientific research. However, despite the requirements of a solid and comprehensive research approach, capable of capturing the multidimensionality of business models, there is a continuous dissatisfaction with the conducted empirical research in this area. The aim of the article is to present the possibility of using the configurational approach and fuzzy set qualitative comparative analysis (fs/QCA) to business models research, which enables to conduct comprehensive, integrated analyses. The research was conducted on the basis of a group of 53 enterprises classified in the high-tech sector. The research provided an insight into the key and auxiliary elements of the selected business models, and the methods of their mutual interaction in the context of the configuration of these elements were monitored, at the same time providing insight into the equifinality of the configuration. The results may form the basis for a deeper discussion on the definition of business models and their core components.

Keywords: business models, configurational approach, equifinality, efficiency, fs/QCA.

1. Introduction

Over the past decade, there has been a growing amount of research on the concept and definition of business models (e.g. Teece, 2018; Dentchev, 2018; Wirtz, et al. 2016; Schaltegger, et al. 2015; Johnson, et al., 2008; Shafer, et al, 2005), their impact on the efficiency of organisation (e.g. Casadesus-Masanell, and Ricart, 2010; Markides, and Charitous, 2004), relations with strategy, issues of configuration of business models or innovative business models (e.g. Olofsson, et al., 2018; Foss, and Saebi, 2018; Amit, and Zott, 2010). However, despite the growing popularity of this subject matter, the view that the concept of business models is multidimensional is becoming increasingly clear, and in order to develop its acceptable definition and operationalisation, further in-depth empirical research as well as theoretical studies are necessary (Foss, and Saebi, 2016; Birkinshaw, and Ansari, 2015; Zott, et al., 2011). Particularly insufficient and not fully mature seem to be the contributions undertaking attempts to analyse the relations between business models and the efficiency of the

organisation, focused more on specific features of business models, such as efficiency or novelty (Zott, and Amit 2007; 2008), or specific choices, such as the sale of property rights (Malone, et al., 2006), than on the relationship between multidimensional constructs, such as business models, and the efficiency of the organisation. More specifically, the current research does not sufficiently explain the relationship between the whole set of elements creating business models which together have an impact on the broadly understood efficiency or performance of the organisation. The research of individual elements of business models and their impact on efficiency significantly limits the possibilities of inference. Therefore, the article proposes to use the configurational approach to business model research, which, in the author's opinion, will be better suited to the current stage of development of theory on this subject and will develop the conducted empirical tests.

The business model, according to configuration theory, can therefore be considered as "a multidimensional constellation of conceptually distinct characteristics that usually occur together because their mutual dependence makes them form specific patterns" (Meyer, et al., 1993, p. 1175). A configurational approach makes it possible to highlight the complexity of business models, according to which the impact on the efficiency of an organisation does not depend on a single attribute, but on complex causal relationships such as complementarity, additionality, substitutability or a suppression effect between multiple elements. The aim of the article is to examine whether the configurational approach can be applied to the business models research. This assumption was verified based on a group of fifty-three enterprises, using one of the newer research methods in the scope of configuration theory by C. Ragin (2000; 2008): fuzzy set qualitative comparative analysis (fs/QCA). In the first part of the article the most important assumptions of the adaptation of the configurational approach to the business model research have been presented. The second part presents the adopted conceptualisation of business models, used analysis tools, operationalisation of variables. The research sample has been described. The results of the research have been presented and discussed.

2. The use of the configurational approach in testing the theory of business models

Studies on literature reviews in the area of business models point to the fact that business models are often analysed and examined without clear definitions, and that existing definitions are interpreted and perceived differently by researchers (Birkinshaw, and Ansari, 2015; Zott, et al., 2011). From P. Timmers' ground-breaking work (1998) to the latest publications, numerous proposals for analyses of various aspects of the concept of business models can be observed, starting with attempts to define and perceive them, projects, links with strategy, role in planning and communication, or innovation. However, there are at least four critical aspects

that can be identified in considering the concept of business models. First of all, business models are composed of many choices, each of which is related to the method in which the organisation creates and takes over values within the network of its creation. Value creation requires defining a whole set of activities, while taking over value forces the creation of unique resources, assets or positions within a set of activities in which the organisation achieves a competitive advantage (Chesbrough, 2007). Secondly, the choices that make up the business models are interdependent and interlinked, and a change in one element can have an impact on the other ones. Thirdly, the success of a particular business model is closely linked to the degree of mutual coherence of its particular elements. In other words, the elements of the business model must mutually reinforce each other and be consistent with the characteristics of the competitive environment. And fourthly, the business model is characteristic of any organisation, even if certain regularities or determinants may exist and be specific to a given industry.

The above considerations, while emphasising that business models are complex and valuable units of analysis, also show that the researcher's attention should be focused on a certain configuration of elements and determinants creating business models rather than on individual and independent characteristics. This argument, in turn, makes it possible to move the discussion towards a configurational approach that plays a key role both in strategic management and in the domain of organisational theory.

The configurational approach suggests that "it is best to know organisations by treating them more as bundles of interrelated structures and practices than as loosely integrated wholes whose components can be considered separately" (Ketchen, et al., 1993, p. 1278; Fiss, 2007, p. 1180; Bratnicki, 2009, p. 7). This approach assumes that complex causality and non-linearity should be introduced instead of single cause-effect relationships and linear relationships, where causally linked variables in one configuration may be unrelated in another. Moreover, it is suitable for building a theory because it focuses attention on an equifinal concept which refers to a situation where "a system can achieve the same end state under different initial conditions and through a number of different paths" (Katz, and Kahn, 1978, p. 30). Thus, there is no single, optimal configuration and two or more configurations can be equally effective, even in the same circumstances. Attribute patterns, on the other hand, show different properties and lead to different results depending on the method of their arrangement. According to the configurational approach, business models can therefore be understood as sets of properties comprising multiple variables that reflect the estimable dimensions. The assumptions underlying the configurational approach seem to be consistent with the current stage of development of theory concerning business models.

3. Conceptual assumptions, sample selection and research tools

For the analyses conducted in this article, two alternative configurations of business models adopted from the works of L. Schweizer (2005) have been selected. The first business model, Integrator, covers and controls all elements of the value creation process, including resources and capabilities, when launching a product on the market. According to the second business model, called Layer-Player, enterprises are specialised in one (or several) specific stages of the value chain.

The conceptualisation of the business models was carried out on the basis of a scheme developed by M. Johnson, C. Christensen and H. Kagermann (2008), in which three categories were used: customer value proposition, key activities and key processes. The analysis considered three key activities that an enterprise needs to take in order to make its model function effectively: production, R&D and distribution. Due to the empirical analysis carried out on the example of high-tech enterprises, three activities are present in the Integrator model, whereas in the Layer-Player model, only production activities are considered in the research. With regard to the key resources needed for the proper functioning of the model, technological, financial and human resources are considered, while the customer value proposition considers two strategies: differentiation and cost leadership.

Due to the area of scientific interest, the research was limited to the group of enterprises belonging to the high-tech sector, where the selection criterion was Eurostat classification. Empirical research was conducted on the basis of data obtained from fifty-three enterprises. Constructed questionnaire covering both dependent variables – efficiency of the organisation (for the measurement of which subjective indicators borrowed from the efficiency measurement tool by Antoncic and R.D. Hisrich and G.N. Chandler and S.H. Hanks were used), as well as independent variables, was addressed to persons managing enterprises. The independent variables considered enterprise strategy, which was measured using two strategies of M.E. Porter: differentiation and cost leadership, measured using the scheme presented in P.C. Fissa's (2011) work. The next independent variables included in the research were key resources, where on the basis of previous research conducted in a configurational approach, three categories of resources were taken into account for analysis: human resources, technological resources and financial resources (measured on the basis of the research tool developed by A. Heirman and B. Clarysse) and the key processes in the framework of which the degree of vertical integration of enterprises on three levels is considered: R&D integration, production integration and distribution integration (measured using the indicators proposed by D. Campagnolo).

From the fifty-three enterprises included in the sample, 60% were production and service enterprises, 40% were service enterprises. Moreover, in the group of surveyed enterprises there were new enterprises whose average age was about 5, 6 years. The research sample included

the following high-tech industries (according to Eurostat classification): Computer programming activities (62.01.Z), Manufacture of instruments and appliances for measuring, testing and navigation (26.51.Z), Manufacture of basic pharmaceutical substances (21.10.Z), Manufacture of medicines and other pharmaceutical products (21.20.Z), Manufacture of other chemical products not elsewhere classified (20.59.Z), Research and experimental development on biotechnology (72.11.Z), Other research and experimental development on natural sciences and engineering (72.19.Z).

In order to achieve the goal of testing the possibility of using a configurational approach to business models research and to explain the multidimensionality of this issue, the fuzzy set Qualitative Comparative Analysis (fs/QCA) was used. Fs/QCA differs from conventional, variable-oriented approaches (such as regression analysis, deviation assessment, cluster analysis) in that it does not separate cases into independent, analytically separate aspects and instead treats configurations as different types of cases. Attribute configuration is examined using Boole's algebra, a recording system that allows for algebraic processing of logical statements, which allows to assess how multiple causes unite to affect a specific result, e.g. the efficiency of an organisation. The combination of verbal statements with logical relationships also contributes to rigorously building an organisation's theory that takes into account complex cause-and-effect relationships, generates new insights into management problems, and allows the researcher to reject elements that are not causally linked to the result. Furthermore, fs/QCA not only allows for the inclusion of configurational patterns, equifinality, and multiple determinants, but also has the additional benefits in the form of the possibility to analyse a sample of small or medium size (Ragin, Fiss, 2008).

It should be emphasised that unlike, for example, regression analysis, the use of fs/QCA is not based on the assumption that the data comes from a specific probability distribution and that the variables are measured by means of set calibration. Calibration reduces dependence on a research sample, as membership of the set is defined on the basis of substantive knowledge and not on the importance of the sample, which affects the decrease in significance of the factor related to the representativeness of the research sample, which does not pose a threat to the validity of the conducted research.

4. Results and discussion

The analysis was conducted using QCA software package supporting fuzzy variables – fsQCA version 2.5. by C. Ragin, and S. Davey (2009). Within the first stage of the analysis, using the direct approach described by C. Ragin (2008, p. 89), the variables were transformed into sets and then calibrated in relation to three substantive thresholds: full membership in a set equal to "1", no membership equal to "0" and transition point equal to "0.5", i.e. a point of

maximum ambiguity (blur) in the assessment of whether the variables are "in" a set or “outside" a set. After the transformation and calibration of the analysed variables into fuzzy sets, membership in the defined sets was compared in order to empirically identify causal processes necessary and sufficient, creating configurations of business models which lead to the desired results. On this basis, it was determined whether one of them is a subset of the other. Depending on the pattern or the scheme of belonging to a particular subset, evidence of causal relationships necessary and sufficient for the occurrence of the desired result was provided. Using the membership measures in the defined sets, a data matrix called the truth table was constructed, having 2k of lines, where "k" is the number of the analysed independent variables (in the case of this analysis for 8 variables, the number of logically possible configurations is 28 = 256). It is important that each line of the truth table refers to a specific configuration of attributes, and the full truth table presents all possible configurations. Moreover, empirical cases have been appropriately divided into additional lines of the truth table, based on attribute values. Some lines contained several cases, others contained one or no cases, if there was no empirical occurrence of the specified attribute configuration consistent with the record in the given line. In the next stage, the number of lines was reduced according to the adopted minimum consistency level, using an algorithm based on Boole's algebra (Ragin, 2008). By carrying out the procedure of minimising, i.e. simplifying the combination of variables in a shorter, more cost-saving form, the solution was obtained, leading to the desired result. In the article, referring to the recommendation of the author of the C. Ragin's method (2008, p. 160-175), one of the three available solutions – an intermediate solution, as "...an optimal solution between a comprehensive and a cost-saving solution..." – was used for the development and interpretation of the results. Moreover, the interpretation of the results was also based on a solution that was cost-saving due to the possibility of presenting key configuration variables as those for which the evidence indicates a strong causal link with the desired results (Fiss, 2011).

Using the presentation system described by C. Ragin, P.C. Fiss (2008), in the tables there are summarised results of the qualitative comparative analysis for the configuration of the Intergrator (table 1) and Layer-Player (table 2) business models.

Full circles („●”) in the tables indicate the presence of the analysed variable, while the crossed-out circles („⊖”) present the absence of the variable. In addition, large circles indicate key variables from a cost-saving solution, and small circles refer to peripheral variables occurring only in the intermediate solution. Empty spaces in subsequent configurations indicate a situation in which variables may be present or absent, and therefore are not, as P.C. Fiss (2011) indicates, required for a given solution, i.e. they do not help to explain the result for a particular configuration of variables.

Table 1.
The Integrator business model – configurations leading to high efficiency

Variables	Configurations	
	I-1	**I-2**
Key processes		
Integration in the R&D sphere	●	●
Integration in the production area	●	●
Integration in the distribution sphere	•	⊖
Key resources		
Human resources		●
Technological resources	●	•
Financial resources	●	•
Value proposition for the customer		
Differentiation strategy	•	•
Cost leadership strategy	•	•
Consistency	0,81	0,89
Raw Coverage	0,10	0,10
Unique Coverage	0,05	0,04

Source: own elaboration.

Table 2.
The Layer-Player business model– configurations leading to high efficiency

Variables	Configurations		
	LP-1a	**LP-1b**	**LP-2**
Key processes			
Integration in the R&D sphere	⊖	⊖	•
Integration in the production area	●	●	●
Integration in the distribution sphere	●	●	●
Key resources			
Human resources	•	•	●
Technological resources	•	•	•
Financial resources	•		
Value proposition for the customer			
Differentiation strategy	⊖	•	•
Cost leadership strategy	⊖	⊖	
Consistency	0,82	0,83	0,89
Raw Coverage	0,08	0,10	0,10
Unique Coverage	0,03	0,03	0,06

Source: own elaboration.

Tables 1 and 2 show only those configurations that have consistently led to the result (high efficiency of the surveyed enterprises) and therefore present a consistent pattern, thus reaching the defined consistency threshold (the consistency indicator - one of the statistics used in fs/QCA measuring the degree of proximity of the subset relationship reflected in all alternative configurations leading to the surveyed result), at a level higher than 0.8, as suggested by C.C. Ragin (2008) or P.C. Fiss (2011). Each column in Tables 1 and 2 shows alternative configurations of the analysed variables leading to the desired result. Moreover, the tables also present the coverage factor relating to the size of overlap between the sets depicting the configurations of variables included in the analysis in relation to the examined result, thus this factor is conceptually similar to the R^2 factor in the regression analysis. Moreover, the coverage measure can be divided into the so-called raw coverage, i.e. the percentage of result covered by a particular solution (configuration of the analysed variables) and the unique coverage, i.e. the percentage of result covered only by a particular solution.

Table 1 presents two equifinal configurations of the Integrator business model (I-1 and I-2). Analysing the key variables (large circles), in both configurations, the R&D integration and production integration were distinguished as the variables distinguished in the key processes of business models. In the configuration (I-2), the combination of these variables is connected with the lack of integration in the distribution sphere, while in the configuration (I-1), integration in the distribution sphere is present, although as an auxiliary condition (small circle). Taking into account the next variables in the configuration (I-1), technological and financial resources are key ones, whereas in the configuration (I-2) they are auxiliary conditions. In addition, both configurations include differentiation and cost leadership strategies, which seem to be independent of the presence of strong integration in the distribution or configuration of key resources. Thus, in an integrated business model, the combination of cost leadership and differentiation strategies does not represent a compromise, but rather seems to create value.

