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CONTENTS

NEW TECHNOLOGIES IN INSTITUTIONS FOR SECURITY AND DEFENSE STUDIES – CHALLENGES AND RECOMMENDATIONS

Małgorzata GAWLIK-KOBYLIŃSKA

War Studies University, Warsaw; m.kobylinska@akademia.mil.pl, ORCID: 0000-0003-3851-6355

Abstract: The aim of the article is to identify future challenges related to the implementation and use of new technologies in the didactic process in institutions for security and defense studies. The author also presents expert recommendations formulated on the basis of their current experience and forecasted achievements in science and technology. Taking into account these recommendations may contribute to more effective management of the quality of education, including the introduction of changes, the way of designing learning and teaching processes. The article uses a critical literature review and qualitative research based on expert interviews and analysis of respondents' statements.

Keywords: new technologies, education for security and defence, challenges for institutions, recommendations.

1. Introduction

The world of new technologies fascinates and surprises with more and more advanced solutions. These solutions on the one hand arouse curiosity, encourage to explore innovative ideas, and on the other give rise to fears about random traps set on human weaknesses. New technologies are understood as those developed over the past decades that affected all areas of human activity (Tort, 2010, p. 44-57; Andrada, 2010, p. 139). In another definition, new technologies (explained more precisely as *emerging technologies*[1]) are solutions that are or will be developed within the next 5-10 years (www.businessdictionary.com/…). More and more questions, discussions on new or emerging solutions (mostly IT) appear in the field of education, especially in institutions that work for security and defense. This is because the support for education and training in new technologies generates both new opportunities and unforeseen consequences. One should be aware that the development of the information society is inseparably connected with innovation and mobility, while the role of institutions introducing new technologies in education for safety and defense is to support the

[1] Some authors regard these terms as identical; for the purposes of this article, these terms will be used as related but not synonymous.

implementation of the didactic process. However, the introduction of these technologies, especially in the specific training conditions (in dispersed and dynamic operation), is also associated with overcoming limitations and striving to achieve the best results. That is why the issue under discussion is a great challenge for both decision-makers and educators. According to M. Kozub, challenges are elements of a set of expected events, phenomena, states, processes, etc., which the subject (organization) should (must) take into account while designing the future. Challenges are both subjectified and objectified. They should be seen as threats, but also as opportunities. They are neither good nor bad, they are *electrically neutral* (Kozub, 2013, p. 29-30). In the light of the quoted definition, the article will attempt to identify challenges in education for security and defense, which will be discussed in terms of opportunities[2] and threats[3]. Awareness of these challenges implies the need to create recommendations and guidelines for both decision-makers and educators. In the institutional dimension, they will be important for the management of the quality of education, including the effective implementation of changes, support of learning and teaching processes, monitoring the learner's activity, and the individualization of educational tasks.

In order to identify these challenges and develop key recommendations (for educators and decision-makers), a critical analysis of literature and qualitative research involving the analysis of the content of statements collected through expert interviews was carried out. As the questions were open (free speech), the content of the statements was analyzed, and the answers of each respondent were classified according to the previously developed codes (categories). In the course of the quantitative analysis, the frequency of the occurrence of similar or synonymous statements was established and factors differentiating the type of justification for the given code were determined thanks to statistical analysis. The interview itself was carried out in 2014 with a group of international experts, hence the research results can be generalized to the international environment.

2. Challenges for institutions

The constantly changing world and the need to generate unique solutions bring challenges. Identification, analysis and evaluation of these challenges is critical for planning the path of development of a given community or institution.

When formulating and assessing challenges, it is essential to refer to megatrends that shape the directions of civilization development and affect the broadly understood education. In the report entitled *Jak będzie zmieniać się edukacja? Wyzwania dla polskiej szkoły i ucznia,*

[2] Opportunities – elements of a set of challenges whose impact on the basis, course and/or results of our activities is assessed as positive, facilitating, accelerating. Ibid., p. 28.

[3] Threats – elements of a set of challenges whose impact on the basis, course and/or results of our activities are assessed as negative, obstructing, delaying. Ibid., p. 28.

instytut obywatelski, W. Kołodziejczyk and M. Polak estimate that *the development of civilization leaves no illusions to the education system. Digitization, digital didactics, mixed styles, IT-assisted learning, connectivism, social learning, and mobility are emerging.* The authors add *that habits that make us perceive a teacher through the prism of the system are still firmly rooted: a cog in the machine, dependent, without necessary tools, a part of the enormous mindless testing machine* (Kołodziejczyk, Polak, 2011, p. 45). Another author, L. Hojnacki, emphasizes the existence of generational differences and barriers that are related to the use of new technologies in the educational process (Hojnacki, 2011).

Challenges that may arise in connection with the development of new technologies in the area of education are also the subject of discussions at high levels of the state. In the Long-term National Development Strategy *Poland 2030. Third Wave of Modernity* (Ministerstwo Administracji i Cyfryzacji…) it was emphasized that by 2030 we will face new digital divisions (resulting from lack of competences in this area), while Poland faces the challenge of creating a modern infrastructure of services and digital resources. This challenge is included in the chapter titled *Strategic goals and directions of intervention in the area of competitiveness and innovation of the economy – innovation of the economy and individual creativity*, in which the so-called *Goal 5* is to create a Digital Poland (Ministerstwo Administracji i Cyfryzacji…, p. 92). It is worth mentioning that *Poland 2050* is the most forward-looking document underlining the importance of necessary actions for the development of the civilization of knowledge, innovation, research and progress (Kleiber, Kleer, Wierzbicki, Galwas, Kuźnicki, Sadowski, Strzelecki, 2011).

The indicated challenges regarding the future of education, although discussed in a general context, also have an impact on education for security and defense. To learn more about the challenges in this area, the author conducted an expert study in 2014, in which specialists from international environments participated (n = 30)[4]. In the interview, open questions were asked about possible opportunities and threats related to the use of new technologies in the broadly understood education for security[5]. The analysis of responses has become the basis for presenting the perception of new technologies by experts who use them in their daily work, as well as identifying the associated risks.

On the basis of the analysis of the content of the statements, eight codes were formulated, expressed in the form of the following statements:

1. sharing content through popularization and development of new achievements of science and technology,
2. increasing the level of education,

[4] The research was published in the author's monograph (Gawlik-Kobylińska, 2016). Due to fact that the book was issued in a relatively small number of copies (*self-publishing*), the research was presented again in this article for the purpose of its popularization.

[5] Although there is a distinction between education for security and for defense, some authors indicate that education for security also includes defense in its scope, e.g. (...) *it also concerns the preparation of the youth and the society for defensive and effective responding to threats* (Kunikowski, 2014, p. 36). This article adopts J. Kunikowski's approach.

3. costs of implementing new technologies,
4. creation of advanced didactic tools,
5. barriers resulting from improper use and understanding of new technologies,
6. raising the level of innovation towards the commercialization of research results,
7. developing interinstitutional cooperation,
8. thinking about the future.

The distinguished codes, recognized as opportunities and threats, became the basis for grouping the experts' statements, as presented in Table 1.

Table 1.
The expert's statements about the challenges related to supporting education for security with new technologies

Opportunities
1) Availability of content through popularization and development of new achievements of science and technology (9)
• *development of new technologies* • *access to many recipients, mass use* • *wider application of hardware innovations* • *increasing interest in new technologies, especially in military institutions - including those at lower levels – where they are becoming more common – mainly due to efficiency, speed and precision of applied technologies* • *the possibility of using the innovations of programs outside the area of education, after completing a training course* • *possibility of logging in to exchange or obtain information from the platform* • *popularization of technology* • *remote access to the platform* • *spreading interest among new social groups*
2) Increasing the level of education (4)
• *developing a "habitual reaction" in the listeners during the process of launching crisis response procedures* • *the ability to check the reaction to emerging threats, delays, etc.* • *increasing the level of education and expanding teaching opportunities (including the number of people who want to and can be educated) related to expert cooperation, feedback and accessibility (time and place of study)* • *virtualization of a dangerous environment in order to consolidate and automate the reactions of the personnel*
3) Raising the level of innovation towards the commercialization of research results (2)
• *new patent applications* • *commercialization of innovation*
4) Creation of advanced didactic tools (2)
• *the most important challenge in my opinion is to build such a mathematical (statistical) model, which after introducing the problem would in almost 100% give answer to the question: "What effect will the given event or its likely course trigger and what the successive phases, stages or intermediate states and possible final effects would be?"* • *the ability to monitor very unusual situations*
5) Developing interinstitutional cooperation (4)
• *increasing the level of expert cooperation in specific fields of teaching and in the field of new technologies (2)* • *creation and use of simulators (automatic for developing habits and automatic-expert for non-typical situations) that would replace the so-called practical workshops* • *possible access to many institutions and faculties of departments cooperating within the framework of broadly understood security*

cd. tabeli 1.

6) Thinking about the future (2)
• *rapid „aging" of technologies* • *e-learning platforms and new technologies are the future of education, yet they are underestimated*
Threats
7)Costs of implementing new technologies (4)
• *purchase of licensed but expensive computer simulation programs, e.g. CBRN Analysis* • *obtaining reliable and up-to-date data; the problem that is also associated with the above thesis is the cost of obtaining the data and the software itself* • *cost of purchasing new technologies (2)*
8)Barriers resulting from improper use and understanding of new technologies (3)
• *lack of management support, technophobia* • *the possibility of flattening of the presented forms and consequently the creation of information blockade* • *cyber-bulling*

Source: study based on: Gawlik-Kobylińska, 2016, p. 175-176.

It can be noticed that the most of the experts' opinions concerned opportunities (6 codes with 23 statements), while threats were described by two codes, distinguished on the basis of 7 statements. Challenges are therefore associated more with opportunities than with threats. These opportunities relate primarily to the popularization of knowledge and easier access to didactic content. In addition, experts pointed out that it is possible to use the potential of new technologies in various types of exercises, which are usually extremely expensive and difficult to prepare in traditional conditions with the use of classical forms and didactic methods. New technologies also facilitate the preparation of the course participant to automate the reactions and maintain desired habits.

In the era of knowledge economy, knowledge is transferred to business, it is a product that should be gradually developed. However, its development costs, hence the statements of experts also emphasized the importance of international cooperation, commercialization of research results and even patent applications.

On the other hand, in terms of threats, the costs of implementing modern solutions and the problem of misuse and misunderstanding of new technologies was mentioned as well. Previous experience of experts in this area is the basis for stating that the lack of response to such barriers may lead to information delay, which is a significant threat to the development of a given organization.

Awareness of the existence of challenges, understood as opportunities and threats, is crucial for each institution, therefore it is important to observe new trends, as well as to discuss the development of modern tools.

3. Recommendations

Preparing recommendations for the implementation of new technologies to the didactic process of a civil-military university may turn out to be a difficult and risky task, as their subject of concern is a future reality. In addition, they may refer to specific situations, institutions, conditions that are still subject to various changes (Gawlik-Kobylińska, 2016, p. 171-172). When preparing recommendations, it is essential to make them consistent or to complement the strategic concepts of social and economic development of the state and the region.

The most common recommendations in the literature on the implementation of new technologies for the didactic process concern the form of education, preparation of teaching resources and implementation of innovative educational solutions – analyzing their usefulness and optimal use (Voogt, Knezek, Roblin, 2015, p. 619-623; Billon, Crespo, Lera-López, 2017, p. 51-68). However, in order to describe the current state of knowledge in such a dynamic field, the author decided to conduct her own research in an international expert environment.

The recommendations presented refer to both educators and institutions (decision-makers). In an expert interview conducted in 2014, 36 experts were asked to express a recommendation or suggestion on the effective use of new technologies in education and training in civil-military institutions. The opinions collected were used to distinguish the following codes in the form of affirmative sentences. For educators they are as follows:

- creating an open attitude (thinking about the future),
- individualization (Karpeta-Peć, 2017, p. 97)[6] and personalization of (Karpeta-Peć, 2017, p. 111)[7] education.

For the decision-makers, the following codes were distinguished:

- promoting a pragmatic approach in the use of technology,
- creating an open attitude (thinking about the future, similar as for educators),
- increasing funding for innovations.

These codes will be illustrated with the examples of experts' statements (opinions).

3.1. Recommendations for educators

In a survey conducted among experts on recommendations for educators, the opinions assigned to specific codes are as follows (Table 2).

[6] Individualization is defined as a *process aimed at individual development and gradual taking over of responsibility by the pupil/student*.
[7] Personalization is *associated with giving the process of learning a personal character (not only individual). Personalization is achieved by developing autonomy and through reflection* (over actions and their effects).

Table 2.
Experts' statements on recommendations for educators

Educators – recommendations	Opinions
Creating an open attitude (thinking about the future) (7)	• *do not be afraid of new technologies* • *openness to young people, greater understanding* • *more frequent use of distance learning* • *using technologically advanced equipment.* • *seeking new solutions in the area of education, using "foreign" technologies and striving to develop own appropriate teaching models* • *observing the current development of science and technology in the field of education for security* • *skilful and effective use of possessed potential; long-term development planning related to technological progress*
Individualization and personalization of education (3)	• *the use of tools suited to age and skills of students; flexible selection of teaching methods* • *individual work on simulation sets* • *paying attention to the evaluation process and suggestions of trainees*

Source: (Gawlik-Kobylińska, 2016, p. 173).

Considering the first code – creating an open attitude (thinking about the future), the educators should be, according to experts, open to new technologies (*do not be afraid of new technologies)*, even the most advanced ones. Searching for and developing teaching models and at the same time observing emerging new trends also fit into the subject of this code. Experts also point to a *skilful and effective use of owned potential.* Even today, it can be noticed that new technologies included in the education process enable faster transfer and verification of knowledge: monitoring and checking the progress of learning is automated. In this slightly changed environment, the teachers have a completely new role: they are advisers, trainers, and experts in learning; they may or may not be the only source of knowledge. They support the acquisition of knowledge and the development of competencies and attitudes, show how to learn, and, above all, motivate students. A. Pieczywok, and L. Wełyczko emphasize that since the (academic) teachers are supposed to be *open-minded creators who possess the skills to share knowledge in a comprehensible and accessible way (...), they should be open to technological progress and use it at their work* (Pieczywok, Wełyczko, 2008, p. 10). The main goal of educating teachers should be the *development of innovative attitudes, creative explorations with the use of their own intellect, diagnosing, interpreting phenomena, and critical approach to the problem* (Pieczywok, Wełyczko, 2008, p. 10). Therefore, openness to new things and thinking about the future is associated with the changes in the approach to the role of the teacher. What are the expected effects of this change? Polak and Kołodziejczyk argue that the *combination of expert knowledge and the teacher's huge experience with the student's digital skills and with the capabilities of digital devices create a real synergy in forming modern education and in raising a generation that will change the world more consciously and responsibly* (Kołodziejczyk, Polak, 2011, p. 45).

Taking into account the second code – individuallization and personalization of education – experts point to, among others, flexibility in designing and conducting classes, adapting the tools to the level of skills and the age of the student, the ability to conduct simulations in virtual reality (Maciejewski, 2017, p. 121-137), and finally the possibility of creating a better (more accurate) system of evaluation. This code is reflected in the provisions of the *Long-Term National Development Strategy Poland 2030. The third wave of modernity,* according to which the adjustment of the education model to the challenges of the modern world is associated with the individualization and personalization of teaching (Ministry of Administration and Digitization, 2013, p. 384).

It is therefore possible to make a generalization that new technologies should improve didactic activities and provide a field for testing new, useful solutions.

3.2. Recommendations for decision-makers

Where the teaching process is supported by new technologies, decision-makers should be open to novelty, use the innovations in a pragmatic way, and ensure sufficient expenditure on innovation (Table 3).

Table 3.
Experts' statements on recommendations for decision-makers

Institutions – recommendations	Opinions
promoting a pragmatic approach in the use of technology (8)	• *recommending/applying technologies that have been already tested in the process of education* • *saving time on analyses, transparency and accuracy of information* • *use common sense and the principle of limited trust in relation to unauthorized people, because the developed technologies may not only help in predicting the effects of a given threat, but also may promote their effective use against the population by the so-called groups of social discontent* • *more efficient implementation of modern equipment* • *make new technologies easily accessible in the field of education in order to be able to use them in everyday work* • *new specializations* • *organize courses and trainings supported by new technologies more frequently* • *recommendation to use free [8]software*
Creating an open attitude (thinking about the future) (7)	• *having a conscious approach to the topic* • *being open to innovations - a chance to increase the share of educational services on the market* • *striving to meet the latest trends*
increasing funding for innovations (3)	• *allocate funds for the development of new technologies* • *investing in and searching for new technologies for visualizing and presenting knowledge* • *enabling the purchase of simulation programs*

Source: Gawlik-Kobylińska, 2011, p. 175-176.

The pragmatic approach to the tools of new technologies (e.g. *recommending/applying technologies already tested in the education process, saving time on analyzes, transparency and accuracy of information)* is, according to experts, based on flexible application of these

[8] Author's note: free *open source* software.

tools, limiting unnecessary costs, and on prudent use, including also the development of new training courses. Therefore, during the planning phase of the training particular attention should be paid to the selection of appropriate tools, through the prism of their effectiveness and efficiency in achieving the assumed learning objective. If through their use it is possible to expand the educational offer (*new specialties*), then the institution gains a new group of recipients and functions in a broader context.

The last two codes are openness to new technologies (e.g. *being open to innovations – a chance to increase the share of educational services on the market*) and the need to increase expenditure on innovation financing (*enabling the purchase of simulation programs*). It is worth noting that they are convergent in line with the *Long-term National Development Strategy Poland 2030* (Ministry of Administration and Digitization, 2013, p. 386), which stressed the openness to new technologies, for example through the necessity of eradication of the digital divide. Is possible to counteract this divide through skilful planning and organizing education in a manner that corresponds to current needs and trends, as well as through increasing funding for education. It can therefore be noted that the directions of education development recommended by the group of experts are consistent with the provisions in the strategic documents. Such unity of thinking has a chance to be transformed into a coherent action aimed at the thoughtful and pragmatic use of innovation in education.

4. Conclusions

The article identifies challenges in the implementation of new technologies in institutions for security and defense studies, as well as recommendations for decision-makers and educators. Identified challenges are understood as opportunities and threats. Perceived by the prism of opportunities, they relate to the wider popularization of knowledge, raising the level of education, designing advanced teaching tools, raising the level of innovation and commercialization of research results, developing cooperation between institutions, and thinking about the future. Challenges understood as threats are related to two fundamental issues, i.e.: high costs of implementing modern tools and the misusing and misunderstanding of new technologies.

According to the conducted research, educators should demonstrate an open attitude towards new technologies, and use them as teaching tools to individualize the learning process (Jędryczkowski, 2012, p. 174-192). Decision-makers should promote pragmatic use of new technologies, encourage an open attitude towards new solutions, and increase fundings on innovations related to education for security and defense.

It can be assessed that the current thinking about education in military-civil environments generally takes into account the role of new technologies and concerns the near future.

Although in the national literature one can find strategic documents reaching the year 2015, the content of experts' statements (international group) indicates that the thinking about new technologies in education for security and defense was short term (used phrases included: *searching for new visualization technologies, simulation programs, implementation of modern equipment, technologically advanced equipment*, while there was lack of concepts such as: artificial intelligence, augmented reality, virtual reality accessories). Therefore, it seems that in order to plan educational activities in the area of security and defense in a more efficient way, it is necessary to think more deeply about the development of science and technology, and perhaps to include the sciences of the future in the process of planning education for security and defense. Not only in Poland, but also abroad. It can help in forecasting the directions of universities' development and contribute to the creation of such an institution strategy that will meet the future requirements and needs of as many interested parties as possible. Research on the future (possible futures) (Kozub, 2013, p. 80-81, 86-88) is particularly important in this context due to the constantly increasing pace of scientific and technological development, which implies non-linear and irregular changes (Aleksandrowicz, 2014, p. 217), significantly impeding the functioning in the educational environment.

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CONCEPT OF KNOWLEDGE IN THE CONTEXT OF MODERN ENTERPRISES

Anna HORZELA[1*], Sonia AMBROCHOWICZ[2]

[1] Silesian University of Technology, Gliwice; anna.horzela@polsl.pl, ORCID: 0000-0003-2345-9861
[2] Silesian University, Katowice; turek.sonia@gmail.com, ORCID: 0000-0002-3726-6609
* Correspondence author

Abstract: The focus of this article is to explore the concept of knowledge with reference to the management of a modern enterprise. The main issues discussed were knowledge management and the knowledge-based economy. The very notion of knowledge was characterised and described from three perspectives: product, resource, limitation. The classification of knowledge was also presented with regard to the most important and most frequently cited approaches. Furthermore, the article illustrates the models of knowledge management which define a given approach to knowledge management in the enterprise.

Keywords: knowledge, management, resources.

1. Introduction

As early as at the end of 1950s and the beginning of 1960s of the 20th century, P. Drucker emphasised, that the traditional resources, such as capital or work lose in importance due to the following social and economic changes, resulting from the development of technology, whereas knowledge is taking on an even greater value (Trajer, Paszek, Iwan, 2012, p. 31). Currently, the development of new technologies, social and cultural changes, as well as globalisation are clearly the reasons, that the victory on the market is won by the one, who manages knowledge the most effectively. The concept of knowledge management includes not only its effective use, but also, its creation, acquisition, storage, protection and its transfer. The need to manage knowledge in virtually all areas of human activity makes the support for the knowledge management by various disciplines indispensable from a scientific point of view. Naturally, these are primarily economics and management, but also sociology and psychology, providing a basis for reflections on social determinants of such activities and chances of their success (Glińska-Neweś, 2007, p. 7).

The aim of this study is to present the issues related to knowledge management. The authors attempted to show the value and importance of knowledge at the present time. The text has been completed with characteristics of the three perspectives on knowledge perception as well as its classification and models of knowledge management.

2. Knowledge as a company asset

The original approach to strategic management of the enterprise assumes that the basis for making any strategic projects is provided by the appropriate asset and the potential of an enterprise. For that reason, the enterprise resources constitute grounds for its operation, whilst the company potential provides possibilities, which these resources create when using knowledge and experience under the present conditions (Nowodziński, 2013, p. 96). With regard to the above, knowledge, experience and material resources of an enterprise, when appropriately configured, result in the most advantageous development of the organisation potential when in operation (Królik, 2015, p. 156).

More attention should therefore be devoted to the characteristics of this particular and currently very significant asset of enterprises. Knowledge, according to the theory of A. Toffler has the following features, which distinguish it from other resources of an organisation (Kłak, 2010, p.40):

- domination – which indicates that knowledge is the most important asset of a company, in addition to capital, land and labour and it is of strategic significance for all companies,
- inexhaustibility – knowledge is the only asset, which does not wear out or does not reduce, and concurrently expands along with the frequency of its use and transfer,
- simultaneity – occurs only with regard to this resource and indicates that knowledge can be used at the same time by a lot of people, equally from many enterprises, and in many places,
- non-linearity – there is no clear correlation between the size of the knowledge resources and the benefits and consequences, which result from it. This means that a small amount of knowledge may contribute to a competitive advantage, and in other cases, significant resources of slightly useful knowledge do not provide company with the market dominance.

On the other hand, J. Klug, W. Stein and T. Licht enumerate the following as the main characteristics of knowledge (Kłak, 2010, p.40):

- subjectivity – perceiving knowledge is dependent on the person who is to use it as well as on the context in which it appears,
- transferability – it can be used in different places,

- embedding – knowledge is embedded in the minds of people, which makes it difficult to transfer,
- being self-powered – sharing knowledge does not contribute to the loss of its value,
- impermanence – knowledge, after a time, loses its value,
- spontaneity – development of knowledge occurs in the processes, which are not frequently controlled.