Comparison of the two configurations gives important clues concerning the substitution effect that can occur in business model configurations. Moving from configuration (I-1) to (I-2), integration in the distribution sphere becomes an absent condition in key processes, while human resources move from insignificant (empty space in I-1 configuration) to active presence (large circle in I-2 configuration). The lack of control over distribution therefore seems to be replaced by a high level of human resources as a support in contacts with external entities in the value chain. Finally, considering the combination of attributes inside each configuration allows to detect the effects of interactions between the components of the business model. For example, in a (I-1) configuration, a combination of a fully integrated system of R&D, production and distribution activities (Amit, and Zott, 2010) combines with technological and financial resources. These conditions are crucial for the achievement of the analysed result, high efficiency. Alternatively, in the configuration (I-2,) the integration in the field of production and human resources ensures high efficiency for the integration in the field of

research and development. This configuration can be described as a partially integrated business model.

Table 2 shows three Layer-Player business model configurations (LP-1a, LP-1b and LP-2), with an acceptable consistency level, showing both the first-order (LP-2 configuration) and second-order (LP-1a and LP-1b configurations) equifinality. According to the assumptions of P.C. Fiss, equifinality is not only perceived at the level of the key variables of the configuration. Taking into account the configurations (LP-1a) and (LP-1b), it can be observed that there are different configurations of auxiliary variables that surround the same key variables. This situation allows different neutral combinations to be taken into account within the key causal paths. Importantly, regardless of the different configuration of the auxiliary variables, they all lead to the same result, high operational efficiency of the surveyed enterprises.

In terms of key variables, all configurations in the Layer-Player business model include both production and distribution integration. For configurations (LP-1a) and (LP-1b), the combination of these variables is associated with a lack of R&D integration and a lack of cost leadership strategy. In contrast, in the configuration (LP-2), the key variables, in addition to production and distribution integration, also include human resources. The combination of differentiation strategies (as a proxy variable) combined with investment in innovation through R&D and technological and human resources is consistent with the evolutionary path of subcontractors (Camuffo, et al., 2007). Such a combination of the attributes of a business model and subcontracting is presented in a configuration (LP-2) showing the highest level of consistency (consistency = 0.89) among the distinguished configurations. Comparing the configurations (LP-1a) and (LP-1b), it can be observed that the lack of a differentiation strategy is compensated for by the fact that the combination of human and technological resources is complemented by high access to financial resources (LP-1a configuration). All three configurations also indicate the importance of a combination of human and technological resources.

5. Conclusion

This article attempts to demonstrate that the configurational approach is well adapted to the current stage of theoretical and empirical development in terms of business models. In particular, this involves a more comprehensive approach that can capture the multi-dimensionality and complexity of the concept. Moreover, while many researchers point out that business models are important units of analysis, and combinations of elements of which they are composed are closely related to the efficiency of enterprises, not many studies attempt to provide empirical evidence. Distinguishing important elements forming business models, and then understanding how their mutual interactions taking place in specific configurations will

contribute to the development of discussion on the definition of business models and their basic components.

In this article, the possibility of applying the configurational approach was tested with the use of fuzzy qualitative comparative analysis, the method that allows to analyse the causal relationships between the interaction of elements of business models and their efficiency, considering observations as combinations of different causal conditions. The configurational logic of fs/QCA explains comlpementarity effects in business model components and gives insight on equifinal configurations and substitution effect.

In the paper, the author distinguished between two main types of business model: the integrated business model and the layer player business model. The business model literature was used to identify the key resources and the customer value proportion that characterize the two types of business model (Johnson, et al., 2008). Then, the model on a sample of 53 high technology firms in order was tested to explain the elements of business model casually associated with high performing configuration. The tests carried out on ideal types of business models show that there are many equifinal configurations of business models leading to high efficiency of enterprises, and the use of fs/QCA allows to understand more precisely how different elements interact with each other to achieve similar results. Research also provides a deeper insight into the set of choices and consequences business models face for increasing reliability, imitation difficulties and competitiveness.

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INNOVATIVE ACTIVITIES IN THE WATER AND SEWAGE INDUSTRY

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Abstract: The purpose of this study is to analyze and present the results of research devoted to the development and intentions of water and sewage companies operating on the Polish market in the context of innovation. The data collected and analysed in the research has not been published yet. The specific purposes of the study is to describe the state of innovation of water and sewage companies operating across the country, and to indicate the directions for their development, their barriers and problems in the context of implementing innovation. The first part of the study focuses on the theoretical aspects of innovative activities of municipal companies, and characterizes the notions of innovation and innovativeness. In its subsequent part, the study describes the object, subject, purpose of the study, the research methods and techniques applied in the paper. The analysis and discussion of a selected research part is included in the last part of the study, which is closed by the final conclusions.

Keywords: innovations, sewage, sewerage, water industry.

1. Introduction

To ensure effective and dynamic growth, contemporary municipal companies should strive to increase their competitive advantage by implementing innovations. The EU Water Framework Directive defines water protection as one of the greatest challenges for the European Union, which calls for greater involvement of citizens and other actors in the search for new solutions. These challenges call for significant improvements in water resources, in terms of both quantity and quality, and underline the need for joint action by public and private entities to effectively reduce water intensity in production processes, and to improve water recycling and reuse to the benefit of industry and society (Gabrielsson et al., 2018). Improved capacity to generate and absorb innovative solutions is a strategic challenge, to which the organization should be prepared by ensuring the necessary resources and organizational solutions. Innovativeness is currently one of the imperatives for companies oriented at developing and raising their competitiveness in the sector of municipal services. Spiller and

others emphasize that innovation in technology and organizations is key to enabling the water sector to adapt to major environmental changes such as climate change, land degradation or drinking water pollution (Spiller at al., 2015). The essence of business is to stimulate innovation and constantly improve various areas of activity. Companies aim to dynamise the process of creating value for all stakeholders, particularly for clients, by diversifying and better penetrating the market, and by pursuing various market niches.

The notion of "innovation" comes from the Latin word *innovates*, which means a renewal. As such, the term stands for introducing something new, a newly introduced thing, a novelty or a reform (Janasz, and Kozioł, 2007). The notion has been perceived in different ways in literature. Innovation can include: the process of transforming a creative idea into a useful product, service or a way of acting (DeCenzo, and Robbins, 2002); each idea or item which is new, as it is qualitatively different to any existing, familiar forms (Burnett, 2010); creating results by doing something new (Miller, and Wedell-Wedellsborg, 2014); implementing new ideas (Karlik, 2014); converting inventions into material reality (Bogdaniecko et al., 2004); introducing new products and techniques; as well as introducing new raw materials, management forms and gaining new outlets (Nowacki, 2010); an extraordinary tool for entrepreneurship, by which changes create opportunities for the commencement of new production activity or the provision of new services (Weiss, 2011); a creative change in a social system, in an economic structure, in a technique and in nature (Marciniak, 1997); changes to the product's pattern, marketing method, price offered, service provided to the client, or changes in organization and management methods which apply to all areas of the company's activity (Drucker, 1992); everything that is perceived by the individual as new, regardless of the objective newness of a given idea or item (Rogers, 2010); the first commercial application of a new product; the first application of an invention (Bielski, 2000); any good, service, idea which is perceived by someone as being new (Kotler, 1994). In turn, literature defines innovativeness as: the tendency and ability to create new and enhance the existing products, new technologies and organizations, as well as management and motivation systems (Kotowicz-Jawor, 1997); the tendency and ability of a company, the economy or a region to implement innovations consisting of resources and methods applied in using them, remaining at their disposal (Nowacki, 2010); the ability of a company to create and implement innovation and the actual ability to introduce new and improved products, new or possibly altered technological or organizational and technical processes (Weiss, 2011). Levidow and others point to the concept of eco-innovation, which includes various innovative practices combining economic and environmental benefits. As an example, renewable energy or biomass can be given as an input substitute for fossil fuels. Moving forward, modernization of production processes has reduced the burden on resources, eg by replacing less harmful chemicals, internal wastewater treatment, re-use of water and/or waste, etc. (Levidow et al., 2016). Therefore, innovation should be understood as the implementation of a new or significantly improved solution devoted to a product (a commodity or a service), a process, marketing or organization

in a company. In the case of introducing a product solution, its essence is that it is offered on the market, whereas for the remaining innovations, the primary premise is that they are applied in the company's activities.

Four types of innovative solutions can be distinguished. There are marketing innovations, which entail introducing new or improved solutions in the product, its equipment, brand, packaging, positioning, pricing policy, promotional activity or business management model stemming from a new marketing strategy in the company's marketing activities. Product innovations entail the marketing of a new tangible or intangible product, or a significant improvement in characteristics or intended purpose, implemented in products offered so far. Process innovations mean the implementation of new or significantly improved production or delivery methods in the company's activities. Organizational innovations entail the application of a new business organization concept, a new workplace organization or a new organization of relations with outside partners (Niedzielski et al., 2007). In today's business reality, innovation has great impact on economic development, as it stimulates the continuous improvement of quality of products and services, and, ultimately, the level of business competitiveness. As a notion, innovativeness indicates the results of a company's innovative activity in time and place (Weiss, 2011). The essence of innovation is a complex process, comprising mutually interconnected phases. It is a social phenomenon, by which old behavioral models are challenged and learning is promoted. It requires expenditure and involves risk. Sometimes, it tears down the current order of the company (Jurczyk-Bunkowska, 2014).

The purpose of innovations is to develop societies, which would have not been possible otherwise. Intent on surviving, companies are forced to take the challenge and shift to developing their products, technological and business processes, as well as their organizational methods, in order to satisfy the client's requirements better. The present consumer prioritizes the quality of products and services, as well as the quality, with which they are served. Price is no longer the decisive factor (Jurczyk-Bunkowska, 2014).

The need to lower costs and search for new possibilities has also been a driving force behind innovation. The solutions proposed can often be radical. Another factor which stimulates the search for new products is their shorter life cycle, caused by easier access to new technologies. Innovations also emerge as a result of changing laws, such as increased environment protection requirements. Demographic and social changes are also very important. Aging societies in Europe and growing wealth of the lowest social classes in Asia result in a need to find solutions to satisfy newly emerging needs. Widespread competition results in the need to find a stabilizing point. Promoting the image of the company is a good way to guarantee customer loyalty. Innovations are perfect for this role, since they are generally noticeable, eagerly discussed and positively received (Knosala et al., 2014). In conclusion, there are many definitions of innovation, and many attempts have been made at interpreting its essence. Therefore, innovation can consist in the transformation of an idea into material objects or, in a narrower sense, it can be defined as a new product or the process of creating it. In a different

approach, innovation can be understood as a significant change of value and an emphasis on what is new: information, outlooks and social phenomena.

The sources of innovation can be diverse. They are often the response to current problems encountered in one's environment, in which case the chances of their commercial success are higher, compared to innovations which create new needs. Furthermore, determination in the pursuit of innovative solutions increases in crisis conditions, in which case we are dealing with desperate search (Lundvall et al., 2014). First, such search is limited to alternative solutions, close to the familiar processes, products and markets. Subsequently, the alternatives pursued are more and more distant. This approach is indicative of companies which were forced to change their production profile fast. Very often, measures such as this are inspired by a close look at the works carried out by the employees and identifying those as semi-legal, unregistered, official eternal commissions (Mamica, 2014). Another factor which can stimulate the pursuit of innovation can be shortages in production factors, such as high warehouse rental prices, which will stimulate the emergence of organizational innovation – a "just in time" delivery method. Therefore, the emergence of innovation is often the effect of a dispersed search for potential possibilities of offering a new product or service, alternatively forms of their effective delivery. The type of information sources used for this purpose is wide and, apart from own or ordered research and development works, includes, among others, suppliers and clients, as well as universities and public institutions. Entering in interaction is therefore a natural method of looking for innovative solutions (Mamica, 2014). Participation in a cooperative chain is an effective way of taking advantage of interaction in increasing the level of business innovation, particularly in smaller companies. Supplying parts or providing services to large consortia leading on the market, is a way to acquire new technologies and implement new quality standards in a relatively cheap manner. It is also often a way to obtain certificates to confirm it. This way, developing a network of cooperators, large corporations become diffusion centers for innovations, including organizational, in their environment. Insofar as these relations were initially based on a system of simple purchases, with time, this relationship transformed into a form of subcontracting, often related to the exchange of production technologies. Due to high transaction costs, when the number of suppliers is high, companies which offer more advanced subassemblies in cooperating with their suppliers are naturally formed. Competitiveness and innovativeness of companies has been increasingly determined by the network of connections, in which they participate. Innovative strategy is a certain way of thinking, determining the framework for decisions made with respect to the scope and direction of innovative activities. Adoption of an innovative strategy is an expression of a natural switch, so popular today, from a product – market organization development concept to a development concept based on innovation, i.e. innovation – product – market (Pichlak, 2012).

Strategies in innovative activity can be divided into four types. Active, applied by leading companies on the market, companies that are intent on conducting their own research activity. To acquire knowledge, they use various sources of innovation. The innovations implemented

are radical in nature (e.g. they change the character of products and services). This type of innovations involves risk, but the success is often worth the risk. The second type is passive strategy, which consists in making changes to meet the expectations and needs of the clients. This applies, among others, to the automotive industry. The next active strategy is based on the protection of current markets and technologies, and involves a bold movement when it is necessary to introduce an innovation into the market. Companies adopting this strategy are exposed to a lower risk, but are also forced to keep watch and react when access to research infrastructure becomes necessary. The fourth strategy is reaction. Here, companies run their own operations and wait for a specific reaction to implement changes (Jurczyk-Bunkowska, 2014).

2. Materials and methods

The object of this study is innovativeness in water and sewage companies operating in Poland, and specifically their directors and selected employees of middle management. The purpose of the study is to:

- Characterize the state of innovation in water and sewage companies across the country;
- Indicate the direction for development of water and sewage companies in Poland;
- Indicate barriers and problems in the context of introducing innovation in Polish water and sewage companies.

The research methods used are: questionnaires, direct observations and interviews. A survey questionnaire containing 25 questions was developed in September 2016. The research questionnaire was created on the basis of experience in innovative activities related to water and sewage management of Sewage and Water Supply Ltd. Rybnik. The questions referred to the development and intentions of water and sewage companies. The survey was sent out to 250 water and sewage companies across Poland. Their senior management was asked to submit their responses.

To select companies to participate in the study, the authors identified 250 largest cities in Poland in terms of population, with active water and sewage companies. Out of all 250 surveys sent, 78 were returned, which constitutes approx. 31%. Their majority – 50 companies – are medium-sized enterprises (specified in the survey as employing from 50 to 250 people). The next 20 companies are largest companies (specified in the survey as employing more than 250 people). The smallest number of responses – 8 – were received from small companies (specified in the survey as employing 10 to 49 people). Micro-companies (specified in the survey as employing 2 to 9 people) did not express a wish to participate in the study.

Interviews with top management were carried out from January to June 2017, followed by observations of innovative activities in 34 companies which consented to it. This aimed at confirming the results obtained in the analysis of questionnaires and at helping the authors identify any problems encountered in the implementation of an innovation strategy.

3. Results and discussion

In the first points of the survey and the interview, the respondents were asked if the companies they managed engaged in any innovative activities, or whether they planned to introduce innovations in their short-term strategies with a 3-year perspective. A great majority of the respondents answered that their companies had already conducted innovative activities (87%), whereas (92%) of the companies intended to introduce or continue innovative activities in their upcoming 3-year strategies.

The respondents who answered yes to the preceding questions were further asked about the areas in which innovations were implemented. Figure 1 below presents the areas, in which innovations are implemented.