3. Prospects for knowledge management

The concept of knowledge plays a very important role in the modern management theory and practice. This derives in particular from the fact that frequently any considerations in this area are carried out based on the not clearly defined definitions, which significantly limits their usefulness. When defining knowledge and its use in the considerations related to various fields, the following barriers should be taken into account (Beliczyński, the Messiah, Stabryła, 2009, p. 165):

- ambiguity of the knowledge concept,
- unspecified relationships between knowledge and information,
- ambiguity of the information concept.

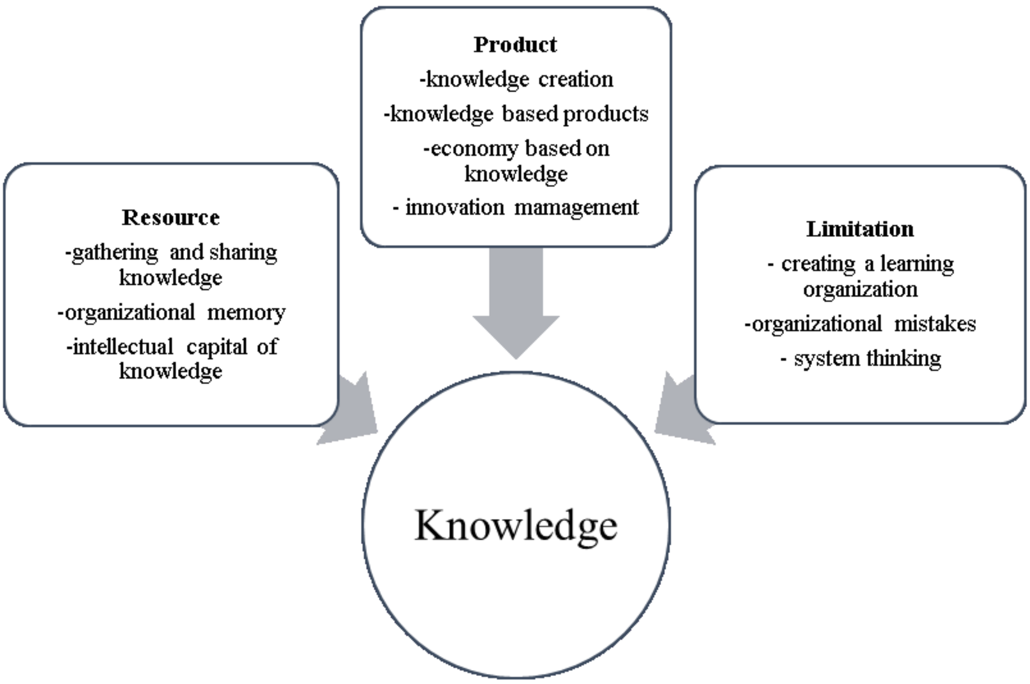

Figure 1. Perspectives on the perception of knowledge in an enterprise. Source: own work based on: (Klincewicz, 2012, p. 72).

In general, knowledge is associated with the action of people in the intellectual (Beliczyński, the Messiah, Stabryła, 2009, s. 166), or physical sphere and is defined as an effective use of information in action. On the other hand, information is treated as structured data, which additionally require cognitive activities. Therefore, knowledge is regarded as a codification of the information significance.

Knowledge management itself is recognised in three perspectives, namely, knowledge is perceived as: a product, a resource and a limitation (Klincewicz, 2012, p. 72).

Knowledge as a **product** is created by employees to be subsequently sold as products and services of a given enterprise. The practice of management has proved that knowledge may become a source of competitive advantage, as well as the way to stand out on the market. Products and knowledge-based services, inter alia, include (Klincewicz, 2012, p. 73):

- technical equipment, which requires the creation of specialised and engineering knowledge,
- computer programs, written using algorithms and programming methods,
- newspapers, the creation and release of which is not possible without the editorial and journalistic skills,
- TV commercials, created as a result of many studies related to the effectiveness of advertising messages and customer preferences,
- fashionable clothes, sewn according to the design created due to the knowledge of current trends,
- mixture of spices, being the result of knowledge concerning the taste combinations and supply points,
- washing powder, the creation of which used, inter alia, the knowledge of chemical reactions.

Perception of knowledge as a **resource** makes a slightly different approach to knowledge management, which is popular among Polish and foreign companies. Processes regarding knowledge management aim at collecting, sharing and using the knowledge within an enterprise. Managers, who represent this particular approach to knowledge, are therefore interested in an effective use of the already owned resource rather than in the creation or stimulation of innovativeness. Researchers Gilbert Probst, Steffen Raub and Kai Romhardt proposed a model of six fundamental processes of knowledge management, which at the same time comprises the objective determinants of such initiatives. The mentioned processes include (Klincewicz, 2012, p. 72):

- identification of knowledge – is associated with determining the sources and content of knowledge in a company,
- acquisition of knowledge – involves meeting the information needs, as well as filling the competence gaps by referring to the resources located within the enterprise environment,

- development of knowledge – indicates expanding the already existing knowledge resources,
- sharing of knowledge – access to knowledge, necessary to conduct tasks, should be guaranteed to the organisation participants,
- use of knowledge – refers to the abilities of employees to use the knowledge in their daily work and to use the emerging business opportunities by the company,
- protection of knowledge - is to protect an enterprise against the loss of this resource.

The third approach means that knowledge is understood as a **limitation**, which affects the operation of an enterprise and induces both the employees and the entire organisation to learn continuously by drawing conclusions from past experience. The previously presented approaches focused on the knowledge creation, sharing and storage. However, in this case the emphasis is mainly placed on the interpretation, analysis and use of knowledge in practice, as well as on modifications of one's actions. The approach, which treats knowledge only as limitations, demands the creation of learning organisations: using one's own experiences, analysing the complexity of decisions, using knowledge concerning managerial successes and failures as well as working on the continuous improvement of an organisation (Klincewicz, 2012, p. 80-81).

4. Classification of knowledge

Knowledge, difficult to be clearly defined, is classified in many different kinds of ways. The division made by M. Polanyi, into the **formal/explicit** knowledge, which is easy to transfer and **hidden/implicit** knowledge, difficult to pass, belongs to the most frequently cited ones. Formal knowledge is characterised by it being transferred using the documentation, e.g., reports or data using words, numbers, symbols, characters. This type of knowledge, by its nature, is frequently compared with the information, since it is easy to spread among employees. On the other hand, the main problem related to the tacit knowledge, the existence of which is widely known, consists in specifying what this knowledge is. This is what makes it difficult to be transferred and stored. Tacit knowledge is associated with people, their experience and intuition. On account of its intangible nature and the fact it represents approximately 80% of all the knowledge in the company, it was necessary to create a system of managing this kind of knowledge and recognising it in two dimensions. That is to say, the technical dimension involves non-formalised skills difficult to be detected, whilst the cognitive dimension consists of mental models, patterns, perceptions and beliefs which are taken for granted (Beyer, 2011, p. 14).

Another significant division of knowledge is the classification disseminated by B. Lundvall and B. Johnson, which distinguishes four types of knowledge (Trajer, Paszek, Iwan, 2012, p. 32):

- Know-what – the kind of knowledge, relative to being familiar with particular facts, which is identified with information and data possession.
- Know why – indicates the knowledge relating to the understanding of the principles adopted in the reporting system, e.g., in an organisation, nature, society.
- Know how – is the type of knowledge, related to the ability to; it is collected as the experiences developed by an enterprise; the public access to this knowledge as well as its transfer is very difficult.
- Know-who – indicates the combination of information and social relations, as to who knows what; it allows the use of the knowledge of experts.

The knowledge resources within an organisation are also subjected to the division suggested by T. Stewart, who distinguishes (Trajer, Paszek, Iwan, 2012, p. 32):

- Knowledge in the minds of employees – including experience, skills or the manner the duties of employees are performed, which contributes to the income generation.
- The stored knowledge – saved in documents, software, video materials and other measures, which facilitate fast access.
- The protected knowledge – protected by patents, trademarks, property rights and trade secrets.

It must be stated that there exist many classifications and divisions of knowledge used for the needs of companies, the aim of which is to support the management of this strategic resource. The divisions are made inter alia, by the criterion of diversity, generality, certainty or the degree of approximation to a given field. The most commonly used division appears to be the one into the tacit and explicit knowledge, which is globally applicable (Kłak, 2010, p. 40).

5. Models of management

The literature concerning this subject additionally lists three basic models of knowledge management, including: the Japanese model as well as the resource and the process models (Janasz, 2013, p. 46).

The Japanese model, by far the forward-looking one, is based on the "spiral of knowledge" concept, including the tacit and formal knowledge division. I. Takeuchi and H. Nonaki define four conversion methods of the integrated knowledge (Janasz, 2013, p. 46):

- From tacit to implicit knowledge (socialisation) – means sharing the experience. Tacit knowledge is created in the form of mental models and technical skills. It is gained directly from other people without the need to use the language. The experience itself becomes a way to acquire the tacit knowledge, e.g., students achieve mastery by observing and imitating their teachers.
- From the tacit to the available knowledge (externalisation) – indicates a complex process of knowledge, consisting in reflecting the tacit knowledge in accordance with the available concepts. These kinds of processes involve sharing the tacit knowledge through formulating hypotheses, theorems, models, comparisons or analogies. The determination of vision itself is achieved by means of the language. The verbal form (the written one) provides the transfer of tacit knowledge into the explicit one. It may happen that this determination proves to be insufficient or inappropriate, but still, irrespective of the all listed methods of knowledge conversion, it is the externalisation, which serves as the basis for its formulation because it provides new ideas using the tacit knowledge.
- From explicit to the explicit knowledge (combination) – is a kind of conversion expressed in the process of sorting and including of the concept to the adopted system of knowledge, which consists in making the elements corresponding to the tacit knowledge "fit" together. Knowledge is shared through meetings, documentation, computer networks and conversations.
- From explicit to the tacit knowledge (internalisation) – indicates the conversion of knowledge, which constitutes the process similar to the "learning by acting" one. This may suggest that knowledge becomes a useful resource, which in its implicit form, penetrates into a human being. This is achieved through the experience, mental models that are being developed, as well as through the acquisition of technical skills. Knowledge is accumulated, interpreted and then subsequently used by people. The internalisation sphere is of particular significance because it provides operational knowledge in the field of production management. Consequently, the two aforementioned types of knowledge are juxtaposed, which results in the process data of its conversion in repeated cycles.

The resource approach assigns the greatest role to the "sources of knowledge" model, which is said to have been propagated by D. Leonard-Barton. This model assumes the existence of the following sources of knowledge (Janasz, 2013, p. 47):

- The key skills, including technical and physical systems, the knowledge and employee skills management systems, as well as a set of norms and values.
- Joint solution to the existing problems.
- Implementation, integration of new tools and technologies.
- Experiments.
- Import of knowledge.

These elements refer both to the inside as well as to the surroundings of an enterprise. They are related both to the present and to the future. The main mechanism, which integrates all the aforementioned elements as one, is constituted by the key skills of employees. The resource model has significantly caused the increase in awareness related to the essence of knowledge as a strategic resource, which is currently turning into as a source of competitive advantage.

On the other hand, **the process model** indicated the direction, which makes use of the experience and solutions applied in large consulting firms. This approach has been propagated by T. Davenport and L. Prusak. In this concept, the knowledge management is spread over the following sub-processes: location of knowledge, its acquisition, development, sharing, dissemination, development, exploitation and accumulation. Application of the process model to the management of an enterprise is expressed through the perception of a particular entity as a complete process, which identifies all sequences of the performed activities. The process approach involves a dynamic process, which is to be completed within the planned periods of time. It integrates time, quality and timeliness of individual actions aimed at shaping the value for customers, which in turn results in achieving flexibility, creating an important competitive advantage. The process model theoretically assumes the manner, in which enterprises generate and use knowledge, concurrently applying the set of operational functions i.e., knowledge expansion, codification, transfer (Janasz, 2013, p. 48).

6. Summary

The environment of an enterprise undergoing constant changes as well as the desire to increase market competitiveness contribute to the introduction of the knowledge-based management. The success of enterprises increasingly depends on the effective knowledge management, in particular, its acquisition, generation and its application in an organisation. Currently, both intellectual capital and knowledge are the most important paradigms of the knowledge-based organisations and are regarded as the strategic asset of an enterprise. On the other hand, the level of importance of intangible assets, in particular the information, skills and competences, is constantly increasing in enterprises (Brzezinski, 2009, p. 9). Therefore, especially, under the current conditions of the 21st century market economy, it must be stressed that the awareness of the essence of knowledge, its accurate interpretation and familiarity with the complexity of the matter is of such great importance.

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MANAGEMENT OBJECTIVES OF A MUNICIPAL COMPANY – THE SOLUTION TO GOOD MANAGEMENT?

Dariusz KLIMEK

Lodz University of Technology, Faculty of Management and Production Engineering; dariusz.klimek@p.lodz.pl, ORCID 0000-0003-3952-4533

Abstract: The provisions of the new salary cap act entered into force on 9 September 2016 (Ustawa z dnia 9 czerwca 2016). The new provisions apply to State Treasury Companies and some municipal companies. One of the basic assumptions of the act is the obligatory enforcement of management objectives in companies by the owners. The variable part of management salaries will depend on the degree of completion of individual objectives. In the first part, the article presents the results of studies of the texts of owner regulations concerning the method of formulating and the type of management objectives in municipal companies. The second part includes the author's considerations concerning possible economic and social effects of the implementation of management objectives in companies. In the conclusions, the author attempts to answer a question whether objectives formulated in this manner can actually improve the quality of management of municipal companies?

Keywords: management objectives, municipal company, management salaries.

1. Introduction

The justification of the Act of 9 June 2016 on the methods of determining the salaries of the managers of some companies in Poland includes a provision that the purpose of implementing new principles for determining salaries is to increase the quality of management, among others, by conditioning the payment of a part of the management salaries on the completion of specific management objectives. Furthermore, according to the authors, the act can help determine the correct proportion between the need to create an elastic mechanism for determining the sais salaries and to approximate it to the principles adopted on the market and the need to fully exercise the constitutional principle of social security (Druk nr 514). The latter refers to the factual reasons for the emergence of new regulations. The direct cause for introducing the changes in the law was a media event. In 2016, a member of the management board of one of leading State Treasury companies was dismissed after a very short term (several weeks) in office. The problem was that this person received a severance that was considered incommensurate with the circumstances and excessive. However, could regulations introduced shortly after the subject event prevent any similar irregularities in the future. Could new laws contribute to new problems emerging in municipal companies in the future? These errors can stem from the method of determining management objectives and the method of paying the salaries related to the completion of these objectives. After it was published, the provisions of the new act were widely criticized (Widera; Tyczyńska). They were however press publications only. Until the end of 2017, no studies have emerged in literature which would discuss the economic effects of the new approach to employing and remunerating the members of management boards of companies, which is understandable, considering that the majority of management board members signed management contracts until the end of the first half of 2017. We will have to wait at least a year from the implementation of the new solutions for the ultimate conclusions to clarify. However, the full texts of by-laws written for companies which are legally obligated to formulate such objectives are available online. An analysis of individual regulations forming these by-laws for 84 municipal companies representing various industries situated in different parts of the country has led to a preliminary assessment of the new legal solutions in terms of possible impact on management. The purpose of the article is to answer a question whether management objectives formulated in practice can improve the quality of management of municipal companies?

2. Objective and subjective scope of the changes

The act of 9 June 2016 on the principles of determining the salaries of managers in certain companies applies to companies representing: the State Treasury, local government units or their associations, legal bodies and municipal bodies. The article is devoted to local government units in the form of limited-liability companies and joint-stock companies. As of 31 December 2015, 2324 limited-liability companies and 273 joint-stock companies with shares or stocks owned by local government units were registered in Poland (Ministerstwo Skarbu Państwa).

According to the provisions of the Act, the body which is entitled to exercise the rights vested in the shares is obligated to take measures to develop and oversee the implementation of principles of remunerating management board and supervisory board members. Exercise of this obligation involves:

1. leading to a voting at the general meeting of shareholders on draft resolutions concerning the principles of remunerating management board and supervisory board members according to the provisions of the act and passing votes to adopt the resolutions,

2. collecting a statement on the adoption of obligation to determine the remuneration principles for supervisory board members according to the provisions of the act from each candidate for the position of supervisory board member indicated by the body entitled to exercise the rights vested in the shares.

The draft resolution concerning the principles of remunerating members of the management board should stipulate that the total salary comprises a fixed part, i.e. the basic monthly salary specified in a per-quota rate, and a variable part, i.e. supplementary salary paid for the company's financial year.

The fixed part of the management board member's salary is determined in consideration of the scale of company operations, particularly the value of its assets, revenues and employment. To determine the remuneration of a management board member, serving as the factor of their salary basis, the company should fulfill at least two of the three premises indicated in table 1 in at least one of two of its last financial years.

Table 1.
Fixed salary part depending on company size

Remuneration as the factor of salary basis	Premises concerning company size		
	Average annual employment	Annual net revenue (equivalence in PLN)	Total balance assets (equivalence in PLN)
1-3	> 10 employees	< 2 M euro	< 2 M euro
2-4	≥ 11 employees	≥ 2 M euro	≥ 2 M euro
3-5	≥ 51 employees	> 10 M euro	> 10 M euro
4-8	≥ 251 employees	> 50 M euro	> 43 M euro
7-15	≥ 1251 employees	> 250 M euro	> 215 M euro

Source: developed on the basis of pertinent regulations of 9 June 2016, op.cit.

A draft resolution concerning the remuneration of management board members can stipulate a different fixed part of the management board member's salary if this stems from extraordinary circumstances pertaining to the company or to the market, on which the company operates, particularly when the company:

1. has implemented a program of consolidating individual companies belonging to its capital group, the purpose of which is to change the structure of its assets or revenues,
2. has implemented an investment program which significantly exceeds the value of its fixed assets,
3. has implemented a restructuring program with a time horizon of at least 3 years, leading to a significant change in the structure of the company's assets or revenues,
4. has its registered office outside the Republic of Poland, or its statutory activities are governed by an international agreement, to which the Republic of Poland is a party,
5. has operated up to a year,
6. was established to complete a project, particularly when co-financed by the European Union or under a non-refundable financing scheme operated by the member states of the European Free Trade Association (EFTA) or when financed under other non-refundable financing schemes.

Passing a vote in favor of a resolution determining the fixed part of a management board member's salary in excess of the value specified in table 1, the body entitled to exercise rights vested in its shares should draw up a written justification and publish it on its website in the Public Information Bulletin (Ustawa z dnia 9 czerwca 2016).

The variable of each board member's salary which serves as a supplement to the basic salary for the company's financial year, depends on the level of achievement of management objectives. The importance of individual management objectives as well as the objective and measurable criteria for their completion and settlement are laid down for individual board members or for all of them, collectively. Pursuant to the act, the variable salary part must not exceed 50%. In turn, in public companies and in other, largest municipal companies (the last row in table 1), the variable salary part must not exceed 100% of the basic salary determined for the management board member in the preceding financial year.

Article 4 section 6 of the said act specifies model management objectives concerning companies assumed by the provisions of the act. These objectives can include, among others:

1. an increase of the net profit and pre-tax profit to include interest, taxes and amortization, or acceleration of the growth rate for one of these results,
2. achieving or changing the production or sales volume,
3. revenues, particularly sales revenues, operating revenues and revenues from other operating or financial activities,
4. a reduction of losses, reduction of management costs or the costs of business activities,
5. the completion of a strategy or a restructuring plan,
6. the achievement or charge of specific indicators, and particularly profitability ratios, financial liquidity ratios, management performance indicators or solvency ratios,
7. the completion of investments, considering their scale, rate of return, innovativeness and timely completion,
8. a change in the market position of the company, counted as a share on the market or according to other criteria or relations with contract parties classified as key partners according to specific criteria,
9. the successful implementation of human resources policies and an increase in employee involvement.

According to the provisions of the act, draft resolutions concerning remuneration principles lay down management objectives, the importance of these objectives and the objective and measurable criteria for their completion and settlement. A draft resolution concerning the remuneration of management board members can further stipulate that the detailed objectives, importance and criteria will be provided by the body or entity which is responsible for determining the salary of the management board member and concluding an agreement for management services with this member. The legislator further decided that draft resolutions concerning board member remunerations should include provisions stating that the supplementary salary of a management board member, i.e. the variable part, is payable after the management board has approved the management board's report on company operations and the financial statements for the preceding financial year, and after this management board member has received a general meeting of shareholder's vote of approval for their fulfillment of their responsibilities.

3. Types and methods of formulating management objectives in companies

A study of resolution provisions was carried out in December 2017 for 84 municipal companies. Among the studied bodies, the largest number of management objectives was identified for Port Lotniczy Radom SA (10), and the smallest number of objectives was specified by Pomorska Specjalna Strefa Ekonomiczna Sp. z o.o. with its registered office in Sopot (2). The total number of objectives in the studied resolutions was 427, which means that, in average, local government bodies would set 5 objectives for each of the companies (table 2). The majority of objectives were economic in character (more than 50%) and referred to: profits, revenues, costs, economic indicators, or the market position of the company. A slightly smaller number of objectives referred to material issues (more than 30%): completion of investments, restructuring plans, achievement of specific operational indicators. Other objectives were the rarest (approx. 17%) and concerned various areas: management, innovativeness, human resources policy. In five instances only objectives were encountered which could be described as socially-oriented (improvement of the quality of life of local residents), and which assumed a very narrow scope. Economic objectives were predominant in companies from the following industries: municipal waste (71.0%), public transport (58.4%) and water supply and sewage companies (53.8%). In turn, material objectives recurred in resolutions concerning social housing and development companies (53.2%).

Table 2.
Number and types of management objectives in companies assumed with the study

Company type	No. of companies	Average no. of management objectives in %		
		Economic	Material	Other
Water supply and sewage	24	53.8	37.6	8.6
Heating distribution	14	44.1	39.0	16.9
Social housing and development	12	23.4	53.2	23.4
Public transport	9	58.4	15.6	26.0
Municipal waste	9	71.0	16.1	12.9
Multi-industry (municipal management)	9	52.5	35.0	12.5
Sports and recreation centers, aquaparks	4	55.6	22.2	22.2
Economic zones	2	40.0	40.0	20.0
Health care facilities	1	57.1	42.9	0.0
Airports	1	60.0	10.0	30.0
In total	**84**	**52.5**	**30.7**	**16.8**

Source: own study.

An analysis of the management objectives for municipal companies, as specified in the resolutions of managing bodies has pointed to the dominance of economic objectives. This means that the authors of management objectives paid little attention to the specific character of their municipal companies. This specific character stems from the fact that these companies provide so-called public services as part of their public utility. A definition of public utility is laid down in the Municipal Government Act of 8 March 1990 (Ustawa z dnia 8 marca 1990). Pursuant to article 9 point 4 of this act, a public utility provides generally accessible services according to the tasks attributed to a municipality, the purpose of which is to continuously and incessantly satisfy the collective needs of the population. These tasks were literally listed in article 7 of the said act. In turn, article 1 of the Municipal Management Act of 20 December 1996 lays down principles and forms of municipal management of local government units, consisting in their performance of own tasks to satisfy the needs of the local government community (Ustawa z dnia 20 grudnia 1996). This mutual contradiction of the economic objectives of a municipal company, as resulting from its situation within the provisions of the Code and the said acts was confirmed in a sentence of the National Administrative Court from 2003. In the sentence, the Court ruled that the primary difference between municipal management and business activity is in that the purpose of this management is not gainful (Wyrok NSA z 9 stycznia 2003).