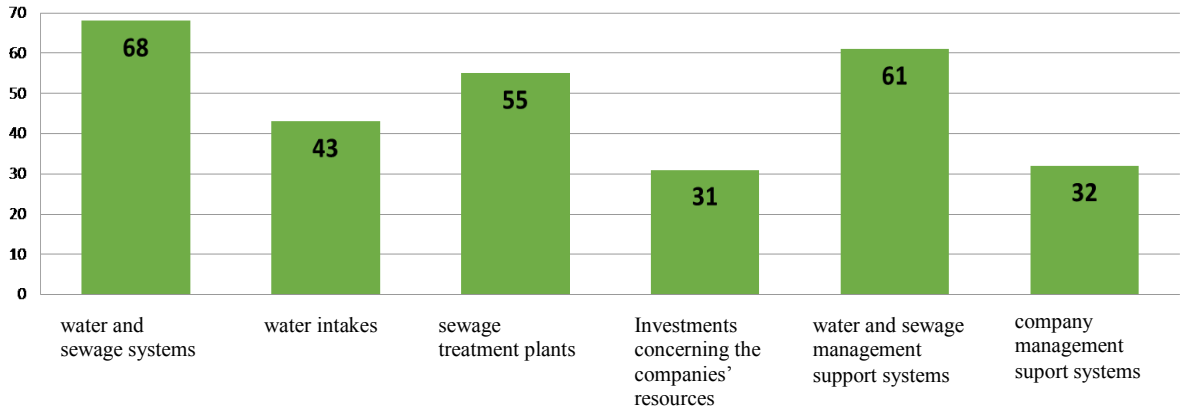

Figure 1. Innovation areas in water and sewage companies across Poland. Own study based on research.

According to the diagram above, the water and sewage systems and the water and sewage management support systems are the largest innovation areas, followed by systems facilitating management of the company, and investments concerning the companies' resources.

One of the next questions concerned the finances the company managers intended to spend on innovations. Their replies are illustrated in Figure 2.

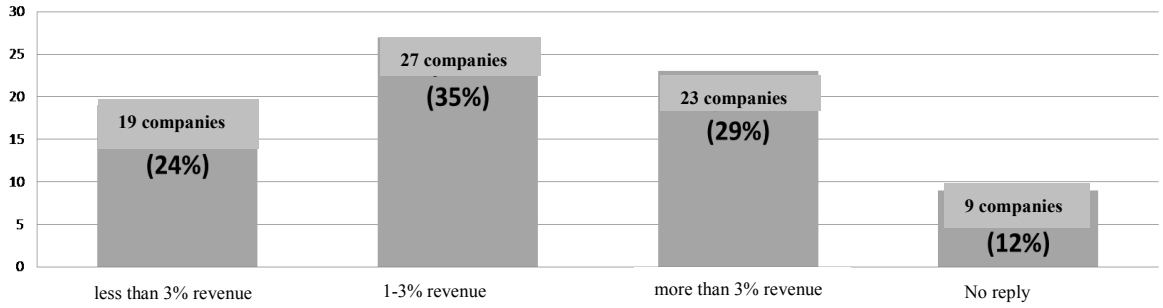

Figure 2. Planned resources to be spent on innovation in water and sewage companies across Poland as part of their 3-year strategies. Own study based on research.

The above graph shows that the majority of enterprises participating in the survey intended to spend 1 to 3% of their revenue (27 companies) on innovation. 23 companies intended to spend more than 3% on innovation, and 19 companies intended to spend less than 1% of their income. In the survey, 9 companies did not mark any field, which means that they did not intend to spend any sums on innovation in the next 3 years.

In the next questions, the respondents were asked about the sources of technological innovations, either planned or currently implemented by the companies. Their responses are presented in the diagram below (Figure 3).

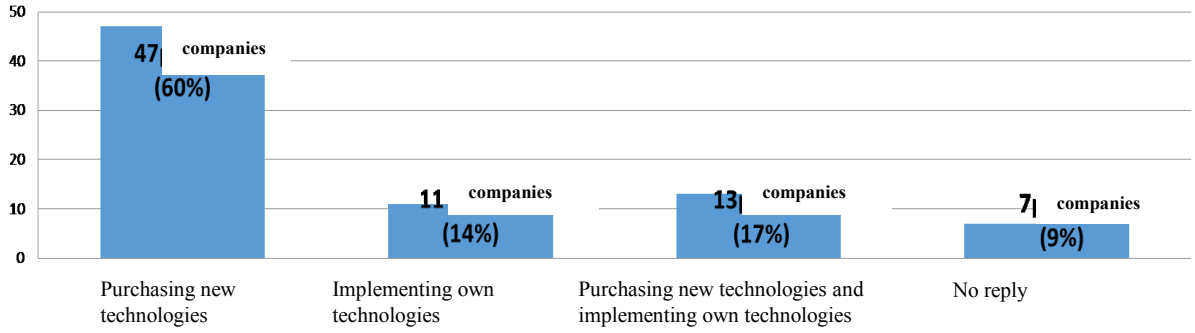

Figure 3. Sources of new innovative technologies in water and sewage companies across Poland, in their 3-year strategy. Own study based on research.

According to this diagram, companies primarily focused on purchasing new technologies – 47 companies (60% of the respondents), 13 companies (17%) were interested in buying ready-made technologies and implementing their own technologies, and 11 companies (14%) intended to implement their own technologies only. 7 companies (9%) did not mark any response.

The next questions were devoted to the type and availability of systems which facilitate the monitoring and management of the water distribution system. The availability of these systems on the market, according to the respondents, is illustrated by the following diagram (Figure 4).

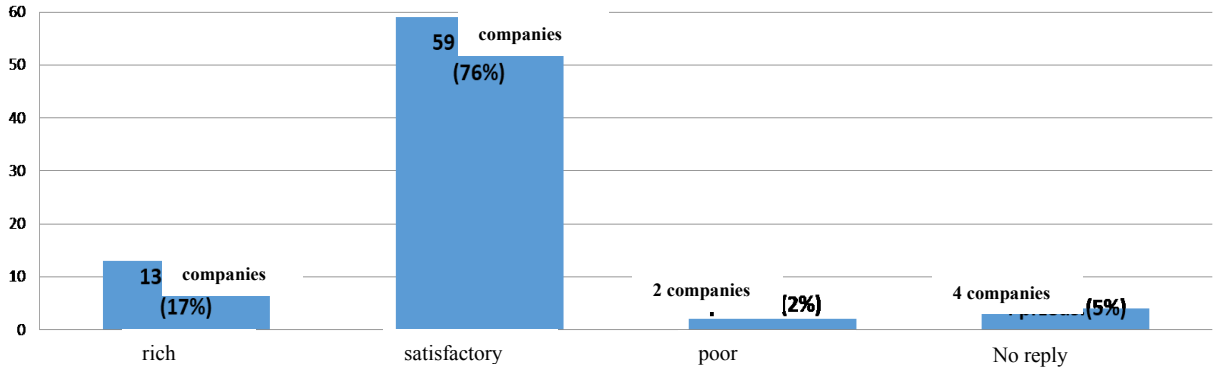

Figure 4. Market offer of systems which facilitate the monitoring and management of water supply systems. Own study based on research.

According to the diagram above, the market offer of supporting and monitoring of water supply system management systems is satisfactory – 76% (59 companies), rich – 17% (13 companies), poor – 2% (2 companies), no reply – 5% (4 companies).

Furthermore, according to the respondents, the types of offered systems which facilitate and monitor water distribution systems are:

- integrated systems combining multiple functionalities, such as expert modules – 28 companies,
- mainly measurement and metering systems – 11 companies,
- various systems, which would require integration to fulfill your expectations – 39 companies,
- it is easier to find suitable technologies abroad – 0 companies.

Among the 78 surveys which were sent back, 43 companies listed the factors which would increase their innovativeness. In turn, 53 surveys were sent back without specifying any factors. The factors which could increase the innovativeness of companies are the following:

- financial resources, external financing – 31 companies,
- cooperation with schools, qualified personnel – 7 companies,
- reduction of fiscal burden, legal regulations – 4 companies,
- reduction of negative impact on the environment – 3 companies,
- integrated information system – 3 companies,
- staff motivation – 1 company.

4. Conclusions

Innovative activity is currently a necessity and should not be treated as supplementary or secondary in a company. The Polish market is still relatively absorbent and the sector of municipal services has not filled it with new solutions. Few examples of service innovations

confirm this regularity. Despite the risk connected with innovative activity, the lack of activity in this respect means sentencing the company to gradual decline. A strong pro-innovation stance of top management and the inclination for risk-taking is the domain of developing companies, oriented at ensuring long-term competitive advantage in a knowledge-based economy. The following conclusions can be drawn based on the research:

- The majority of water and sewage companies operating in Poland have been implementing innovations and plan to take such measures within the next 3 years – the trend is clearly increasing, compared to a study carried out for this industry in 2013.
- Unfortunately, only few of the companies declared their will to implement own innovative technologies – we can therefore conclude that few companies are planning to conduct their own innovative technological activities, focusing on purchases from the external market instead.
- On the Polish market, the availability of systems which support and monitor water supply networks is satisfactory, but they must be integrated with other units to fulfill the expectation of the management of water and sewage companies.
- The basic direction for development is the extension of the water and sewage systems. An identical number of companies declared their plans to extend their water and sewage systems plus their systems to facilitate their management.
- Insufficient financial resources are identified as the main barrier to the implementation of innovations.
- According to interviews conducted with top management, among the barriers to implementing innovations is the lack of legal stability in the municipal sector in terms of long-term investments through innovations. Apart from the technological risk related to the success of a given innovation, innovations require financial stability of the enterprise.

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THE IMPACT OF A MILITARY UNIT ON THE SOCIO-ECONOMIC SITUATION OF MUNICIPALITIES IN THE CONTEXT OF LOCAL DEVELOPMENT

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Abstract: This paper presents the results of a survey conducted among residents of municipalities. Respondents expressed their opinion on selected aspects of the impact of the military unit located in their municipalities on the socio-economic situation. Centre for Public Opinion Research (Polish: CBOS) results were also referenced.

Keywords: municipality, military unit, socio-economic situation.

Introduction

Military unit location in a specific geographical area is dictated by considerations of national security and is generally not a subject of municipality competition. It can be regarded in the context of the municipality's possession of specific resources, which, to a certain extent, may be included in the local development process (Jewtuchowicz, 2013, p. 129-130). In light of the resource approach (Floyd, Sherman, Sigismund, Terjesen, 2011, p. 45-51), the organisation is perceived as a "bundle of resources, skills and competencies" (Nowakowska-Krystman, 2014, p. 48-50). With regard to the municipality, the combination of resources located on its territory determines the development based on the created competitive advantage (Klasik, 2002, p. 39-52). Local development "includes (...) the regional environment of the life of communities that are considered local, and is conducted from the point of view of the needs of these communities, regional development resources, and with the involvement of local communities, regional government structures and other organisations and institutions (...)" (Parysek, 2001, p. 46). Local development can be equated with the notion of socio-economic development as socio-economic processes and their effects are related to specific spacial units and are placed in time. In the economic dimension, development signifies changes of a quantitative as well as structural and qualitative nature (Milewski, 1994). In turn, in the social

dimension it signifies changes in the approaches, preferences and practices in the society, and increased access to public services, and social, technical and economic infrastructure, enabling wider satisfaction of diverse needs, and thus increasing the residents' quality of life (Piotrowska-Trybull, 2013).

The factors of local development, as assessed by J.J. Parysek, may include: the need for local communities, workforce, natural resources and qualities of the environment, infrastructure investments, economic potential, local and external markets, financial capital, the level of education, technology and culture, modern production technologies, the territory and areal benefits, international relations and bilateral cooperation (Parysek, 2001), and the localisation of national institutions, including military units. In the context of army presence[1] in a particular territory, it should be emphasised that its activities are not aimed at achieving effects within the municipality, but at the effective performance of its function, which is to ensure national security, addressed towards the general public. The army, as an element of the local economy, contributes to the potential of the region in which it is located, and at the same time is a part of the national economy (Polski, 2007).

A military unit stationed in a municipality's territory performs defence tasks, and at the same time its presence fosters relationships with local entities (local government, residents, schools, various associations). The role and place of a military unit in the local community is specified by its internal elements, i.e. the structure and size of staff, conducted tasks, intensity of cooperation with municipality entities, as well as external elements, i.e. community size – its population and economic potential, as well as its character – rural or urban.

In the context of relations between the army and local communities, in the national and foreign secondary sources the following issues are discussed: consequences of the army "leaving" a particular area (social, economic), the process of transferring post-military assets to other users, revitalising the natural environment, activities related to the reconstruction of the regional economy, as well as the impact of the army on local development. Among the consequences of army withdrawal for the local community, the following effects are emphasised: an increase in unemployment and a decrease in employment (Stenberg, 1998; Stenberg, and Rowley, 1993; Sirko, and Piotrowska-Trybull, 2013), production limitations, decrease in income and demand (Paloyo, Vance, and Vorell, 2010), migration (Andersson, Lundberg, and Sjöström, 2007), limitation of demand for public sector services (Piotrowska-Trybull, 2011; Thanner, and Segal, 2008), and changes in the real estate market (Stenberg, 1998; Dardia et al., 1996). The results of our own analysis and those presented in secondary sources allow for the formulation of the conclusion that the influence of military units on local development varies and depends on the territorial unit type in which the army is quartered. The impact of military units on the socio-economic situation in a municipality may take place

[1] This paper will consider the military as regular troops of given kinds of armed forces (Szymczak, 1981, p. 745). More on the relations between the notions of military, armed forces and army at work (Piotrowska-Trybull, 2013).

in various forms and with varying intensity at the social, economic, environmental and technical levels. With respect to the living conditions of the residents and the conditions for running a business, this impact may be both direct and indirect (Table 1).

Table 1.
The impact of a military unit at social and economic levels

Social	Economic
• limits the population outflow from the municipality • contributes to the population inflow to the municipality • affects the level of education in the municipality • contributes to establishing foreign contacts • develops cooperation with schools and strengthens patriotic attitudes among children and youth • influences the level of security	• diversifies the labour market in the municipality • contributes to the creation of new jobs in the municipality • stabilises/dynamises the demand in the municipality • provides revenue to the local budget • contributes to the development of local businesses • contributes to the development of services

Source: authors' own elaboration.

Considering the above, the article focuses on the identification of the directions, extent and ways of influence of the army at social and economic levels in selected municipalities. To this end, qualitative and quantitative methods were used, in particular: analysis, synthesis, inference and survey method.

Survey Implementation

Surveys were conducted using the CATI method2 in November 2017. At the request of the authors, they were conducted by ASM. The authors prepared the questions that the respondents were asked. 600 people, drawn in proportion to the population from individual municipalities, were asked about their opinion on the impact of the military units on the situation in their municipality in the context of regional development. The respondents were divided by sex and age (18-34 years, 35-54 years, 55-75 years, above 75 years), taking into account the proportion of residents in individual municipalities. Among the respondents, professionally active people were the most numerous group (49.0%). The remaining ones are: pensioners (38.3%), students and pupils (3.2%), and unemployed (9.5%). The respondents had: higher (38.8%), secondary (46.5%), vocational (10.7%) and primary (4.0%) education.

In the article, the results of our own analyses of the data obtained from the ASM company are presented. They were conducted using Excel and Statistica v. 13.1. The presented measures of descriptive statistics are derived from the level of measurement used in the questionnaire. Test x^2 was used to verify the statistical hypotheses. The results presented in the article were

[2] Computer Assisted Telephone Interview. Advantages and disadvantages of the method are presented in the paper (Szreder, 2010).

statistically significant at the level of 0.05. Figures (1, 3, 4, 6) present the results of correspondence analysis[3]. The information used to characterise the municipalities was obtained from the Polish Central Statistical Office (Local Data Bank) website.