An analysis of the provisions of resolutions adopted by the bodies of local government units and pertaining to their management objectives has led to other remarks. It was found that these provisions had been reproduced without any deeper consideration of the specific character and the actual need for setting specific management objectives in individual companies. Table 3 presents selected examples of management objective formulations. One could venture a claim that the majority of the objectives specified in these resolutions adopted by other municipal companies in Poland was no different to the formulations quoted in the table. Copying objectives in resolutions adopted by a single office or company is common. There are multiple examples available. For instance, the Public Information Bulletin in Suwałki lists 6 resolutions concerning the remuneration of management board members in municipal companies. These refer to the following companies: Parku Naukowo-Technologicznego, Przedsiębiorstwa Energetyki Cieplnej, Przedsiębiorstwo Gospodarki Komunalnej, Przedsiębiorstwo Gospodarki Odpadami, Przedsiębiorstwo Wodociągów i Kanalizacji and Zarząd Budynków Mieszkalnych TBS. Each of these resolutions specifies identical management objectives. This is not an isolated case in Poland. What is more, analyzing the provisions of these resolutions, we will instantly notice that objectives are not only copied within cities, but include the objectives which have been included in earlier issues. The same formulations are found in documents issued by companies headquartered in Radom and Suwałki. This proves either the lack of actual knowledge of the objectives which should be set for individual companies, or, simply, the lack of professional commitment from the authorities and officials. Although municipal companies are included in the sphere of public finance due to the role and the tasks they fulfill on the local market, this behavior must be clearly condemned.

Table 3.
Examples of management objectives in selected municipal companies

Company	Management objectives
Zakład Komunikacji Miejskiej w Elblągu Sp. z o.o.	Achievement of a positive financial result; Increase in sales volume and value; Lowering of operational costs; Undisturbed and correct completion of tasks; Achievement or change of specific indicators, particularly key performance indicators and solvency ratios; Achievement of the planned revenues and financial result; Completion of the strategy or adopted restructuring plan; Completion of human resources policy adopted.
Port Lotniczy „RADOM” SA	Increase of net profit or pre-tax profit minus interest, taxes and amortization, or increase of the growth rate for one of these results; Achievement or increase in sales volume and value; Revenues, particularly from sales, operating activities or financial activities; Reduction of losses, reduction of management costs of business costs; Completion of the company development strategy or a restructuring plan; Achievement or change of specific indicators, including profitability ratios, financial liquidity indicators, management performance indicators and solvency ratios; Completion of investments, considering the scale, the rate of return, the innovativeness and timely completion; Completion of human resources policy and increase in employee involvement; Change in the market position of the company, counted as a share on the market or according to other criteria or relations with contract parties classified as key accounts according to specific criteria; Completion of human resources policy and increase in employee involvement; Degree of completion of public tasks.
Pomorska Specjalna Strefa Ekonomiczna Sp. z o.o. with its registered office in Sopot	Completion of the zone development plan; Improvement of economic and financial indicators.
Towarzystwo Budownictwa Społecznego – Przedsiębiorstwa Mieszkaniowego Sp. z o.o. w Krośnie	Preparation and implementation of investments in the construction of apartments for rent; Completion of the company's annual plans; Creation of a positive image of the company; Development of an effective system for charging municipal waste collecting services provided to Municipal resourced managed by TBS, in cooperation with the Municipality.
Chemwik Sp. z o.o. w Bydgoszczy (oczyszczalnia ścieków)	Improvement of operational indicators and the quality of services provided, Improvement of financial indicators, including: a) achievement or change of specific indicators, particularly key performance indicators and financial liquidity ratios, b) reduction of management costs or the costs of business activity; Conformity of the financial plan with its execution; Implementation of investment and capital renovation plan; Completion of investments, considering their innovative character and completion dates.
Chorzowsko-Świętochłowickie Przedsiębiorstwo Wodociągów i Kanalizacji Sp. z o.o.	Achievement of a positive financial result; Completion of investment and renovation tasks essential to the city of Chorzów or the city of Świętochłowice; Acquisition of additional sources of income or financing; Rationalization of operating costs.
Przedsiębiorstwo Gospodarki Odpadami w Suwałkach Sp. z o.o.	Increase of net profit or pre-tax profit minus interest, taxes and amortization or increase in growth rate for one of these results; Achievement or change in production or sales volume; Revenue, including from sales, operating activities or financial activities; Reduction of losses, reduction of management costs or the costs of business activities; Completion of the company development strategy or a restructuring plan; Achievement or change of specific indicators, including profitability ratios, financial liquidity indicators, management performance indicators and solvency ratios; Completion of investments, considering the scale, the rate of return, the innovativeness and timely completion; Completion of human resources policy and increase in employee involvement.

Source: own study on the basis of: Resolution no. 2/2017 of the Extraordinary General Meeting of Shareholders of Zakład Komunikacji Miejskiej w Elblągu Sp. z o.o., www.zkm.elblag.com.pl/; Public Information Bulletin of the Radom City Council, http://bip.radom.pl; Resolution no. 2/2017 of the Extraordinary General Meeting of Shareholders of Pomorska Specjalna Strefa Ekonomiczna sp. z o.o. with its registered office in Sopot, https://mr.bip.gov.pl/ fobjects/download/247502/psse_zarzad-pdf.htm; Public Information Bulletin of the Krosno

City Council, http://www.bip. umkrosno.pl; Resolution no. 4 of the Extraordinary General Meeting of Shareholders of Chorzowsko-Świętochłowickie Przedsiębiorstwo Wodociągów i Kanalizacji Sp. z o.o. http://www.chspwik.pl/; Resolution no. 8/2/2017 of the Extraordinary General Meeting of Shareholders of „Przedsiębiorstwo Gospodarki Odpadami in Suwałki" Sp. z o.o. dated 9 May 2017r., http://bip.umsuwalki.pl.

4. Discussion

Considering that the purpose of these changes, at least in the official version of the above quoted justification, was to improve the quality of management of municipal companies, it would be difficult not to notice the flaws of the new regulations in this aspect, and the resulting flawed formulations concerning management objectives.

The biggest error in the management objectives formulated is that municipal companies are treated as if they operated in market conditions, and as if they were oriented at profit, revenue or goodwill increase. In this aspect, comparing State Treasury companies operating on the competitive market and aiming at producing the best results with municipal companies is completely inexplicable for the managers of these companies. What is more, the contradictions between economic and social objectives predating the effective date of the act were not only not refuted, but will soon magnify problems related to having to choose between individual economic objectives. Until recently, one of the basic problems of managing municipal companies was that they were governed by the provisions of two acts: the Municipal Management Act of 1996 and the Code of Commercial Companies. So far, the majority of company managers would make a choice between public utility, thus making decisions which were not necessarily as profitable (e.g. construction of sewage in non-developed areas or opening of bus lines in non-developed areas), but which improved the quality of life of their residents and the working conditions for local business owners. If however new management objectives are now to stipulate revenue increase, cost reduction and profit increase, then they are contradictor for one of the municipal companies. A company can increase its revenues twofold: by increasing its tariffs (prices), thus increasing its profit, but is this the expectation of the society? The second method involves e.g. the construction of water supply networks in low-development areas. This will increase revenues, but will also increase costs and reduce profits. The act therefore introduced an additional problem for municipal company boards which will be forced not only to choose between economic and social objectives, as was the case so far, but also between economic objectives themselves.

Its authors were not able to implement separate evaluations of board members' performance or the assessment of the company's economic status. Identifying the evaluation of board's performance with the evaluation of the company's performance is, unfortunately, a common error. In the foreseeable future, this will mean that the management boards of municipal companies which have found themselves in good economic standing for various reasons (considering that a large number of these companies are monopolists), will be entitled to higher salaries compared to the boards of companies which are not in such a good condition despite taking efforts and risks to improve this situation.

The introduction of provisions stipulating the measurable character of management objectives should be also construed as an error. For municipal companies, this will result in eliminating management objectives involving social issues, at least according to the by-laws of these companies. In turn, as public utility companies, municipal units should be focusing on these social issues that benefit the residents and business owners operating in the region. The dominance of economic objectives (primarily profit) at the cost of social objectives places municipal companies next to one-person State Treasury companies which base their activities solely on commercial principles and which are governed by the provisions of the Code of Commercial Companies. Some of the board resolutions do in fact contain such objectives as, e.g. increase of employee involvement or the completion of human resources policies, but a question which could be asked here is how could employee involvement be actually measured (what is expected here are original indicators), and whether the people who formulate these objectives will violate the provisions of this act, one that clearly bans the application of other objectives.

Another problematic issue concerns the introduction of the one-time payment of the variable part. The variable salary can be paid as a one-time amount after the management board's report on company operations and the financial statements for the preceding financial year have been approved, and after a specific management board member has received a general meeting of shareholder's vote of approval for their fulfillment of their responsibilities, provided that the supervisory board has claimed that the management board member has completed the management objectives and that the payable sum has been determined. It should be noted here that this applies to a municipal company whose revenues are paid by the residents of the municipality. This contradicts the basic intention of the act, which was to eliminate such one-time payments made to management board members.

5. Summary

In conclusion, management objectives formulated in this manner will not improve the quality of management of municipal companies. Such improvement would be possible when objectives considering their specific market character and their public utility would be created for municipal companies. It is therefore likely that, incorrectly formulated, these objectives will be neglected and marginalized. The worst situation would be when the presidents of municipal companies focused on profit being the ultimate objective of their activities. Furthermore, it is not possible to state when the boards which had formulated such objectives would actually realize the economic consequences of their decisions on the local communities.

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CSR IN THE ACTIVITIES OF POLISH ENTERPRISES – RESULTS OF OWN RESEARCH

Katarzyna OLEJNICZAK-SZUSTER

Częstochowa University of Technology, Faculty of Management, Institute of Enterprise Management, Częstochowa; katarzyna.olejniczak-szuster@wz.pcz.pl, ORCID: 0000-0002-7820-4746

Abstract: In the era of the global economy, conducting business is more and more often based on economic, environmental and social management aspects, and thus on the assumptions of the CSR concept. This is the concept according to which companies strive to maximise their profits while meeting, at the same time, social and environmental objectives. It can be said that CSR is currently an effective management strategy that gives enterprises confidence capital, which more and more often determines the choice of the consumer or potential partners. This study addresses the subject of CSR, and in particular its place in Polish companies. Therefore, apart from the theoretical basis, in the study were presented the conclusions from the research conducted in 2017 in comparison to 2014, on the basis of which one can notice the changing attitude of Polish enterprises towards social responsibility – CSR. The research results show that Polish enterprises are beginning to balance economic goals with activities in the field of social responsibility, including environmental responsibility, which forms the basis of CSR.

Keywords: corporate social responsibility, economic goals, social goals, environmental goals, trust.

1. Introduction

Along with economic development, surrounding expectations of organisations, enterprises and other entities operating on the market also grew. At present, it does not suffice to limit one's activity to creating value and therefore maximising the profits, but instead it must be extended by achieving social and ecological goals. For this reason, many companies take actions related to implementing the concept of social responsibility – CSR, as evidenced by the growing number of reports and good practices in this field. To confirm the above, according to A. Kolk, the scope of social notions that companies have to address has expanded to incorporate moral and ethical issues as well as social issues, including working conditions, the environment and sustainability (2016, p. 23). As claimed by A.A. Sidhoum and T. Serra (2017, p. 1) there are no universal CSR characteristics, however it is currently treated as a four-dimensional concept, including the following dimensions:

- economic, referring to the direct and indirect financial results of a company,
- environmental, related to the impact of economic activities on natural ecosystems,
- social, involving issues related to the living standards of employees, customers and future generations as well as
- the dimension of corporate governance, connected to relationships between directors.

It can be stated that CSR is widely recognised as a key notion that modern enterprises must follow in order to ensure a competitive advantage and maintain long-lasting relationships with stakeholders (Carrol, and Shabana, 2010). According to P. Kotler and N. Lee, as part of social responsibility, companies are "obligated to improve community well-being through discretionary business practices and contributions of corporate resources" (2005, p. 3). In McWilliam and Siegel's (2001) view, CSR is defined by "actions that appear to further some social good, beyond the interests of the firm and that which is required by law". In this respect, CSR is perceived as a moral imperative based on the principle of social, as well as environmental, voluntariness instead of that which is required or enforced by law. Of course, CSR must not be seen as a substitute for laws, acts or regulations. They are business activities whose scope covers the fulfillment of business objectives together with the achievement of social and environmental goals. According to M.E. Porter and M.R. Kramer, "economic and social objectives have long been seen as distinct and often competing. But this is a false dichotomy (...) companies do not function in isolation form the society around them" (2007). It is therefore those enterprises which balance economic objectives with social, also environmental, goals that become successful. It can thus be stated that CSR is no longer a supplementary activity of the company which generates nothing but costs, but rather a kind of requirement related to social expectations. Certainly, many entrepreneurs ask themselves whether responsible behaviour is possible? profitable? what impact has it got on the functioning of their company?

This study addresses the subject of CSR, in particular the determination of its place in the activities of Polish companies. In light of the above, in addition to the theoretical basis, the study presents the conclusions from research carried out between 2017 and 2018, as compared to research performed in 2014, thanks to which it will be possible to obtain answers to the research problems presented above.

2. Source material and test method

The study was divided into two main parts. The first part is a theoretical in which was used a literature discussion relating to the analysis of 15 years of CSR from the perspective of Polish enterprises. The second part of the study is empirical and its aim was to define the role of CSR in the activities of Polish enterprises. The study is of purely theoretical and empirical nature, and its aim is to define the role of CSR in activities of Polish companies. The research methodology makes use of literature relating to the analysis of 15 years of CSR from the perspective of Polish enterprise.

In addition, the purpose of the study was to find the answers on the following research problems:

– is it important for companies to be guided by ethical principles?
– whether Polish companies feel an increased need for the implementation of activities in the field of social responsibility?
– what are the reasons for the interest in CSR?
– what is the opinion of Polish companies regarding CSR?
– what CSR activities are undertaken by Polish enterprises?

It should be emphasized that the presented conclusions in the empirical part were formulated on the basis of the results of surveys conducted at the turn of 2017/2018 compared to the results of surveys conducted in the first quarter of 2014[1]. The research tool used in the survey was a questionnaire (PAPI and CAWI) addressed to 174 companies in 2014 and 101 companies between 2017 and 2018. The respondents were both managers (45.5% and 36.6% respectively) and employees in non-managerial positions (54.5% and 63.4% respectively). Most of the companies which participated in the research were from the SME sector (73% and 75.4% respectively). It should be stressed that the conducted research was completely anonymous and voluntary.

3. CSR in practice – 15 years of CSR in Poland

The emergence of CSR in Poland is usually traced back to the period of systemic transformation, when the Polish market was eager to absorb Western business standards. According to K. Kowalska, it was connected with the entry into our market of international corporations which transferred their culture and standards into their host countries to a greater or lesser extent (2015, p. 227)

In the initial phase, social responsibility was treated as a hindrance to further development and the resulting market success. Therefore, there was a complete lack of interest in CSR among the management of Polish companies until 2000. The creation of the Business Ethics Centre (Polish: Centrum Etyki Biznesu) in 1999, followed by the creation of the Responsible Business Forum (Polish: Forum Odpowiedzialnego Biznesu), had a major impact on the development of CSR in Poland. Since 2002, the Responsible Business Forum has been publishing a report titled "Responsible Business in Poland. Good practices".

[1] Results of the study were published: Olejniczak, 2014, p. 232-242 and Olejniczak, 2015, p. 159-170.

The next step in the development of CSR in Poland was 2002-2004, described as the third stage of CSR. It was during this period that public declarations of recognising CSR as the foundation of company activities became trendy. The end of 2004 was the moment of development of specific, albeit fragmentary, projects involving select and significant CSR activities of business activities, and from 2006, Polish managers tried to match CSR with other business strategies (Ocena stanu wdrażania..., 2011, p. 33). The period of quality and effectiveness assessment for CSR strategies implemented by Polish companies (2008-2010) was an important moment (Jastrzębska, 2016, p. 92). The breakthrough moment in CSR development happened in 2009, when the Prime Minister of Poland appointed an interministerial Team for Corporate Social Responsibility and an index of socially responsible companies – Respect Index – was created on the Warsaw Stock Exchange. 2011 also had a significant impact on the formation of CSR as its highlight was the "Shared Responsibility" conference, organised the Responsible Business Forum and the Polish Ministry of Economy as part of Polish Presidency of the EU Council (Ocena stanu wdrażania..., 2011, p. 222). Further years of CSR development were mostly a period of search for new ways to measure the effectiveness of actions as well as increased interest in CSR from the government administration (2012-2014), and from 2014, the combination of CSR with innovations or new phenomena in economy. At present, the question of social responsibility among Polish entrepreneurs is increasing in popularity, becoming a dominant factor in building a business development strategy. Over the past 15 years, a growing activity in the field of CSR actions could be observed, as evidenced by the growing number of what is known as good practices and CSR initiatives (Figure 1).

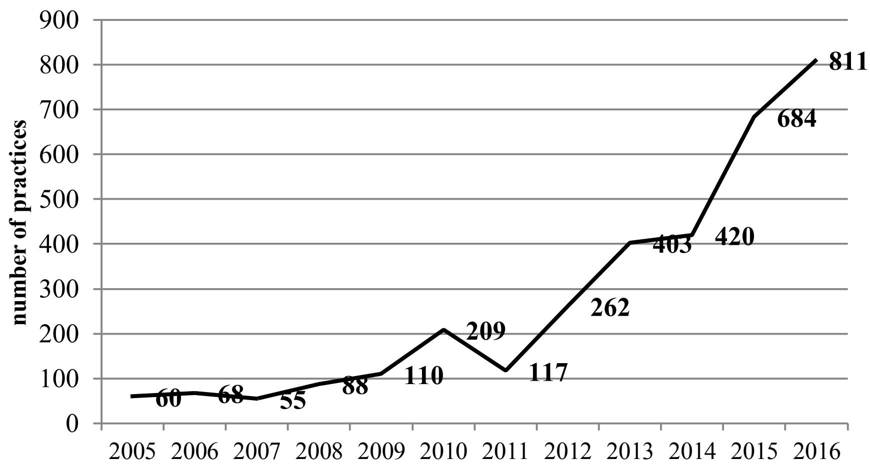

Figure 1. Good practices in Poland 2005-2016, source: http://odpowiedzialnybiznes.pl.

The results of the "CSR Managers" (pol. Menadżerowie CSR) survey conducted by the Responsible Business Forum in 2015 are very optimistic for CSR in Polish enterprise. The aim of the survey was on the one hand to gauge the achievements of CSR in Polish business over the previous 15 years, and on the other to set the prospects for development over the next 15 years. According to the survey (Menadżerowie CSR, p. 8) 81% of managers see the impact of CSR on the functioning of business as in their opinion:

- thanks to CSR, there has been a significant change in relation to the way the company is shaped, the role of ecology or meeting the needs of the society,
- CSR development would not have been possible without the involvement of all employees as well as the growing demands of stakeholders,
- appropriate education of the management staff, contributing to the correct understanding of CSR, which in turn will translate into responsible leadership, has been, and will continue to be, the stimulus for CSR development in Poland,
- the main hurdle to the development of CSR is the lack of understanding of CSR by management staff as well as failure to notice the benefits of its implementation,
- business models will change, which will be related to new consumption styles and the ever-growing social expectations; for that reason, future companies will have influence on the socio-economic development in such areas as: shaping a knowledge- and intellectual capital-based economy and building social capital,
- CSR will grow intensively in both the companies that already implement it as well as new ones.

On the basis of the above, it can be stated that the coming years will be a period of further CSR development in our country and increasing influence of CSR on the functioning of companies.

4. Study results

In the conducted comparative study, factors relating to CSR-related issues in the reality of Polish companies were analysed. For this reason, the respondents were first asked to provide their opinion on CSR in the operations of Polish companies (Figure 2), and then to determine the importance of ethical activities and CSR in Polish business (Figure 3).

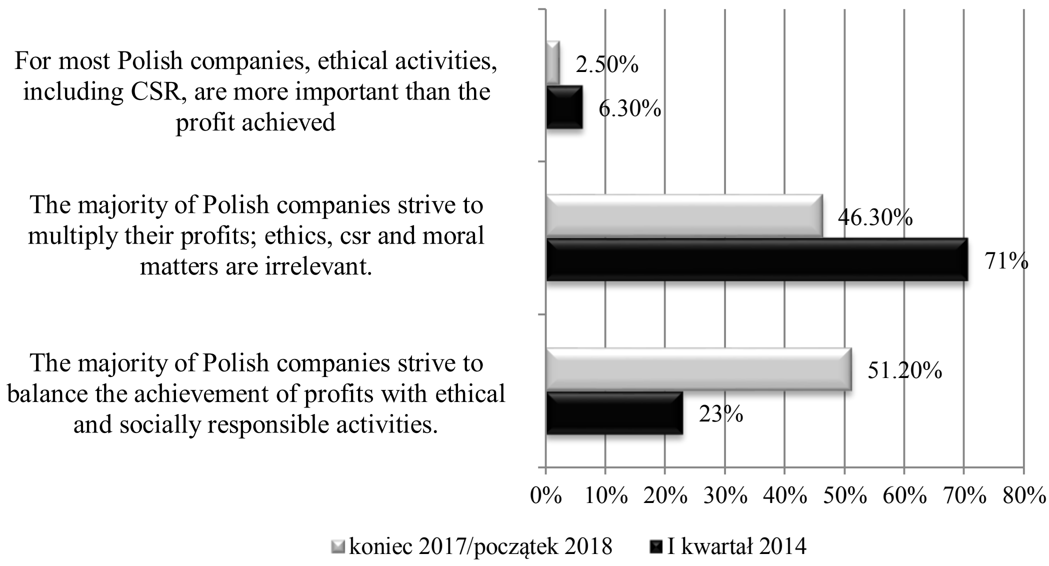

Figure 2. Operations of Polish business according to the respondents, source: own study.

As you can see (Figure 2) the respondents believe that the operations of Polish companies have undergone a change. According to 70.7% of the respondents in 2014, most Polish companies strived to maximise the economic value in their activities, ignoring the ethical and moral ramifications of their actions as well as CSR. The current survey shows that Polish companies are beginning to follow the CSR principle, i.e. balance the achievement of economic objectives with social and environmental goals (51.2% of answers). Of course, there is still a large percentage of companies which base their operations on profit, while activities for the benefit of the community or the environment reduce said profit.

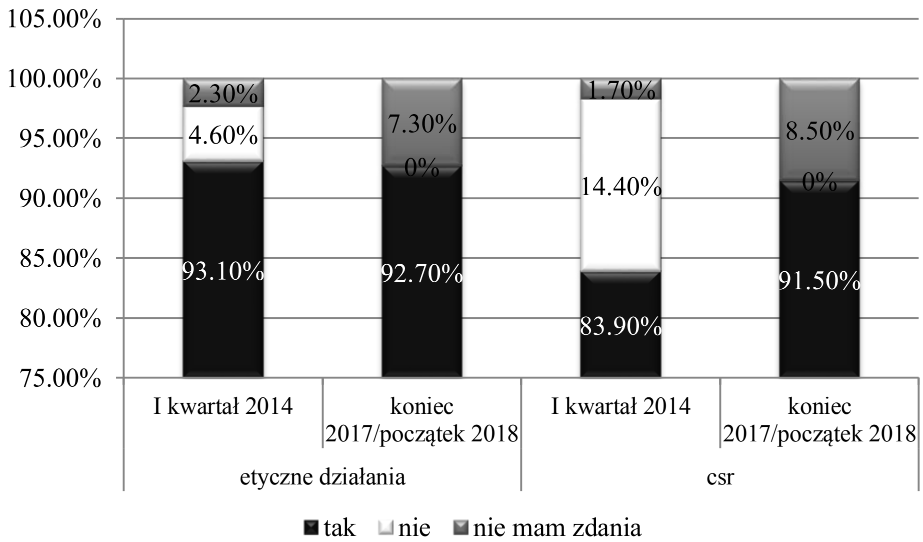

Figure 3. Importance of ethical activities and CSR in Polish business according to the respondents, source: own study.

Analysis of the research material showed that in the opinion of the respondents, Polish business is in need of the inclusion of ethical conduct rules and socio-environmental activities that fit into the scope of CSR activities. Such was the opinion of the vast majority of respondents in both the 2014 survey as well as the current one. It should be emphasised that while the opinion on the implementation of ethical conduct was at a comparable level, a significant difference can be observed in regard to CSR activities (from 83.9% to 91.5%). Therefore, it can be assumed that CSR is becoming an important element in the functioning of Polish companies. On these grounds, the respondents were asked to indicate the reasons for the companies' interest in CSR.