Characteristics of the municipalities

Within the municipalities in which the surveys were conducted the following urban municipalities were included: Braniewo, Brzeg, Chełmno, Hrubieszów, Słupsk (a city county). The Słupsk municipality occupied the largest area, while the Braniewo municipality occupied the smallest area (Table 2).

Table 2.
Area and location of the municipalities within which the survey was conducted, as of the end of 2016

Territorial unit	Location of the municipality in the province	Area in km²
Braniewo	Warmińsko-mazurskie	12
Brzeg	Opolskie	15
Chełmno	Kujawsko-pomorskie	14
Hrubieszów	Lubelskie	33
Słupsk	Pomorskie	43

Source: based on the data of Local Data Bank of the Central Statistical Office, https://bdl.stat.gov.pl/BDL/dane/teryt/tablica, January 8, 2018.

Within the territory of the analysed municipalities, military units representing various types of armed forces were stationed. In 2016, the municipalities were inhabited by 183,416 residents. Słupsk was the most populated (91.9 thousand residents), followed by Brzeg (36.2 thousand residents), and the smallest population was in Braniewo (17.1 thousand residents) (Table 3). In recent years the number of residents has decreased in all analysed municipalities. In 2016, the change in population per 1,000 inhabitants ranged from (-2.2) in Braniewo, to (-11.6) in Hrubieszów.

The analysed municipalities varied in terms of population density. The highest density of population in 2016 was recorded in: Brzeg – 2,484 residents per km2 and Słupsk 2,131, while the lowest occurred in Hrubieszów – 547 residents. Comparing the population density of the

[3] They are interpreted on the basis of the location of the points reflecting the categories of specific variables. Points far away from the centre of projection provide the largest contribution to abandoning the independent variables hypothesis. Close proximity of points belonging to different variables indicates the existence of connections between the categories. Close proximity of two points belonging to the same variable indicates a high similarity of their profiles. For better illustration, the location of some points is distinguished by a dotted line. More in the studies (Stanimir, 2005; Stanisz, 2007).

analysed municipalities to the national average (123 residents per km 2 in 2016), it was higher in all of them[4].

Table 3.
Population of municipalities in which military units are stationed, state at the end of 2016

Territorial unit	Population in 1 km^2	Change in population per 1,000 residents	Number of residents	Internal migration balance	Foreign migration balance	Rate of natural increase per 1,000 residents	Population of non-working age per 100 residents of working age
Braniewo	1,380	-2.2	17,123	-39	0	0.00	55.9
Brzeg	2,484	-4.9	36,292	-83	11	-1.90	64.9
Chełmno	1,474	-11.1	19,991	-119	-16	-2.04	61.5
Hrubieszów	547	-11.6	18,075	-118	-12	-2.69	60.4
Słupsk	2,131	-6.1	91,935	-357	6	-2.26	65.0

Source: own elaboration.

The demographic burden rate in the analysed municipalities was relatively high[5], indicating adverse changes in the population structure. In 2016, the highest demographic burden rate was recorded in Słupsk, where the non-working age population per 100 residents of working age was 65. The lowest demographic burden rate among the analysed towns was recorded in Braniewo, – 55.9.

Taking into consideration the rate of natural increase in 2016, the most adverse situation was recorded in Hrubieszów (-2,69), and the most beneficial in Braniewo (0.0).

In 2016 in all the analysed municipalities negative internal migration balance was recorded. This means that the number of people who left the municipality exceeded the number of people who arrived. The highest negative internal migration balance was recorded in Słupsk (-357 people), and the lowest in Braniewo (-39). A negative international migration blance was recorded in two municipalities: Chełmno and Hrubieszów: (-16), (-12), respectively. In Braniewo, the same number of people went abroad as arrived in the municipality. In Słupsk and Brzeg the balance was positive and amounted to 6 and 11, respectively.

Comparing the situation in the labour market in 2011 and 2016, there had been a noticeable improvement in the labour market in the analysed municipalities. The total number of people registered as unemployed in the Braniewo, Hrubieszów and Chelmno municipalities decreased (from 23% to 29%), while in the two biggest analysed towns, Brzeg and Słupsk, it fell by about 50%. A similar tendency occurred in relation to the number of people registered as unemployed up to the age of 25. In 2016, in comparison to 2011, the number was reduced by at least 50%

[4] Territorial Profile of the Area and Population in 2017, Statistical Information and Elaborations, GUS (Central Statistical Office), Warsaw, 2017, https://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/powierzchnia-i-ludnosc-w-przekroju-terytorialnym-w-2017-r-,7,14.html, January 8, 2017.

[5] People of working age are people of an age that enables them to work. The age adopted was in the range of 15-64 years for men and 15-59 years for women. People of non-working age: people of pre-working age, i.e. 14 years and less, and of post-working age, i.e. men 65 years and above, women 60 years and above.

in Braniewo, Hrubieszów and Chełmno, while in Brzeg and Słupsk by more than 60% (Table 4).

Table 4.
The labour market in municipalities in which military units are stationed, as of the end of December of 2011 and 2016

Municipalities	Braniewo		Brzeg		Hrubieszów		Chełmno		Słupsk	
Variables	**2011**	**2016**	**2011**	**2016**	**2011**	**2016**	**2011**	**2016**	**2011**	**2016**
The total number of registered unemployed	1,401	1,019	2,422	1,274	1,538	1,173	1,496	1,062	4,692	2,208
People registered as unemployed under 25 years of age	267	142	369	130	268	134	266	149	696	219
People registered as unemployed over 50 years of age	291	256	724	470	331	272	373	295	1,256	701
People registered as long-term unemployed	804	611	1,208	639	1,054	790	835	669	2,351	968
Share of people registered as unemployed in the population of working age, in %	12.0	9.3	10.1	5.8	12.5	10.4	11.0	8.6	7.6	4.0
Employed people per 1,000 residents	182	192	227	201	221	229	213	234	286	290

Source: based on the data of the Local Data Bank of the Central Statistical Office, https://bdl.stat.gov.pl/BDL/dane/teryt/tablica, November 1, 2018.

On the other hand, in relation to the number of people above 50 registered as unemployed, an improvement was also recorded, although it was slightly smaller than in the case of the above-mentioned variables: about 12% in Braniewo and about 44% in Słupsk. Another important variable in the context of the labour market is the time span of unemployment. In all the analysed municipalities the population of long-term unemployed decreased between 2011 and 2016. The highest decrease in this regard was recorded in Słupsk – about 58%, the lowest in Chełmno – almost 20%. A similar tendency was noticed in terms of the share of people registered as unemployed in the working population as in terms of the above-mentioned variables, namely, in the most populated towns the unemployment rate in relation to the number of the working age population was the lowest, which means that the larger urban centres dealt with unemployment slightly better.

From the point of view of regional development stimulation, entrepreneurship and local community activites, as well as building social capital are extremely important factors. Changes in the area of entrepreneurship are reflected in the increase or decrease of the number of economic subjects entered in the REGON register per the total number of residents and the number of working age residents, as well as change in the number of newly registered subjects. In turn, the activity of the local community and the potential development of social capital can be inferred by analysing, among others, the number of foundations, associations and social organisations per 10,000 residents (Table 5).

Table 5.
Entities of national economy[6] in municipalities where military units are stationed, as of the end of December 2011 and 2016

Municipalities	Braniewo		Brzeg		Chełmno		Hrubieszów		Słupsk	
Variables	**2011**	**2016**	**2011**	**2016**	**2011**	**2016**	**2011**	**2016**	**2011**	**2016**
entities entered in the REGON register, per 10,000 residents	875	954	1,374	1,391	847	879	1,026	1,098	1,394	1,404
newly registered units in the REGON register, per 10,000 residents	74	79	91	76	83	63	56	66	100	87
entities deleted from the REGON register per 10,000 residents	103	63	116	88	80	63	118	63	153	90
natural persons[7] performing an economic activity per 100 people of working age	8.6	9.3	15.1	15.5	9.4	9.7	12.3	13.2	15.3	15.4
foundations, associations and social organisations per 10,000 residents	25	34	21	30	35	42	23	30	33	45
share of de-registered entities in the total number of entities entered in the REGON register (in%)	11.8	6.6	8.4	6.4	9.5	7.2	11.5	5.8	11.0	6.4
share of newly registered creative sector entities in the total number of newly registered entities (in%)	5.30	5.15	7.92	9.78	7.47	3.97	3.77	6.67	5.96	5.50

Source: based on the data of the Local Data Bank of the Central Statistical Office, https://bdl.stat.gov.pl/BDL/dane/teryt/tablica, November 1, 2018.

In all analysed municipalities the number of entities entered in the REGON register per 10,000 residents was higher in 2016 than in 2011. The highest growth was noted in Braniewo – 9% and Hrubieszów – 7%. The lowest increase occurred in Słupsk – approximately 1%. The highest growth of newly entered entities per 10,000 residents in the REGON register was noted in Braniewo and Hrubieszów, by 6.7% and 17.4%, respectively. In the remaining urban municipalities, in this regard, declines were noted in Brzeg (16%), Chełmno (26%), and Słupsk (13%). At the same time, in all municipalities a decline in the number of entities deleted from the REGON register took place, as well as a decrease in the share of de-registered subjects in the total number of subjects entered into the REGON register, which may suggest a general improvement of the economic situation in the municipalities. In the context of residents' entrepreneurship, it is worth emphasising that in every municipality a growth in the number of

[6] A legal person, an organisational unit without legal personality and a natural person operating a business, http://stat.gov.pl/metainformacje/slownik-pojec/pojecia-stosowane-w-statystyce-pu-blicznej/814,pojecie.html, January 13, 2018.

[7] Entrepreneur as defined by the Act of July 2, 2004 on the freedom of economic activity and another neutral person holding. Neutral person conducting educational activity is not subject to entry, http://stat.gov.pl/metainformacje/slownik-pojec/pojecia-stosowane-w-statystyce-publicznej/814,pojecie.html, January 13, 2018.

natural persons conducting economic activity per 100 residents of working age was noted, the highest being in Braniewo and Hrubieszów, both around 8%. On the other hand, a conversion of the number of persons conducting an activity per 1,000 residents indicates that the economic activity in the municipalities of Brzeg, Chełmno and Słupsk is slightly lower than in Braniewo and Hrubieszów. At the same time, the number of foundations, associations and social organisations per 10,000 residents has increased in all municipalities. The most dynamic growth was recorded in Brzeg (45%), Braniewo and Słupsk (around 35% each).

Considering the newly registered entities in the creative sector in relation to the total number of entities registered in the municipalities, a positive tendency can be noted in Brzeg and Hrubieszów. This can potentially increase the number of innovative solutions in these municipalities, with a decrease in the share of these entities in the remaining ones.

Residents' opinions about the influence of the military unit on the situation in the municipality

The results of the surveys conducted so far indicate inner connections between military units and their local environment. Using the resources, the units perform the tasks assigned to them while providing the collective good of security to the environment and generating effects resulting from the use of resources. From the perspective of some municipalities, the military units stationed in their territory can be a favourable circumstance. In the case of others, it can limit their development to a greater or lesser degree. In this situation, proper relationships between the army and the environment (local authorities, schools, associations and other social organisations) are very important.

According to the majority of respondents (61.0%), the military unit is in a good relationship with local entities. Such an answer was given by 83.3% of respondents from the Hrubieszów municipality and 83.9% of those surveyed in the Braniewo municipality. In the remining minucipalities, the percentage of those indicating good relations between the military unit and its environment was lower: Brzeg (66.7% of respondents from this municipality), Słupsk (56.7%), and Chełmno (54.8%). The highest percentage of responses indicating proper links between the army and its environment was found in the youngest (18-34) and oldest groups (over 75 years) of respondents (66.7% in both groups), and among students (79.0%). In each municipality there were also people (35.7% of the total number of respondents[8]) who could not take a clear position on the issue in question, or perceived it negatively (3.3%).

[8] Both respondents in touch with people who work or worked at a military unit stationed in their municipality (49.5% of respondents within this group) and those who had never had contact with such people (58.5%) could be found in this group.

The quality of life of the residents is shaped by many factors. As such, among others, the following were indicated (Gawlikowska-Hueckel, and Umiński, 1999): the demographic situation, the state of the natural environment, the housing situation, transport and communication, education and training opportunities, access to culture, the level of health and healthcare among the residents, the commercial network, the standard of living, the level of security, and opportunities for recreation and leisure.

In a situation where a military unit offers jobs, cooperates with schools, ensures income to the regional budget, and can directly and indirectly influence the development of local companies (Piotrowska-Trybull, 2013; Sirko, and Piotrowska-Trybull, 2013), the respondents were asked about the military unit's impact on the standard of living of the residents of the municipality where the unit is located. According to nearly half of the respondents (49.6%), the military unit's presence contributes to enhancing the quality of life. Others (43.2%) did not see such influence or believed that the presence of the army contributes to a decrease in the quality of life in their municipalities (4.0%). The rest (3.2%) could not take an unambiguous position. The army's beneficial influence was noticed in all of the analysed municipalities. Among them were 73.9% of those surveyed from the Braniewo municipality, 73.0% from the Hrubieszów municipality, 50.7% from the Chełmno municipality, 46.6% from the Słupsk municipality, and 46.2% from the Brzeg municipality (Figure 1). Those who noticed a positive influence of the military unit on the quality of life were men (48.1% of all men) and women (50.9%). Respondents of all age groups and different levels of education were conscious of such an influence. The highest percentage of such indications occurred in the group of 18-34 years (56.5%) and among students and pupils (84.2%), with the lowest in the group 55-75 years (43.7%) and those who were retired (47.0%).

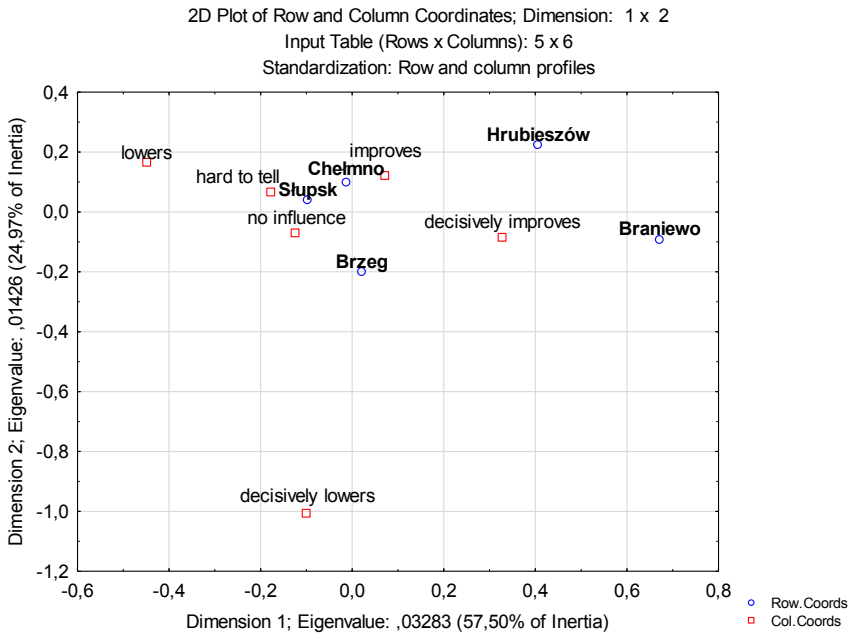

Figure 1. Opinion of the respondents on the influence of the military unit on the municipality residents' quality of life. Source: authors' own elaboration.