According to the respondents, creating a positive image, especially in crisis situations, continued to be indicated as the reason for interest in CSR issues and activities, followed by the desire to be better than the competition. A detailed distribution of answers is shown in Figure 4. The survey showed that the lack of adequate knowledge about CSR continues to be the main problem in implementation, which is also confirmed by the RBF "CRS Manager" survey.

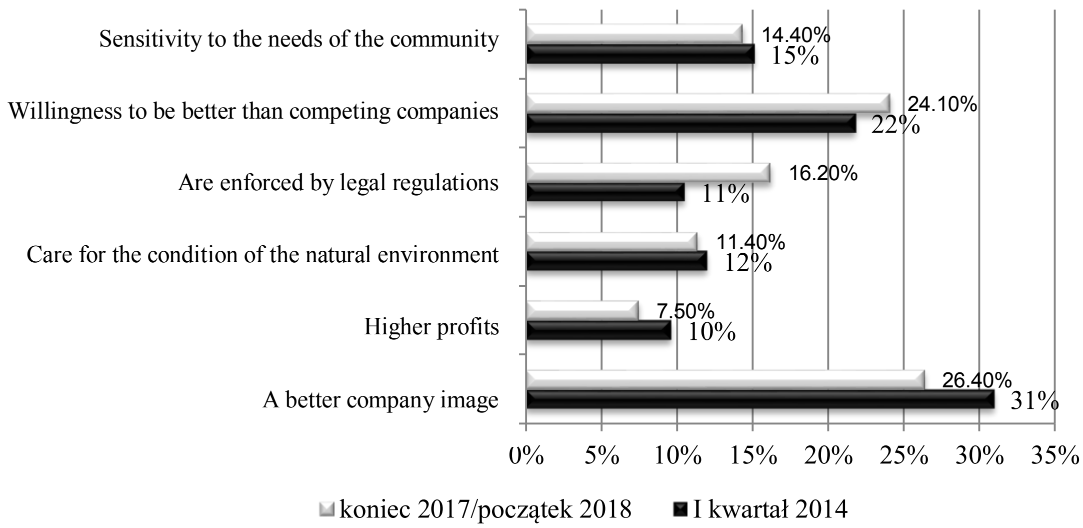

Figure 4. Reasons for interest in CSR according to the respondents, source: own study.

The obtained research results also allowed to establish the attitude of Polish companies towards CSR as well as the social responsibility actions they undertake.

Based on the data presented in Figure 5, it can be stated that there has been a slight change in the attitude of Polish companies towards social responsibility actions. Polish companies are still characterised by the attitude of social obligation. It means that they are only liable to their shareholders, at the same time accepting the obligations regulated by the law. A decrease can be observed in the number of companies characterised by the resistance attitude, i.e. an approach that does not engage in solving social problems in order to grow an attitude of social contribution and the resulting socially-sensitive enterprise which is involved in social and environmental goals.

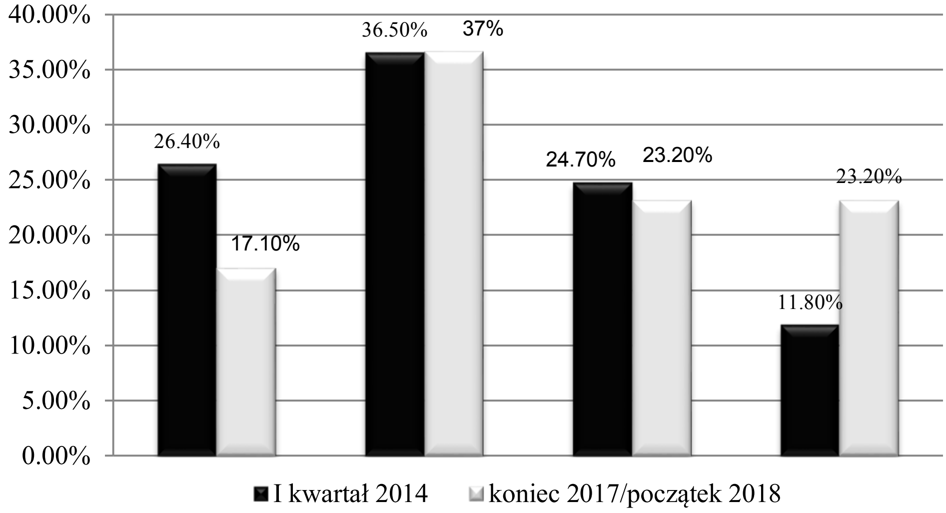

Figure 5. Attitude of Polish companies towards CSR according to the respondents, source: own study.

The analysis of the research material (Figure 6) showed that the employees remain unaware of the actions undertaken by the companies in which they work. For this reason, communication on social responsibility should be improved. To confirm the above, both in the first quarter of 2014 and at the turn of 2017, the respondents reckoned that the CSR-related information provided to them was insufficient. The fact that the number of companies in possession of a CSR strategy has increased seems to be optimistic.

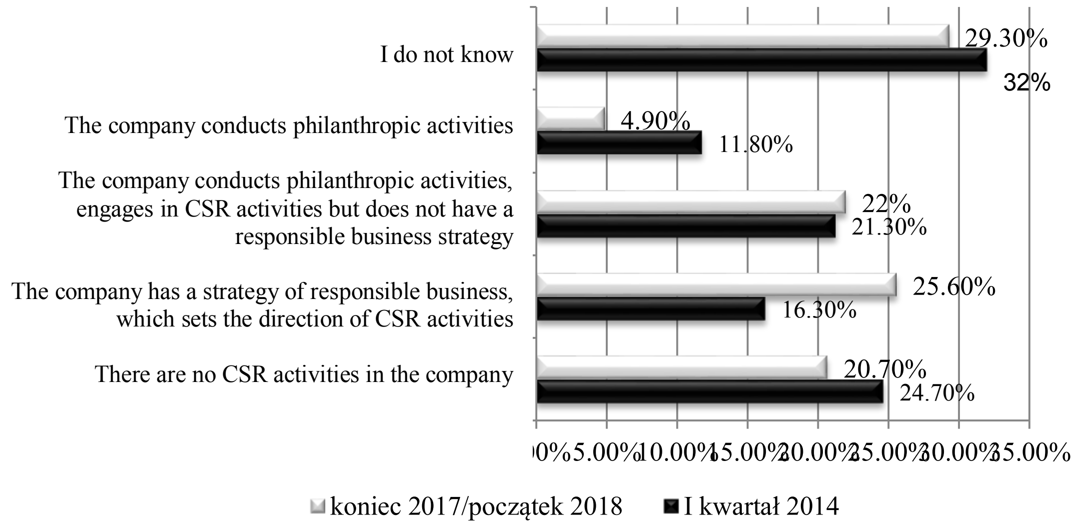

Figure 6. CSR activities of Polish companies according to the respondents, source: own study.

From the research objective point of view, it was important to determine the key social responsibility area for the implementation of social responsibility activities and to identify the impact of these activities on the functioning of the company.

Based on the research results, it can be concluded that according to the respondents, the most important area of activity is taking care of the employees (70.2% and 73.2% of answers respectively), followed by care for relationships with key stakeholders (15.7% and 18.3% respectively) and protection of the environment (9% and 6.1% respectively).

The conducted research showed that the respondents still have doubts regarding the sincerity of social responsibility activities. As it can be observed (Figure 7), the percentage of people who believe in the sincerity of CSR activities has increased insignificantly.

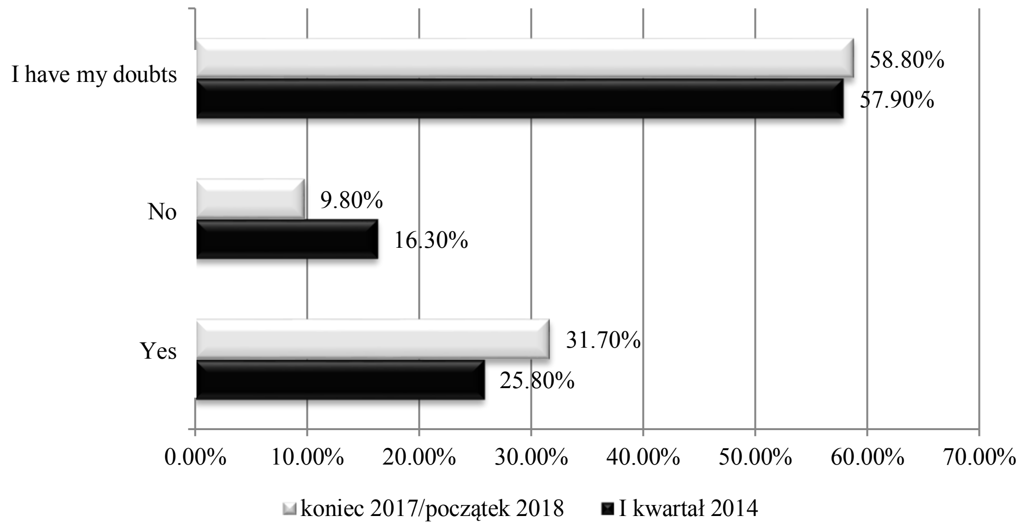

Figure 7. Sincerity of intentions in CSR activities according to the respondents, source: own study.

Despite the fact that social responsibility continues to raise doubts, the respondents deemed these actions necessary because CSR-related actions have a positive impact on the environment in which the company operates. Respondents admitted that they were definitely more trusting towards socially responsible companies.

5. Conclusions

To sum up, it should be stated that social responsibility of companies has a significant impact on **the functioning of business in Poland. Because of this, Polish companies should not** treat **CSR** as a temporary fad, but rather as a management strategy based on multidimensional relationships with a wide range of stakeholders. This finds its confirmation in the results of the comparative research (from the first quarter of 2014 compared to the end of 2017 and beginning of 2018), on the basis of which one can notice the changing attitude of Polish companies towards social responsibility – CSR. While in 2014 CSR was regarded as an additional cost, at present Polish companies are beginning to balance economic objectives with activities in the field of social responsibility, including environmental protection. It can be therefore assumed that regardless of their size or business profile, Polish companies will more and more often incorporate environmental protection and community service in their strategies, noticing the usefulness of CSR for their development. Therefore, it can be concluded that the implementation of **CSR activities can provide managers or directors with useful tools and methods of operation on the competitive global market. It could be tempting to state that social responsibility constitutes an important premise for proper business conduct, to which Polish entrepreneurs should pay particular attention.** Moreover, studies showed that:

- CSR is an increasingly exposed area of activity of Polish enterprises,
- Polish business requires the inclusion of ethical conduct principles, including CSR activities,
- there has been a change in the attitude of Polish enterprises towards CSR,
- communication regarding CSR should be changed,
- one can notice the growing number of enterprises with a CSR strategy.

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WEBSITE QUALITY ASSESSMENT VS. CONSUMER BEHAVIOURS

Anna RYBAK

Częstochowa University of Technology, Częstochowa; anna.rybak@wz.pcz.pl, ORCID: 0000-0003-3981-0273

Abstract: Subject matter literature shows that the Internet is becoming a more and more frequent place to purchase goods and services. E-customers choose to select the website of the store which arouses their confidence. The purpose of this article is to present the factors that determine the selection of the e-store for individual customers. The study used the three-point Likert scale. Conclusions concerning assessment of the quality of the website as a place to shop for young customers were drawn on its basis. The author's contribution involved identification of the factors determining the decision regarding product or service online purchase, which will facilitate better alignment of e-stores and customer needs.

Keywords: purchase decision process, website assessment.

1. Introduction

Rapid development of ICT (Information and Communication Technologies) has introduced new, more efficient channels of communication and distribution of products and/or services. In such a different environment, customer behaviours are bound to change. One of such factors is the quick access to information concerning the product or the service, the entrepreneur, the distribution channel, or security of the transaction and the after-sales service. The information enables the customer to make a carefully considered and thought over decision. Owing to ITC, customer behaviours change; from passive persons, recipients of information, they turn into active players, creators of information involved in economic, social and environmental matters. At present, the customer is not only the buyer of a product/service but, through the purchase, they want to feel emotions (positive experience) related to the purchase of the product. Contemporary customers are more demanding, diverse, pedantic and careful in making choices, and they have greater expectations which they do not articulate. Pursuing rationality in making purchase decisions, individuals gain experience and share the knowledge with friends, on Internet forums and portals.