Military units influence the local labour markets to a greater or lesser degree. On the one hand, they can provide employment to residents of the municipality as well as outsiders, and on the other, if they are disbanded, more unemployed people can appear in the labour market[9] (Piotrowska-Trybull, 2013; Sirko and Piotrowska-Trybull, 2013) or the level of employment can be lowered (relocation of the army also results in the transfer of soldiers to other places where they continue to serve). According to 94.6% of the respondents from the Hrubieszów municipality and 82.6% from the Braniewo municipality, it is hard to find employment. In the case of the Chełmno municipality the situation differs slightly as 63.0% of the repspondents indicated problems with gaining employment. An even smaller percentage of such responses was recorded among the respondents from the Brzeg municipality (41.7%) and the Słupsk municipality (40.6%), where in 2016, as compared to 2011, the biggest fall in unemployment was noted. 42.6% of men and 53.9% of women surveyed pointed out problems with finding a job. The biggest percentage of such indications, which is rather obvious, occurred among the unemployed (77.2%) and primary education holders (62.5%). It was observed that the younger the respondents, the higher the percentage of those claiming that finding a job is easy in that particular age group (statistically significant relationships at $p<0.05$). Students and pupils (57.9% of this group) and those professionally active (58.2%) did not see problems with gaining employment within their municipalities. Along with the increase in the level of education of the respondents, the percentage of those for whom finding employment is not a problem also increased (primary 33.3%, secondary 46.2%, vocational 46.8%, higher 50.6%).

During the survey the respondents were asked to assess the level of impact that a military unit stationed in their municipality can have on the socio-economic situation. Among the statements proposed to the respondents regarding the areas of influence, the highest percentage of responses point to a high or very high influence of the army achieved by the upbringing of young people (Figure 2).

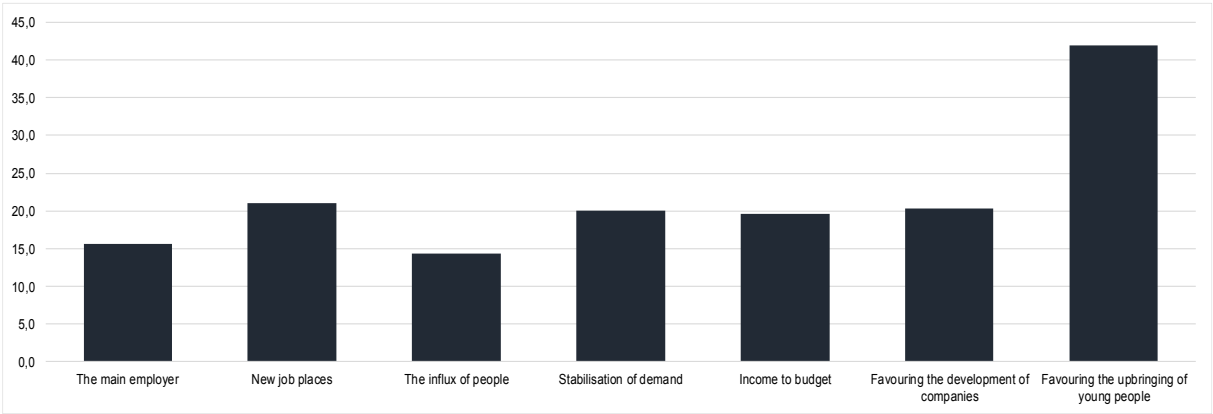

Figure 2. High and very high influence of the military unit in particular areas (data in %). Source: authors' own elaboration.

[9] According to the analyses carried out by the authors of the article (municipalities of various natures were taken into account), dismissing several hundred people would cause unemployment to rise by a few dozen percentage points, while for others, especially in urban municipalities, it would have an insignificant effect on the employment market.

Respondents' opinions regarding the role of the military unit in the local labour markets were divided. The smallest group (15.7%) claimed that it was one of the main employers in the municipality. A significantly bigger group of respondents believed that the role of the army in this regard was minor (53.8%) or average (30.5%). The significance of a military unit as an important employer was noticed by 39.1% of the respondents from the Braniewo municipality and 37.8% from the Hrubieszów municipality (Figure 3). In the remaining municipalities responses prevailed indicating the small role of the army in this regard (Słupsk 60.0%, Chełmno 56.2%, Brzeg 52.3% of the answers). As a result of the analysis it was found that the younger and more educated the respondents were, the higher the percentage of them who did not indicate the military unit as an important employer (18-34 years – 61.9%, 35-54 – 55.7%, 55-75 years – 48.6%, over 75 years – 40.4%) (higher – 63.1%, secondary – 50.2%, vocational – 46.9%, primary – 25.0%) (statistically significant relationships at $p < 0.05$).

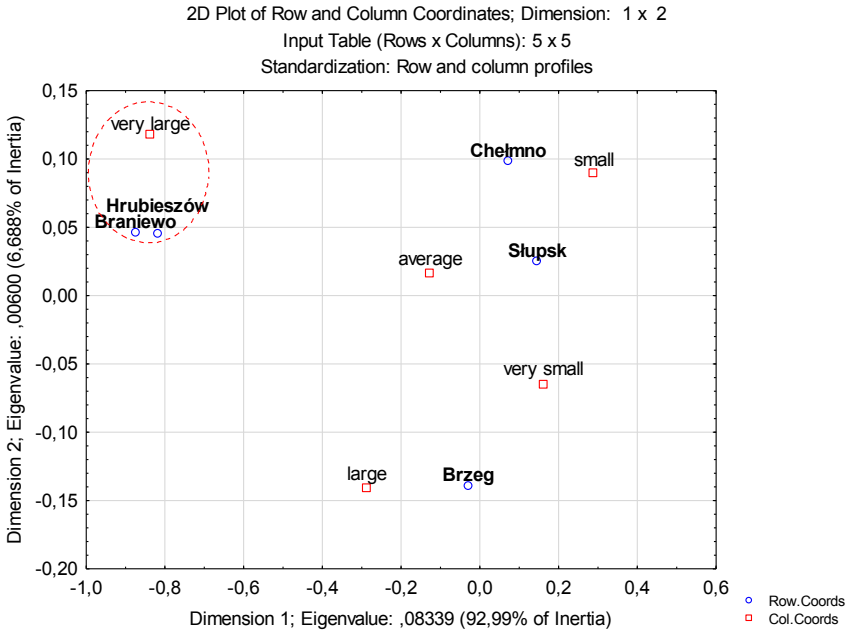

Figure 3. Evaluation of the role of the military unit as the main employer. Source: authors' own elaboration.

In the opinion of every fifth respondent the presence of a military unit in the municipality encourages the emergence of new jobs. A different view in this regard was expressed by more than half of the respondents (50.2%), while the rest (28.8%) perceived the impact of the military unit on to the emergence of new jobs as average. Similarly to the question about the role of a military unit as an employer, the possibility of new jobs emerging as a result of its being stationed in the territory of a municipality was mainly observed by respondents from the Braniewo municipality (43.5% of respondents from this municipality) and from the Hrubieszów municipality (40.5%). In remaining municipalities the answer suggesting a minor role of the army in this area was chosen more commonly (Chełmno 61.7%, Brzeg 53.%, Słupsk 50.2% of all of the answers). It was established that the higher the level of education, the bigger the percentage of those assessing the presence of the army as having little impact on the emergence

of new jobs in the municipality (primary – 33.3%, vocational – 42.4%, secondary – 49.1%, higher 55.4%) (statistically significant relationships at $p < 0.05$).

Due to the presence of a military unit, soldiers arrive in a municipality, often with their families. Others, after leaving service, remain in the municipality permanently as pensioners. The inflow of people to a municipality as a result of the stationing of a military unit was noticed by 26.1% of the respondents from the Braniewo municipality and 29.7% from the Hrubieszów municipality. In the remaining municipalities the percentage of those people was lower (Słupsk 14.3%, Chełmno 13.7%, Brzeg 8.3% of all of the answers). Regardless of age, education and professional situation, the respondents commonly indicated that a military unit's contribution to the population influx to the municipality is minor. No statistically significant relationships were noted between those variables and the opinion of the respondents about the increase of the population in a municipality as a result of the presence of the army.

A military unit employs both soldiers and military personnel. Their fixed number, with fixed income, creates the possibility to sell goods and provide services by the local economic entities. In the opinion of every fifth respondent, the presence of the army in a municipality contributes to the stabilisation of demand in its territory. Such a dependence was noticed by 40.5% of respondents from Hrubieszów and 34.8% of those from the Braniewo municipality (Figure 4).

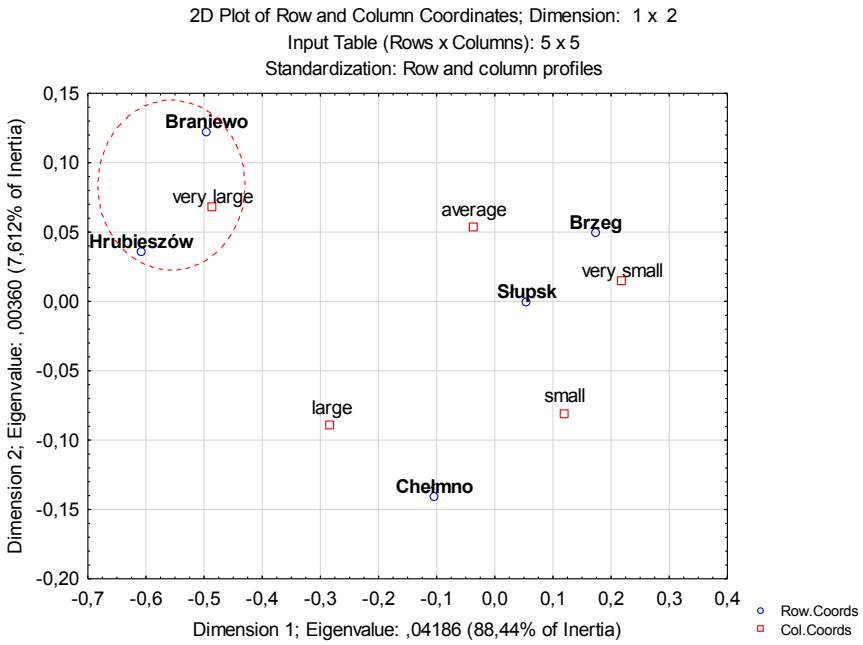

Figure 4. Assessment of the military unit's influence on the stabilisation of demand in a municipality. Source: authors' own elaboration.

In the remaining municipalities the percentage of indications in this area was smaller (Chełmno 26.0%, Słupsk 17.6%, Brzeg 14.4% of all answers). It was established that the higher the level of education held by the respondents, the higher the percentage of responses indicating a lack of a military unit's influence on the stabilisation of demand in a municipality (primary – 37.5%, vocational – 43.7%, secondary – 43.7%, higher – 48.1%) (statistically significant

relationships at $p < 0.05$). In the case of the remaining variables, no statistically significant relationships in reference to the presented issue were found.

The stationing of a military unit in the territory of a municipality is important for economic reasons. As an entity belonging to the public finances sector the military unit settles accounts with the Regional Infrastructure Boards, which transfer property taxes, agricultural taxes, forestry taxes and vehicle taxes to the municipal budget (Sirko, and Piotrowska-Trybull, 2013). The share of those taxes in the municipal income differs for each of them. Between 2007 and 2014, the average value of income to the urban municipal budget from the property tax amounted to PLN 4,872,458 (Piotrowska-Trybull, and Sirko, 2015). The income from the property tax in the years 2012-2014 in the analysed municipalities is illustrated by Figure 5, with the exception of Słupsk. In the analysed period the highest income from this source was in Brzeg (average annual at a level of PLN 771,000), and the lowest in Hrubieszów (PLN 310,000).

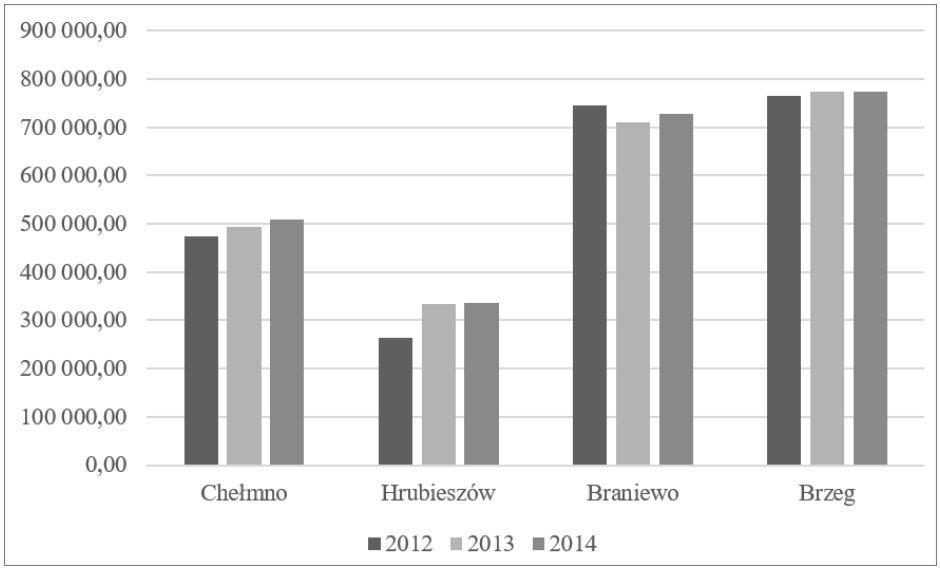

Figure 5. Revenue from property tax between 2012 and 2014 (in PLN). Source: authors' own elaboration on the basis of data acquired from Regional Infrastructure Boards in: Bydgoszcz, Lublin, Olsztyn and Wrocław.

Respondents' opinions on the amount of income transferred to the regional budget thanks to the presence of a military unit varied. The highest percentage of answers in the Braniewo municipality (43.4% among the respondents from this municipality) suggested medium revenue sent to the self-government's budget, while in the Hrubieszów, Słupsk, Brzeg and Chełmno municipalities, the largest group of respondents (respectively: 37.8%, 40.3%, 53.0%, 54.8% of the total) deemed the revenue minor (Figure 6).

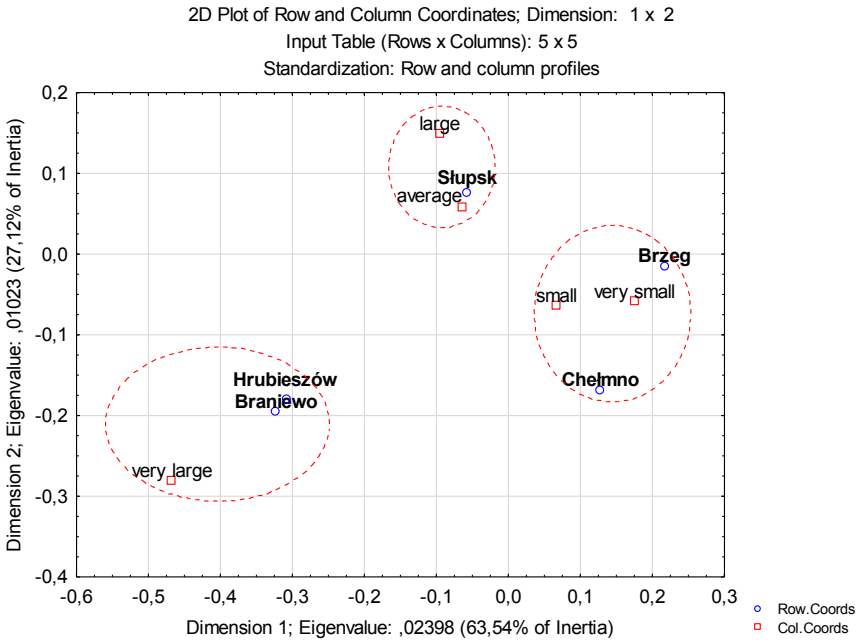

Figure 6. Assessment of military unit influence in terms of providing revenue to the regional budget. Source: authors' own elaboration.

Sales outlets, catering outlets and other facilities used by the soldiers, the military personnel and their families on a daily basis profit from the presence of a military unit. As a result of successful tenders, other companies provide specific materials to a unit or perform work in the unit's territory (Piotrowska-Trybull, and Sirko, 2013). These relations were noticed by every fifth respondent. According to others, a military unit's influence on the local companies is minor (50.3% of all respondents) or average (29.3%). The highest percentage of answers indicating the influence of a military unit on the condition of local companies was noted among the respondents from the Hrubieszów municipality (35.1% of all respondents from this municipality) and from the Braniewo municipality (34.8%). Among the respondents from the remaining municipalities the percentage of such indications was lower (Słupsk 21.8%, Chełmno 15.1%, Brzeg 12.9% of all answers). The army's contribution to the development of local companies was noticed by the respondents regardless of their occupational situation and educational level. This answer was most popular among the youngest age group (18-34 – 24.4%), students and pupils (31.6%), and those with vocational education (28.1%).

Cooperation between military units and schools in the municipalities takes the form of discussions, lectures, presentations conducted during open days at schools, as well as school field trips, sports competitions and youth camps. Sometimes soldiers participate in organising free time activities for the pupils, or perform work for the school. In each of the municipalities a large percentage of the respondents indicated that the presence of a military unit contributes to the upbringing of young people (Hrubieszów 59.5%, Brzeg 50.8%, Braniewo 47.8%, Chełmno 39.7%, Słupsk 36.7%). This was equally noticed by men (42.3%) and women (41.8%) participating in the survey. This dependence was indicated by respondents of all ages (18-34 years – 47.0% of this group, 35-54 years – 35.4%, 55-75 years – 43.2%, over 75 years – 45.6%)

regardless of the occupational situation (employed 37.8%, unemployed 38.6%, pensioners 43.9%). However, the highest percentage of such answers was recorded in the group of students and pupils (94.7%).

Discussion and Summary

Opinions of the residents participating in the survey from the Hrubieszów and Braniewo municipalities often differed from those of respondents from other municipalities. While answering the questions concerning the influence of the military unit on the socio-economic situation in their municipality in the context of the regional development, the respondents used the whole range of the measurement scale, taking an unambiguous position. Referring to the variables on the basis of which the socio-economic situation of Hrubieszów and Braniewo was characterised, it is worth noting that in some respects these municipalities were similar (population, labour market, changes in the entities of the national economy).

In the case of questions regarding the relationships between a military unit and entities in its environment and the impact of the unit on the quality of life of the residents, the answer "hard to say" was found among respondents from each municipality. However, the largest percentage of such answers was noted in the Słupsk, Chełmno and Brzeg municipalities. The respondents' opinions regarding the relationships of a military unit with its environment corresponded with their opinions regarding the influence of the unit on the socio-economic situation in a municipality. Statistically significant relationships also occurred between the respondents' opinions and the following variables: age, employment status and education.

Studies on the relationships between military units and entities of the local environment have been conducted by the authors since 2009. In 2011, the following relationships were established as a result of these studies, considering the municipalities regarded in this article as well: the residents of the Braniewo and Hrubieszów municipalities most often emphasised that the relationships of military units with local entities are positive; 86% and 82%, respectively. In the Słupsk, Brzeg and Chełmno municipalities, positive opinions were expressed by a slightly smaller number of the residents (76%, 72%, 64%, respectively). In the context of the impact of a military unit on the quality of life of the residents, most of the respondents who noticed this relationship lived in Braniewo (78%) and Hrubieszów (70%). Respondents' answers in this respect were slightly different in other municipalities: Słupsk (42%), Brzeg (40%), Chełmno (32%).

Results of the surveys conducted in 2017 indicate that in urban municipalities: Braniewo and Hrubieszów, the respondents more often than in other cities indicate the importance of the army for the labour market and population influx. In this context it is worth noting that the place and importance of a military unit in the local community is determined by a number of internal

and external elements, mentioned above. Among these elements, the assessment of the army by residents is conditioned by the size of the staff in a unit, which determines the needs of soldiers and military personnel for products and services offered by local entities, and defines their purchasing power. Moreover, the assessment is conditioned by the size of the city, – its potential population, and economic structure. The bigger the demographic potential and the stronger and more diversified the economic structure, the harder it is to clearly determine the influence of the military unit on the socio-economic situation of a municipality in the context of its potential development. Surveys conducted so far indicate that the assessment of a military unit by the residents is conditioned by the location of the town. The closer to the eastern border of Poland, the more often the ratings are positive.

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MODELS OF QUALITY COSTS CALCULATION AND THEIR CLASSIFICATION

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Abstract: Quality costs calculation is a tool companies use to measure quality costs. The origins of interest in the field noted in foreign literature and practice date to the end of the 1960s, while in Poland the subject has been known since the 1970s. The purpose of the paper is to present and classify selected models of quality costs calculation. The consequences of the undertaken research work will be the organization of knowledge about models of this calculation, and the specification of the key elements used to build them. Quality costs calculation is the subject of the research. In order to achieve the pursued research objective the critical analysis method was applied to the literature on the subject in the areas of quality management and management accounting, as well as to selected journals. The present paper forms a body of theory with which to develop the author's own model of quality costs calculation.

Keywords: classification, quality costs, model, quality costs calculation.

1. Introduction

Cost accounting is most frequently interpreted as the whole of the activities in an accounting system, such as recognition (measuring and documenting the course of processes), measurement (measuring, documenting and evaluation of resources used in processes), grouping (recognizing and establishing costs by type, origin and final carriers), processing, presenting and interpreting (preparation of reports about costs and results), and analysing, expressed in quantities and in terms of value results of an organization's resource consumption processes in relation to its economic activity (Jarugowa, Malc, Sawicki, 1983). It also embraces planning (budgeting), achievements control, and generating information used for the assessment of the financial position, and for making both operational and strategic decisions. Cost accounting is a system providing information *ex post* and *ex ante* (Jaruga, Kabalski, Szychta, 2010).

In its enhanced definition cost accounting can be considered as a costs and results accounting system involving the study and transformation of information on the costs and

revenues of past, present and future activities, in line with the implemented model, in order to support the management of organization (Jaruga, Kabalski, Szychta, 2010). However, quality costs calculation enables us to single out quality-related costs, and is the foundation aimed at calculating, planning and steering these costs.

The cost accounting model covers a set of assumptions and rules, together with procedures allocated to them, on the basis of which information on costs is processed according to the needs of information recipients. Each of the models has specified assumptions determining the data processing method (Nowak, 2017). The quality costs calculation model is a set of assumptions and procedures which form the foundation for generating data about quality costs. The model of this calculation outlines the structure of quality costs, presents the plan of accounts where these costs should be recorded, indicates sources of information about these costs, and identifies the individuals responsible for keeping this account.

The main objective of the present paper is to classify selected quality cost calculation models on the basis of the adopted division criterion. The author addressed the issue of quality costs as they form a significant element of the managerial accounting system in a company, and their calculation is an integral part of the system for managing it. Moreover, the literature provides access to numerous quality costs calculation models. However, there is no available classification for organizing them and allowing us to single out their key elements.

The paper is divided into three main parts. In the first one the author explains the essence of quality costs calculation. The second part presents a classification of quality costs calculation models. And in the final part an attempt is made to perform a critical analysis of selected models. Conclusions from the considerations are included in the summary.

2. Essence of quality costs calculation

Quality costs calculation is acknowledged as the most important element of the quality management system in companies. It forms an individual part of the cost accounting of an entity (Nowak, 2014). It is a system for registering, analysing and evaluating costs related to ensuring quality at each stage of product manufacturing and in all carried out processes. What is more, it is also regarded as a system for undertaking activities aiming at quality improvement and at quality costs optimization (Ciechan-Kujawa, 2005). It is also a tool combining a company's intentions to optimize production, commercial and management processes with the necessity to use new management methods in order to identify and eliminate company weaknesses and to ensure high quality of provided products and services (Astapczyk, 2011).

Furthermore, it is also a decision making account, held in organizations on the basis of cost information used in making economic decisions (Sulowska, 2012). In quality-oriented companies quality costs calculation is one of the key decision-making tools (Balon, 2007; Balon

2012). It streamlines quality management in organization and is a significant element of the economic analysis of an organization. It is a source of information on reasons for incurring specified quality costs. It allows the identification of the place and time of the origin of a given cost. It enables evaluation of the necessity to incur a cost and its impact on improvement of work results and quality, or on optimization of quality costs in an organization (Grudowski et al., 2016; Rehacek, 2018).

By applying quality costs calculation companies can compare their own quality costs with those of other companies in the same industry. A thoroughly carried-out calculation is the foundation for a cost analysis which is to create stimuli for improving the efficiency of activities in the area of quality (Wójcik, 2014).

This calculation should embrace registering by way of booking in adequate accounts of all costs related to quality, calculating quality costs and analysis of their rates behaviour, as well as undertaking preventive and corrective measures (Hamrol, 2008).

The increase of an entity's efficiency obtained by the identification of sources of apparent deviations from quality requirements, their measurement, and the implementation of corrective actions eliminating irregularities are the main tasks of quality costs calculation (Zymonik, Hamrol, Grudowski, 2013).

The main objectives of quality costs calculation are quality management effectiveness assessment, creating the foundation for internal quality improvement programmes by identifying problems to be solved, and increase of the company's value (Toruński, 2009).

Introducing quality costs calculation brings a number of benefits to the company. The entity obtains information as to the quality costs levels generated in the entire organization, as well as in a cross section of individual areas of activity. Thanks to this knowledge, it can identify the reasons for generating costs of product non-compliance, and adjust production to customer expectations. Implementation of this calculation also allows the mobilisation of all company staff to participate in the quality management process, and is a strong stimulus for developing an incentive scheme for production supervisors. A very important advantage of introducing quality costs calculation is the possibility to lower quality costs, and the pursuit of the optimisation of their structure (Murumkar, Teli, Loni, 2018).

Quality costs calculation is a modern management tool allowing the optimisation of quality costs, and the identification of problematic activities and processes (Sadkowski, 2019). It is a decision-making account which, when run fairly, may contribute to improving quality in an organization. It is responsible for quality costs measurement, recording, registration, grouping, processing, analysing and interpreting, together with the preparation and control of the budget of these costs.

3. Classification of quality costs calculation models

The diversification of recipients of information originating from cost accounting has contributed to the development, over the years, of many different models of cost accounting (Nesterak, Kołodziej-Hajdo, Kowalski, 2017).

Among the strategic cost management models one can distinguish quality costs calculation which is characterized by the specified quality costs structure, accounts plan, procedure for running the calculation, indication of responsible individuals, and sources of information about costs, as well as by suggested improvements.

The author adopted the activity of an enterprise, for the needs of which the model was developed, as the criterion for the classification of models of this type of accounting. The choice of this criterion results from the indication of the subject of the research made by the creators of the discussed models. In the author's opinion, division by type of activity allows us to clearly identify the types of enterprises which may use such models, but also highlights the types of activities for which the model solutions are not available. Based on this criterion the following should be distinguished:

- quality costs calculation for manufacturing companies,
- quality costs calculation for service companies,
- universal quality costs calculation for enterprises.

Models created by researchers representing the Polish school of quality belong to the most important models dedicated for manufacturing companies: Ośrodek Badania Jakości Wyrobów Hutnictwa i Przemysłu Maszynowego "ZETOM" (OBiKJW PM, 1978), S. Sojak (Sojak, 1981), A. Polak (Polak, 2003), U. Balon (Balon, 2007), Ł. Kraska and D. Stadnicka (Kraska, Stadnicka, 2010), and J. Toruński (Toruński, 2011), and models by overseas authors: H.J. Harrington (Harrington, 1987), A. Chopra and D. Garg (Chopra, Garg, 2012) and T.M. Malik, R. Khalid, A. Zulqarnain, S.A. Iqbal 2016 (Malik et al., 2016). Quality costs calculation models for service companies were authored by U. Sulowska-Banaś (Sulowska-Banaś, 2013) and J. Wierzowiecka (Wierzowiecka, 2015). Universal quality costs calculation models are presented by Polish researchers: K. Lisiecka (Lisiecka, 2002), Z. Zymonik (Zymonik, 2003), M. Ciechan-Kujawa (Ciechan-Kujawa, 2005), A. Kister (Kister, 2005), and M. Foremna-Pilarska (Foremna-Pilarska, 2008), and by an overseas researcher: D.C. Wood (Wood, 2013).

Table 1 presents a classification of quality costs calculation models. They were chronologically ordered by the adopted criterion. Key variables used in comparative analysis are: availability of assumptions adopted in developing the model and a graphic scheme of procedure for keeping quality costs calculation, quality costs structure, adopted record of costs for the accounting system, an example of the quality costs accounts plan, the source of information on quality costs, bodies responsible for implementing and keeping quality costs calculation, and model enhancements the author introduced, which to date have not been used and can be regarded as innovative.

Table 1.
Classification of quality costs calculation models

Author	Year	Availability of assumptions adopted for developing the model	Graphic scheme of procedure for keeping QCC	Quality costs structure used in QCC model	Records of cost for accounting system adopted in the model	Presentation of an example of quality cost accounts plan	Source of information on costs	Bodies responsible for implementation and keeping QCC	Improvements introduced
Models of quality costs calculations for manufacturing companies									
Ośrodek Badania Jakości Wyrobów Hutnictwa i Przemysłu Maszyno-wego „ZETOM”	1978	Yes	Yes	PAF model	Analysis by nature/ Analysis by function	Yes	Balance sheet accounts and off-balance sheet accounts	Organization management, implementation team	Developing a quality improvement programme based on quality costs studies in the mechanical engineering industry
S. Sojak	1981	Yes	Yes	Preventive costs, quality appraisal, external and internal costs of bad quality; quality costs by product life cycle stages	Analysis by nature/ Analysis by function	Yes	Accounting records, unrecorded materials (documents from controls and audits, reports from directorial inspection, data from computer systems, error reports, complaint registers)	Organization management, quality manager, quality department, expense/ payroll department	Financial quality indicators (measures)
H.J. Harrington	1987	No	No	PAF model	Analysis by function	Yes	General ledger, error and corrections reports, guarantee reports, budgets, complaints	Implementation team and organization management	Quality costs priorities table

cont. table 1.

A. Polak	2003	Yes	Yes	PAF model and process approach	Analysis by function	Yes	Locations with investment in quality and where losses are generated	President's Representative for Quality Assessment, managers of Quality Steering, Accounting and Controlling Departments	Developing a set of accounts to record quality costs in group 5 (591, 592, 593, 594, 595, 596)
U. Balon	2007	Yes	Yes	PAF model	Analysis by function	No	Accounting documents, defects cards	Chief Accountant, Representative for Quality Assessment, Quality Costs Department	Quality costs qualification scheme, "Defects Cards", setting up "53513 Quality Costs" account
Ł. Kraska i D. Stadnicka	2010	No	Yes	Quality costs model	Analysis by nature/ Analysis by function	Yes	SAP database (process mapping cards), operational documentation	Quality Director, IT Director, Quality Manager, Implementation Team with its Leader	Schedule for implementing full account, calculation methods for quality cost values
J. Toruński	2011	Yes	No	Internal and external quality assurance costs	Analysis by nature/ Analysis by function	Yes	Documents (invoices, payrolls, information tables, etc.)	Management, quality assurance service and Accounting Department	Benchmarking and controlling
A. Chopra i D. Garg	2012	No	No	PAF model	Analysis by nature/ Analysis by function	Yes	Quality-oriented activities	Management and Quality Costs Team	System consists of two models: cost calculation and implementation of quality costs programme
T.M. Malik, R. Khalid, A. Zulqarnain, S.A. Iqbal	2016	Yes	No	PAF model	Analysis by function	Yes	Various reports (among others, scrapping, payroll) interviews, cost sheets	Management and Quality Costs Team, Quality Control Team	Detailed templates for each stage of implementation
Models of quality costs calculations for service companies									
U. Sulowska-Banaś	2013	Yes	Yes	Compliance and non-compliance costs and opportunity costs	Analysis by function	Yes	Invoices, internal calculations, internal documents proving encumbered costs	Hospital Director, Director's Representative for Quality Management, Chief Accountant,, Accounting Department, Central Sterile and Operating Theatre Management	Off-balance sheet account "53101 Quality Costs" and additional analytical accounts for recording individual quality costs, Procedure P/SZJ/8.4/01 Quality Costs Calculation

cont. table 1.

J. Wierzo-wiecka	2015	No	Scheme of U. Balon	PAF model	Analysis by function	Yes	Computerized accounting system and accounts	Accounting, Head of Quality Management System	Modified scheme for quality costs qualification, proposal for quality costs structure and accounts plan for laboratory and examples of such costs
Universal quality costs calculation for enterprises									
K. Lisiecka	2002	Yes	Yes	PAF model, process costs, quality loss, ISO 9004 standard	Analysis by nature/ Analysis by function	No	Listing of costs critical for quality, registration forms	Organization management, Quality Department Manager, Quality Department, Costs Department	Quality costs indicators
Z. Zymonik	2003	Yes	Yes	Process approach	Analysis by function	No	Strategic results card	Organization management	Quality costs model based on activities
M. Ciechan -Kujawa	2005	Assumptions of K. Lisiecka	Scheme of K. Lisiecka	ISO 9004 standard, ASQC	Analysis by function	Yes	Recorded and unrecorded materials	Management, Quality Management,Accounting and Controlling Departments	Developing procedure for quality costs account
A. Kister	2005	Yes	Yes	Costs of defects, assessment, and prevention model	Mixed analysis (analysis by nature – cost allocation - analysis by function)	Yes	Accounting documents	Management and Accounting Department	Model of relation of quality costs management with organization effectiveness
M. Foremna-Pilarska	2008	Assumptions of A. Kister	Scheme of A. Kister	Costs of defects, assessment, and prevention model	Mixed analysis (analysis by nature – cost allocation - analysis by function)	No	Accounting documents	Management and Accounting Department	Change of account name to “decision-making” cost account
D.C. Wood	2013	Yes	No	PAF model	Analysis by function	Yes	Financial data, accounts	Management, Quality Manager, each employee	Quality costs qualification scheme, data sheet template for quality costs, template for quality costs report

Note. own elaboration.

4. Results and discussion

Models of quality costs calculations for manufacturing companies are the results of the work of, among others, H.J. Harrington, A. Polak, Ł. Kraska and D. Stadnicka, and A. Chopra and D. Garg.

In his book *Poor-Quality Cost* H.J. Harrington presents 15 steps to take while implementing a poor quality costs system (Harrington, 1987). He suggests implementing it first in a test area in a company, which may include a production line. Poor quality costs reports, drawn up and published every month, are a key component of the system. The model may be a significant point of reference for later researchers of the subject.

In her model A. Polak presents two options to approach quality costs in a traditional perspective and through the prism of processes (Polak, 2003). The recipient can choose an option for developing quality costs calculation according to their objectives, which stands for the high flexibility of this project. The author also offers specific solutions such as cost accounts under group 5, which should be created while implementing this calculation. The whole system is based on assumptions presented in a manner comprehensible for each potential interested individual. It is characterized by a great level of detail and great attention to detail. Keeping an efficient quality costs calculation by using the model authored by A. Polak seems achievable for entities with quality costs optimization at heart, and also for those aiming at improving their processes.

A model of a comprehensive quality cost calculation for large manufacturing companies was prepared by Ł. Kraska and D. Stadnicka, and covers three stages: Initial, Analysis and Preparation, and Preparation and Implementation (Kraska, Stadnicka, 2010). A new solution available in this model is developed by the authors' work schedule for the implementation of a comprehensive calculation with precisely specified weeks of completing individual stages of the project. The entire time-line covers 21 weeks of implementation works. The cost calculation model developed in such a way is a well thought-through and designed tool. It provides comprehensive solutions such as full implementation works schedule with a description of all activities or methods for calculating quality costs. The author of the present paper believes it to be the most advanced model, which should be easy to implement in all manufacturing companies. Its only shortcoming is the lack of all assumptions used for its development collected in one place.

The quality costs calculation system for industrial enterprises authored by A. Chopra and D. Garg is formed by two models: the quality cost calculation model and the model for quality costs programme implementation (Chopra, Garg, 2012). It is characterized by simplicity universality and can be applied across the entire industry. This makes it an interesting alternative to other models. A lack of clearly defined model assumptions is not its strong suit, and calls for further development in this respect.

U. Sulowska-Banaś prepared a quality costs calculation model dedicated to service companies. The entire procedure of this account can be found in document P/SZJ/8.4/01 and is meant for Public Autonomous Health Care Management Units, and covers: Central Sterile (CS), Operating Theatre (OT), Cost Accounting Department (Sulowska-Banaś, 2013). The procedure consists of seven stages. The model by U. Sulowska-Banaś is a comprehensive solution for hospitals. The entire procedure, scope of responsibilities of persons liable, plan of quality costs accounts, and rules for calculating the quality cost index are described in detail and presented in document P/SZJ/8.4/01and its attachments.

Universal quality costs calculation models for companies are being developed, among others, by K. Lisiecka, A. Kister and D.C. Wood.

The next stages of creating and implementing quality costs calculation for a company accountancy system are presented by K. Lisiecka in her model (Lisiecka, 2002). In detailed procedures the author explains how to proceed when implementing this system. At each stage departments responsible for execution are identified. Each action has its initial assumptions to meet and results obtained after completion. The whole is logical and clear for a recipient who plans on introducing quality costs calculation in their organization.

In her procedure of quality costs calculation A. Kister distinguishes the four following stages: recognition, analysis, optimization and reporting (Kister, 2005). Her quality costs calculation presents assumptions in great detail. As opposed to K. Lisiecka and A. Polak, the researcher does not distinguish departments responsible for the completion of individual stages. Therefore, she leaves a certain freedom of choice for the interested organization. The model by A. Kister is accurately prepared with detailed assumptions as its strength. However, it is different from the previous models.

Also, D.C. Wood prepared a universal quality costs calculation model for companies. The proposed system for qualifying quality costs is one of its great assets (Wood, 2013). The author also created a template for a quality costs data sheet and a quality costs report in monthly and annual breakdowns. The assumptions adopted while developing the model are very general, without specific guidelines or a system visualizing the quality costs calculation procedure. D.C. Wood describes in detail all steps necessary for implementing this calculation. However, he does not indicate the people or teams responsible for their implementation, nor does he specify to which enterprises this offer is directed. This concept is interesting, but the missing aspects need to be supplemented.

In light of the above considerations and prepared classification of quality costs calculation models, it must be found that:

1. The quality costs calculation model is made up of quality costs structure, accounts plan, scheme of procedure for keeping this account together with indication of responsible individuals, sources of information about quality costs, and suggested improvements.
2. Type of company activity is the main criterion for the classification of the quality costs calculation.

3. The greatest number of models was studied for manufacturing companies.
4. There is no quality costs calculation model dedicated for service companies. Only organizations providing services in healthcare have such a calculation model, developed by U. Sulowska-Banaś.
5. Universal quality costs calculation models are the result of work carried out by: K. Lisiecka, Z. Zymonik, A. Kister, M. Ciechan-Kujawa and D.C. Wood.
6. The majority of researchers provide clearly specified assumptions, with the exception of H.J. Harrington, Ł. Kraska and D. Stadnicka, A. Chopra and D. Garg, and J. Wierzowiecka.
7. H.J. Harrington, D.C. Wood and T.M. Malik, R. Khalid, A. Zulqarnain and S.A. Iqbal do not ensure any graphic scheme of the procedure.
8. Models by M. Ciechan-Kujawa, M. Foremny-Pilarska and J. Wierzowiecka are further elaborations on projects by K. Lisiecka, A. Kister and U. Balon, using their assumptions and operating schemes.
9. The PAF Model is the dominating quality costs structure.
10. Analysis by function is the most frequently adopted in grouping costs by authors of the models.
11. Most models provide example classifications of quality costs in the form of company accounting plans for quality costs.
12. Accounting documents, accounting records, defect cards, error reports, and complaint reports are the most important sources of information on quality costs.
13. Responsibility for implementing and keeping quality costs calculation is on the management, quality manager and implementation team. The implementation process should be carried out in co-operation with the accounting department and controlling department.
14. Virtually all of the models provide new tools, such as quality costs priority table (H.J. Harrington), quality costs indexes (K. Lisiecka), quality costs qualification scheme (U. Balon, D.C. Wood), implementation works schedule (Ł. Kraska and D. Stadnicka), defect cards (U. Balon), and detailed templates for implementation stages (T.M. Malik, R. Khalid, A. Zulqarnain and S.A. Iqbal), which may ensure more efficient work organization in the course of the quality costs calculation procedure.
15. The most advanced quality costs calculation models belong to A. Polak and Ł. Kraska, and D. Stadnicka.
16. The greatest number of concepts was developed after 2000.
17. Only model by T.M. Malik, R. Khalid, A. Zulqarnain and S.A. Iqbal provide adequate templates for application at each stage of quality costs calculation implementation.

5. Summary

To sum up, it should be stated that the adopted classification criterion, in the form of the type of activity carried out by an enterprise, arranges the selected quality costs calculation models in a comprehensible and clear manner.

The presented and discussed models of this calculation by Polish and foreign authors can be characterized by simplicity and attention to detail. Each of the projects, to a greater or lesser extent, presents further steps to take in developing quality costs calculation.

The authors use tried and tested models, and the experience of their predecessors, which they modify for their needs. Unfortunately, some approaches' clearly specified assumptions are missing, which may lead to misunderstandings and errors in the course of implementation.

The great number of models confirms researchers' interest in the subject of quality costs calculation. The procedure by T.M. Malik, R. Khalid, A. Zulqarnain and S.A. Iqbal is worth noting and recommending as it may be of particular help in organizations without any experience in the area of quality costs. Large companies, in turn, should apply the study prepared by Ł. Kraska and D. Stadnicka.

What is most visible is the lack of a quality costs calculation model which could be used in any service company regardless of the type of provided services. The procedure created by U. Sulowska-Banaś can be used only in hospitals. The author recommends for the direction of future research the undertaking of works on creating a universal quality costs calculation model for service companies.

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DIAGNOSTIC ASSESSMENT OF MZK TYCHY'S CUSTOMER SERVICE LEVEL

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Abstract: This paper analyses the standard of MZK Tychy's customer service. The surveys were carried out among the users of the services provided by the above-mentioned transport services provider. The results of the analysis made it possible to formulate the following problems, indicated by the users of local transport: restrictions on the ticket distribution points, the impact of delays on abandoning the use of this means of transport, modernization of rolling stock, the issue of the quality and price of services.

Keywords: standard of customer service, quality of transport services, public transport.

1. Introduction

The analyses presented in this publication were performed during the implementation of the "Management methods and instruments impacting the development and modernity of cities and regions" (pol. „Metody i instrumenty zarządzania wpływające na rozwój i nowoczesność miast i regionów") research project, registered under number 13/040/BK_18/0057, financed by the Ministry of Science and Higher Education.

Customer service is a crucial concept for manufacturers, distributors and service providers. It consists primarily in focusing on the customer and his/her needs. It is also connected with the willingness to discover what the customer's requirements are. Therefore, customer service should be seen as a skill or an ability to meet the customer's requirements and expectations.

Professional customer service and good customer relations require knowledge and understanding of customers' needs, especially since their exact expectations are not always known. Therefore, discovering what the customer requires makes it possible not only to understand them better, but also facilitates communication between the parties involved. It is important to provide information that the customer expects, and let them know where they can

find answers to questions they might have and how they can solve their problem or settle a matter. Moreover, it is the service provider who is responsible for solving the problems of the customer, who expects that all their questions and doubts will be settled or resolved by means of a full, exhaustive and credible answer. However, in addition to substantive needs, the customer expects a friendly attitude, respect, empathy, and a sense of justice and fairness. The customer is the one who matters most, and it is essential to evoke this feeling in every aspect. Therefore, working with a customer requires both professionalism, reliability and absolute compliance with the law, as well as an individual approach to the customer while maintaining impeccable manners and applicable ethical standards. It is a difficult task due to changing customer expectations and needs.

Modern customer service, if it is based on appropriate standards, makes a great impression on customers. Consequently, they are willing to buy goods or services again. A documented agreement containing technical specifications or other criteria, used consistently as rules or guidelines, constitutes a standard to provide assurance that the service meets the requirements and objectives of service providers and purchasers (Borowiec, and Michalski, 2014). Correctly defined standards become a valuable tool for customer service and influence its quality. From the customer's point of view, the quality is nothing more than the degree to which the requirements are met (Stoma, 2012). The higher the level, the greater the customer satisfaction becomes. Many terminological proposals for the concept of quality have already appeared in the literature (Beemer, and Shook, 2010). However, they share the common feature of placing the customer at the centre of attention (Hyken, 2011).

Public institutions, including institutions of public transport, serve the local community and should strive for a high level of the services provided. Their services are directed at the whole society, and therefore involve modern customer expectations, which are more difficult to meet due to the increased requirements and expectations of the service provided at the highest level, with equal treatment for each party involved. The correct definition of the customer and their needs affects the quality of service and guarantees fruitful cooperation (Leland, and Bailey, 1999; Kempny, 2001). Therefore, public transport services must adapt to the needs of the modern customer, who is increasingly aware of their rights and obligations.

The customer is any person who wishes to purchase any product or service. In a broad sense, the customer may also be a person served in an office or institution, even though there is often no direct payment for the service. Customers of this type are often referred to as petitioners (Chwałek, 2011; Performance Research Associates, 2015). Every person acts as a customer in their everyday life because functioning in society is based on purchasing goods and services. Customers require professionalism from the service providers. A professional is a person who recognises customer service as a profession that is best performed when customer needs are understood and the best ways to satisfy them are discovered. A customer who leaves with a negative experience and a bad impression has a tendency to share it with multiple people, leading to the "ripple effect", whereby a bad opinion about the company spreads faster than

a good one. It is understandable that a dissatisfied customer has more anger and energy which they are willing to expend by using every opportunity to talk about poor quality of service (Sobczak-Matysiak, 1997; Blanchard, 2016). This is the reason why customer service is so important, regardless of whether it involves a public or a private institution. The broadly defined perception of other people (customers), their mental states and characteristics, is constantly performed during the process of interaction with them. It is an extremely important interpersonal skill to notice a person's behaviour and understand the reasons behind it, and their effects on interpersonal relationships (Sobczak-Matysiak, 1997; Kumar, 2010).

The broadly-understood customer service applies to various types of customers. These include both individual and institutional customers. The principle of due service applies regardless of the type of customer encountered in a given situation. It is important to be able to discern between them. An individual customer is a person who buys goods and services on the market, and makes decisions independently, on their own behalf and with their own money, whereas an institutional customer is any type of enterprise, organization, or state or local government institution which, upon purchasing goods or services on the market, is represented by accordingly authorised persons acting on its behalf and with the use of its financial resources (Chwałek, 2011).

It should be mentioned that the relations between transport services providers and citizens have undergone a profound transformation throughout history. The consequence of the new approach lies in recognising their needs and conducting all activities in such a way as to satisfy those needs. The citizen changes their status from a petitioner at the mercy of the transport services provider to a "co-producing" customer whose opinion influences the shape of the service (The Chancellery of the Prime Minister, 2012). Human needs are very complex. Therefore, in order to serve a customer in a professional manner it is necessary to remember that their needs arise from all levels and constitute the result of their desires, aspirations, dreams and preferences, closely related to their expectations towards the service provider, from establishing contact to satisfying their needs. As part of the contact, it is possible not only to satisfy the needs already felt by the customer, but also create new ones (Kasprzak, 2010).

Customer services is a process which is primarily based on all kinds of contact between the people offering or selling certain goods or services and the people interested in purchasing those goods and services. This contact may be direct, in which case it usually takes the form of a conversation, presentation, demonstration, or any verbal exchange of thoughts or ideas related primarily to the needs of the people served. They can also be indirect, whereby they take place by means of communication, such as phone or radiotelephone, or exchange of correspondence via post, fax or the Internet (Chwałek, 2011). Customer service consists in understanding who the customer is, what they think and feel, what irritates or annoys them, what satisfies them, what their expectations and needs are, and finding the best way to satisfy them (Sobczak-Matysiak, 1997).

2. Methods

The main objective of the conducted research is the diagnostic assessment of the customer service standards at MZK Tychy, including a detailed analysis of the opinions of people using the services provided by the above-mentioned transport services provider.

The Municipal Transport Authority in Tychy (pol. Miejski Zarząd Komunikacji w Tychach – MZK Tychy) was created as an entity financed by the City of Tychy under Resolution No. 372 of the City Council of Tychy of 12 September 1996. Since 30 October 2008, it has acted as a budgetary unit. It is directly supervised by the Mayor of Tychy. The unit deals with organising public transport and, above all, creating timetables, controlling the quality of services offered, collecting service fees from the passengers, and concluding contracts with companies which offer passenger transport services. Its range encompasses Tychy and 16 other municipalities (including, e.g. Mikołów and Orzesze) (The Municipal Transport Authority in Tychy, 2018).

The following research problems were adopted in order to complete the main research objective:

- determining how the limited number of tickets at points of sale affects the quality of customer service,
- determining whether delays in public transport affect the quality of customer service,
- analysing whether MZK cares for the continuous development and quality of its offer,
- analysing the level of satisfaction with MZK's offer among passengers from outside Tychy,
- determining whether the fare is adequate to the level of services provided,
- analysing whether the information available at stops is optimal for travellers.

The following research hypotheses were adopted in the study:

- H_1: The limited number of tickets available at points of sale discourages the use of services provided by MZK Tychy.
- H_2: Delays in public transport affect the abandonment of services provided by MZK Tychy.
- H_3: MZK introduces modern solutions which improve the quality and functionality of the services.
- H_4: Customers from outside the City of Tychy are less satisfied with the services than the residents of Tychy.
- H_5: The fare is adequate to the level of services provided by MZK Tychy.
- H_6: The availability and transparency of information are satisfactory for travellers.

The study used both original (survey) and secondary (internal materials) data sources. The surveyed group consisted of travellers from the City of Tychy and neighbouring towns.

The research tool used in order to conduct the research was a questionnaire consisting of 30 questions which are both open-ended and semi-closed. The survey was anonymous, and the respondents were selected at random. The survey contains mandatory demographic questions (1-4). They describe the respondent's gender, age, place of residence and status. The general questions (5-6) were designed to determine how often the respondent travels with MZK Tychy and whether they were satisfied with its services. The next questions may be described as detailed – they focus on specific questions and issues which directly concern the topic under research and will serve as the basis for formulating the most important conclusions for the project. Questions 7-9 determine the impact that the lack of access to tickets has on the passengers, while questions 10-14 focus on the impact of delays on abandoning the services. The next questions (15-16) concern the noticeability of changes in quality and additional services offered by MZK Tychy. These questions were designed to demonstrate how the passengers react to the introduced innovations and how noticeable those innovations are. Questions 18-23 apply to passengers who use MZK Tychy outside the main area of its operation. They serve the purpose of verifying whether or not the services offered by MZK Tychy in smaller towns differ significantly from the standards existing in large cities. Questions 24-29 concern solely the quality and price of the services offered. These questions include issues related to cleanliness, driving culture and safety. Questions 17 and 30 involve the issue of access to information. Based on these questions, it can be determined whether the information provided by the facility is transparent and comprehensible for passengers. A part of the survey, including questions 7-23 and 30, responds to the hypotheses put forth in the project. It determines their accuracy by presenting the attitude of passengers towards individual issues.

3. Analysis of empirical studies

The study proper was preceded by a pilot study on 3 and 6 November 2017. A group of 60 respondents participated in the study. It was carried out in Tychy and Katowice. The main objective of the study was to verify the correctness of the study procedure, as well as to receive comments and requests concerning the structure and substantive scope of the questionnaire. The respondents showed great interest in the subject, answered the questions with ease, expressed satisfaction with the very fact of conducting the survey, and were extremely interested in the results. The respondents did not indicate any difficulties when filling out the questionnaires; however, it was pointed out that questions 3, 6, 10, 12 and 13 did not include a sufficient number of optimal answers.

The study proper, conducted with a sample of 320 respondents, took place between 23-26 November 2017.

380 respondents participated in the conducted studies. Each time, the respondents were inhabitants of the Śląskie Province; 53.1% were women (202 people) and 46.9% were men (178 people). The age distribution among the respondents was as follows: 6.3% (24 people) were in the age group below 18 years of age. 46.9% (178 people) belonged to the age group 18-25 years of age, 34.2% (139 people) were 26-35 years of age, 6.3% (24 people) were in the age group 36-55 years of age, and 6.3% (24 people) were in the age group 56-66 years of age. None of the respondents was older than 66 years of age. The respondents' places of residence were as follows: 25% (95 people) – village, 15.6% (59 people) – town of up to 50,000 inhabitants, 37.6% (143 people) – town between 50,000-100,000 inhabitants and 21.8% (83 people) – city with over 100,000 inhabitants. Taking into account the social status of the respondents, it can be noted that 37.3% (142 people) were school/university students, 46.9% (178 people) were employed, 9.5% (36 people) were unemployed, and 6.3 (24 people) were pensioners.

Table 1.
Distribution of answers to question 5 (in [%])

		I don't use it	*Very rarely*	*Rarely*	*Quite often*	*Very often*
5	How often do you use the services of MZK Tychy?	***6.2***	***28.1***	***21.9***	***25***	***18.8***

Source: author's own study.

Table 2.
Distribution of answers to question 6 (in [%])

		Yes	*Quite*	*I don't have an opinion*	*Not really*	*No*
6	Are you satisfied with the quality of services provided by MZK Tychy?	***31.3***	***28.1***	***23.1***	***8.7***	***8.8***

Source: author's own study.

Table 3.
Distribution of H1 answers (in [%])

		Definitely yes	*Perhaps*	*It's hard to say*	*Not really*	*Definitely no*
7	Have you encountered a situation where there were no MZK Tychy tickets available at a point of ticket sale (e.g. newsstand).	***21.9***	***40.6***	***0***	***0***	***37.5***
8	Have you ever wished to buy a ticket from an MZK Tychy bus driver, but the tickets turned out to be unavailable?	***15.6***	***53.1***	***0***	***0***	***31.3***
9	Have you ever chosen a different mode of transport due to a problem with the availability of tickets at points of sale?	***25***	***0***	***0***	***0***	***75***

Source: author's own study.

When analysing the distribution of answers to questions verifying the first research thesis, it can be noted that despite the fact that more than half of the people participating in the questionnaire had dealt with a lack of availability of tickets, as many as 75% of them did not decide to choose another means of transport. Their choice might be influenced by the fact that younger people with no driver's licence, for whom evading fares does not pose a problem, constituted a large part of the respondents. It can therefore be concluded that the first research hypothesis H_1: "The limited number of tickets available at the points of sale discourages the use of services provided by MZK Tychy" has been verified as negative.

Table 4.
Distribution of H2 answers (in [%])

		Definitely positively	*Quite positively*	*It's hard to say*	*Rather negatively*	*Definitely negatively*
10	How do you assess the punctuality of the public transport organised by MZK Tychy?	***34.4***	***15.6***	***34.4***	***12.5***	***3.1***
11	Is it often the case that your target mode of transport arrives late?	***18.8***	***43.8***	***0***	***31.3***	***6.1***
12	Have you ever arrived late to an important event due to a delay in public transport?	***43.8***	***0***	***28.1***	***0***	***28.1***
13	Did you decide to file a complaint in that situation?	***0***	***0***	***0***	***0***	***100***
14	Have you ever changed the mode of transport because the bus was delayed?	***31.3***	***0***	***6.2***	***0***	***62.5***

Source: author's own study.

The conducted research confirmed hypothesis H_2: Delays in public transport affect the abandonment of services provided by MZK Tychy. The survey shows that delays have a greater impact on abandoning the services provided by MZK than the limited availability of tickets. This may result from frustration, as almost 44% of the respondents had not made it to an important event due to delays in the timetable. Keeping that in mind, travellers will think twice before choosing the services of MZK Tychy.

Table 5.
Distribution of H3 answers (in [%])

		Yes	*It's hard to say*	*No*
15	Have you noticed a change in the quality of services offered by MZK Tychy?	***15.6***	***28.1***	***56.3***
16	Do you use additional services provided by MZK Tychy? - "EKO BILET" [ECO TICKET] - "Ginger" - "Kiedy przyjedzie" [When will it arrive] - "moBILET" [Mobile Ticket] - I don't use it		***3.1*** ***0*** ***21.9*** ***12.5*** ***62.5***	

Source: author's own study.

Changes introduced by MZK Tychy are hardly visible. Of those taking part in the survey, less than 16% had noticed an improvement in the functionality of MZK services. Oddly enough, most of them – as many as 62.5% – do not use the additional services provided by MZK Tychy. This is surprising given the fact that most of the respondents were young people who, as a rule, quickly adapt to new technologies and are willing to try out new, convenient solutions. Taking into account the above data, hypothesis H_3: MZK introduces modern solutions which improve the quality and functionality of the services – can be refuted.

Table 6.
Distribution of H4 answers (in [%])

		Yes	*It's hard to say*	*No*
18	Do you use the offer of MZK Tychy outside Tychy?	***50***	***25***	***25***
		Several times a week	***Several times a month***	***Several times a year***
19	How often do you use the offer of MZK Tychy when travelling outside Tychy?	***20***	***44***	***36***
		Good	***Average***	***Bad***
20	Is the timetable offered by MZK Tychy satisfactory?	***32***	***56***	***12***
		Yes, often	***Occasionally***	***No***
21	Has your bus ever arrived late?	***52***	***32***	***16***
22	Has your bus ever failed to arrive at the bus stop?	***16***	***64***	***20***
		Definitely yes	***It's hard to say***	***Definitely no***
23	Is the offer of transport services providers in other regions richer and better suited for travellers?	***36***	***52***	***12***

Source: author's own study.

Upon analysing the distribution of answers to questions 18-23, it can be noted that the majority of the respondents use the services of MZK Tychy both in and outside the city. Customers did not notice any difference in the quality of services between regions. A large part of travellers outside the area of Tychy were as satisfied with MZK services as people from other regions. This is an unexpected result since the smaller number of bus lines or longer journeys should negatively impact the way the offered services are received. Despite the fact that the offer is significantly poorer in terms of its range and additional services, only 36% of the

respondents believe that the journeys should be refined and improved. Thus, hypothesis H_4: Customers from outside the City of Tychy are less satisfied with the services than the residents of Tychy – can be refuted.

Table 7.
Distribution of H5 answers (in [%])

		Yes	*It's hard to say*	*No*
24	Do you think that the fares offered by MZK Tychy are adequate to the level of services provided?	***37.5***	***46.9***	***15.6***
25	Are the buses up to an adequate standard?	***56.3***	***34.4***	***9.3***
26	Are the means of transport maintained in a clean condition?	***50***	***43.8***	***6.2***
27	Are the manners and behaviour of the drivers satisfactory?	***56.3***	***40.6***	***3.1***
28	Are the waiting conditions at the stops satisfactory?	***46.9***	***34.4***	***18.7***
29	Do you feel safe while travelling with MZK Tychy?	***40.6***	***56.3***	***3.1***

Source: author's own study.

Upon analysing the distribution of questions concerning the quality and price of the services offered, and issues related to cleanliness, driving culture and traveller safety, it can be concluded that hypothesis $H5_5$: The fare is adequate to the level of services provided by MZK Tychy – has been confirmed.

Table 8.
Distribution of H6 answers (in [%])

		Yes	*It's hard to say*	*No*
17	Is the availability of information concerning the timetable organised by MZK Tychy adequate?	***53.2***	***40.7***	***6.1***
30	Is the information at the bus stops legible and comprehensible?	***65.6***	***28.1***	***6.3***

Source: author's own study.

Hypothesis H_6: The availability and transparency of information are satisfactory for travellers – has also proven to be correct, as more than half of the respondents were satisfied with the availability of information regarding the timetable, and over 65% of them believed that the information is comprehensible. Only a few respondents believed that the information should be clearer.

4. Summary

The main objective of the conducted research was the diagnostic assessment of the customer service standards at MZK Tychy, including a detailed analysis of the opinions of people using the services provided by the above-mentioned transport services provider, performed during the

implementation of the "Management methods and instruments impacting the development and modernity of cities and regions" (pol. „Metody i instrumenty zarządzania wpływające na rozwój i nowoczesność miast i regionów") research project, registered under number 13/040/BK_18/0057, financed by the Ministry of Science and Higher Education. Its implementation was based on the following research problems: determining how the limited number of tickets at points of sale affects the quality of customer service, determining whether delays in public transport influence the quality of customer service, analysing whether MZK Tychy cares about the continuous development and quality of its offer, analysing the satisfaction level for MZK passengers outside the area of Tychy, determining whether the fare is adequate to the level of services provided, and analysing whether the information at the stops is optimal for travellers.

This served as the basis for research on the implementation of the stated objective, and by analysing the material obtained the following can be concluded: most of the respondents had a positive image of MZK Tychy's facilities. Its services are used by people of various ages, but they are mostly young people (up to 25 years of age). Customers appreciate the punctuality and cleanliness of the vehicles, and the prices of services offered. Unfortunately, the study shows that a considerable number of the respondents had encountered a situation where tickets were unavailable for purchase (both from the driver and at the shop). It is a problematic situation, especially at night, when newsstands are closed and the driver is out of tickets. Ticket vending machines are also not available at every spot. Having no other means of transport to choose from, the passenger is therefore forced to evade fares in order to reach their destination. It is also important that half of the respondents do not use the additional services offered by MZK Tychy. However, it is difficult to unambiguously determine what exactly may be the reason for such behaviour. Elderly people may be suspicious of new, additional offers, or accustomed to the traditional, regular forms of paying for tickets. Furthermore, not all passengers have phones capable of running an application which enables such services.

Taking into account the collected information, the following changes in the area of MZK Tychy's customer service standards can be proposed:

1. Increasing the number of ticket vending machines. There should be at least one per stop to ensure passenger freedom and peace of mind in relation to ticket purchase.
2. It is advisable to examine the situation related to potential passengers' lack of interest in additional services. The situation must be carefully analysed, and it must be decided whether the additional offers should be withdrawn, reduced or modified. It is also recommended to advertise additional offers by means of leaflets at newsstands (located next to stops), or on posters or stickers.

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