In the era of Internet development, entrepreneurs should change their approach towards the client interpreted not only as a consumer of their goods but also as a co-creator and co-decision maker within the entire supply chain.

The article presents consumer behaviours related to the assessment of the website as a place for making online purchases.

2. Decision-making process – the traditional approach

A decision is a resolution resulting from selection. (Słownik, 1968). When making purchases, the customer makes decisions. The decision may result from a deliberate, carefully considered action being an element of a prudent decision-making system, or it may be made impulsively, or emotionally, which in turn reflects the affective system. Loewenstein et al. (Loewenstein, et al., 2015) believe that the decision-making process is affected by both affective and deliberation (reason) factors. Their research leads to the conclusion that individual behaviours in the decision-making process are a result of many direct and indirect events, experiences and emotions that affect consumer behaviours and their decisions. The virtual sales environment expects that purchase decisions will be more prudent and thoughtful as the purchase and payment path is extended with every purchase stage authorisation.

Mącik (2016) proposed an individual, personalised approach to the decision as a style characteristic of any individual. The customer's purchase decision-making style is a mental orientation characterising the consumer's approach towards purchase decision-making. We can distinguish the following styles of the customer's purchase decision-making:

1. Perfectionist – uncompromising in terms of quality of the goods purchased; willing to make the extra effort (cost or time) to get the expected quality; comparing the available options, the individual often uses search engines;
2. Brand oriented – belief that quality, and thus satisfaction with the purchase and consumption of the goods, will be assured by the product or the service brand; the individual may avoid online purchases for fear that the product should be counterfeited;
3. Novelty and fashion oriented – satisfaction with the purchase and consumption is related to the most fashionable products/services; being the first to have them is the individual's most important goal; excitement about novelties and following market trends may lead to diverse choices regarding product distribution channels;
4. Hedonistic/recreational – buying for fun or on a whim, often spontaneously; the individual gets satisfaction and pleasure from the very fact of being able to make purchase decisions; the individual spends a lot of time shopping, but not necessarily buying, and they often browse websites;

5. Quality and price oriented – satisfaction with the purchase is correlated with the quality and the price of the goods/services; the individual tends to maximise 'the value for money', and they do not avoid online shopping;
6. Impulsive / Careless – the purchase decision is unreflective; the individual does not plan the purchase, they act emotionally; the client purchases from e-stores, but they often withdraw from the purchase contract (frequent returns of the goods ordered);
7. Routine, brand loyalty oriented – brand or store loyalty resulting from knowledge, experience and/or convenience enables the individual to make satisfactory purchases; the individual does not avoid various distribution channels;
8. Flooded by information – the customer gets satisfaction with the purchase from the quick purchase of products/services meeting their minimum requirements; the individual does not like to make choices, and making purchase decisions tires and irritates them; online shopping is satisfactory (not tiresome) to them;
9. Compulsive – the individual treats shopping as an inner compulsion, a form of restoring self-control over their life, or a form of reducing their anxiety; the customer often improves their mood through spending money (a hedonistic attitude);
10. Eco-sensitive – the individual makes careful purchase decisions oriented at pro-ecological and pro-social behaviours of manufacturers and sellers; satisfaction with the purchase and consumption results from the manufacturer and the customer's social responsibility; the customer gets information from the Internet, and they often buy products in the digital world.

The presented decision-making styles provide an overview of the characteristic features of consumer behaviours in various distribution channels, while the course of the changes constitutes the purchase decision process. Rudnicki (2012) divided the process into five phases of making purchase decisions concerning the selection and the purchase of the best version of the product or the service by the prudent customer. The process is made up of phases of varying duration, namely feeling the need, searching for alternatives, evaluating the alternatives, making the purchase decision, and the feeling following the purchase. Each of these phases may be omitted, or the customer may cancel the purchase or to decide not to satisfy their need at any stage. The process is always accompanied by decision-making. The decision-making process is formed in advance, prior to the need phase, as awareness of the existence of the need leads to deciding whether to satisfy it or to resign from it. While recognising the need, there arises the awareness of its existence and the interest in the possibility of meeting it. When searching for alternatives, the individual collects information by associating facts and recollecting the ways of resolving similar problems. Having the knowledge and the experience, the consumer may begin evaluation of similar solutions. Implementation of the purchase decision makes the consumer decide on the problem solution they find satisfactory. The final stage of the decision-making process is the evaluation of the level of satisfaction with the choice made and the fact that the need has been addressed (Krzepicka, 2016). As satisfaction with the choice made is a factor affecting implementation of activities related to further purchase decisions, one should investigate two separate processes, namely and purchase process and the consumption process. The subject matter literature carefully distinguishes the two. The purchase decision-making process relates to the perception of the product/service (and benefits from them), the processing of the information, the evaluation and the actual making of the purchase decision. On the other hand, consumption is related to the use of goods and services, and to the experiences associated with it. Affects accompanying the individual making purchase decisions may determine the very fact of entry into possession of a given object. Consumption and resulting emotions follow the purchase, so they will trigger different attitudes and behaviours. (Gaczek, 2015) However, the satisfaction and the emotions accompanying these two processes intermingle and complement each other, giving the individual a full sense of contentment, satisfaction or disappointment with the purchase and consumption.

Website assessment by individual customers has been the subject matter of numerous studies and scientific deliberations. With the opening of the e-market, enterprises incorporated this sales channel as an additional way to distribute and sell their products and services (Barwise and Farley, 2005). However, not all websites effectively encourage online purchases.

The subject matter literature analyses the website quality in terms of:

1. the ease of reaching the customer with the information, and the ease of website selection, confidence and loyalty (usefulness of the information from intelligent databases, the so-called Pay-as-you-go) (Srinivasan, and Arya, 2013; Gao, and Liu, 2014; Curry et. al., 2018).
2. The industry in which the enterprise operates (e.g. e-banks, airlines, health care, for instance Bauer et. al. 2005; Chmielarz, Zborowski, 2016).
3. Online safety and dangerous redirections (Nilashi et al., 2015; Rodda et al., 2017, 2018).

Chiou et al. (Chiou et al., 2010, 2011) proposed a three-level strategic framework for assessing the quality of the website, namely the level of information – customer satisfaction with the information provided on the website; the level of agreement – satisfaction with the online improvements; the settlement level – satisfaction with the payment and delivery forms. Parasuraman et al. (Parasuraman, et al., 2005 and, inter alia, Hu, 2009, and Yang Fang, 2004) carried out a study of the service quality scale (E-SERVQUAL) covering the effectiveness of reaching the customer with the information, the system availability, the service provision, and the transaction security (privacy) as the characteristic features which the organisation should measure to assess changes in customer behaviours.

Most of the methods used to assess website quality are focused on certain points, based on the determination of a set of assessment criteria according to a fixed scale.

This article also uses Likert scale.

3. Research methodology

The study covered a group of 10 young consumers who responded to a survey posted on an e-learning platform. This approach made it possible to select people using computers (no technological barriers) and making online purchases (experience and knowledge make it possible to assess a website in terms of its reliability and usefulness to the e-customer). Posting the survey on the platform made it possible to obtain answers to the questions in conditions in which the respondents most frequently made their online purchase decisions.

Among others, the survey contained questions regarding purchasing preferences, purchasing frequency, and the amount spent annually on e-commerce. Then, the respondents answered questions regarding website assessment in terms of its functionality and usefulness in the purchase decision-making process. Seven indicators measured with the three-point Likert scale were allowed for, and they were considered as reflexive features. Further questions regarded verification of online payment security.

70% of the research group were women aged up to 24 (80%) who did used e-commerce irregularly (50%). Most frequently, the respondents bought things to cater for their personal needs (60%), followed by clothes and shoes (20%), cosmetics (10%), automated machinery and devices (10%). The annual amount spent online, without paying bills, is lower than PLN 1,000.00 (90%), and only 10% of the respondents spent up to PLN 2,000.00 in 2016.

The results were influenced by the fact that the respondents were young people without regular income (largely dependent on their parents), so purchase decisions were financially limited.

4. Indicators affecting website assessment by young consumers – research results

According to Gemius, 79% of citizens aged 7 to 79 use the Internet in Poland. People making online purchases constitute 54% of all the Internet users. Statistically, the largest group of people using the web to do shopping are people aged 15-49 (87%), with secondary education (47%), living in the city (74%), whose household financial situation is good (51%). The greater part of all Poles (53%) shop on Polish websites, but only 16% of the Internet users choose to do their shopping on foreign websites. Allegro is the most recognisable e-services platform (71%), followed by OLX (32%) and Zalando (13%). Among foreign e-services platforms, it is Aliexpress, spontaneously recognised by 26% of those who shopped on foreign websites within the last 6 months. The respondents declared that the reason for their doing online shopping were the prices offered by e-stores (58%), lower than those offered by traditional stores, and low costs of delivery (62%). The factors deterring from online shopping included long delivery times (38%), high costs of delivery (37%), and intrusive advertising after seeing the product (36%).

Surveys carried out by Gemius provide a comprehensive picture of the e-commerce development in Poland; consequently, research regarding website assessment in terms of their reliability and credibility of information affecting purchase decisions made by e-customers appears to be reasonable. The purpose of this study was to analyse the indicators of the website assessment during online shopping by young individual customers. Indicators to assess websites were adopted based on the studies carried out by Oliveira et al. (2017).

Table 1.
Characteristics of website assessment indicators, by respondent gender

I choose a website when:			
CATEGORIES	YES	I HAVE NO OPINION	NO
Everything is easy to understand on this site.			
Women	100%		
Men	100%		
This site is easy to use, even if used for the first time.			
Women	100%		
Men	100%		
It's easy to find the information you need on this site.			
Women	87.5%	12.5%	
Men	66.7%	33.3%	
The structure and the content of the site are easy to understand.			
Women	100%		
Men	66.7%		33.3%
It's easy to navigate on this site.			
Women	100%		
Men	100%		
The arrangement of the content of this site makes it easier for me to know where I am.			
Women	87.5%	12.5%	
Men	66.7%		33.3%
When I navigate on this site, I feel I control what I can do.			
Women	87.5%	12.5%	
Men	66.7%	33.3%	

The table contains data deriving from the respondents' answers. The sequence of the statements is consistent with the sequence in the survey.

Source: author's own studies and elaboration.

The respondents (Table 1) consistently claimed (both men and women) that the site needed to be understandable, simple to use and easy to navigate for them to make their purchase decisions. These statements have a decisive impact on their feeling of satisfaction with the purchases. When doing their shopping, young customers do not look for intellectual emotions; they want to order a product easily and nicely, without having to look for it. They abstain from purchase decisions when the website is very complex.

The respondents were not certain whether easy access to information and control over what they can do on a website constituted a factor that facilitated their online purchase decisions. Awareness of purchases in the digital space does not raise young consumers' concerns about navigating websites; the author believes that those factors will have a greater influence on the decisions made by older people who may feel lost in the virtual space of the Internet. E-store customers obtain information about products or services from other sources, for instance using search engines, or comparing products with one another. E-store websites are a source of selection of already defined products, and information on them is not searched by Internet users. Awareness of choice is devoid of a wish to seek knowledge about the product on the store website.

The most surprising are the answers given by the male respondents, stating that the fact that the structure and the content of the website are easy to understand, and that the layout of the website makes it easier to know where the potential customer is, has no influence on their purchase decisions. The foregoing makes it possible to assume that e-store customers do not pay much attention to tracking their own actions on e-store websites, but the decisions they make result in a quick order. These issues complement earlier deliberations that the choice and the decision are made beforehand, and the purchase should be simple and easy.

It seems reasonable to claim that when making purchase decisions, young e-customers pay attention to the ease of navigation and the clarity of websites without tracking or controlling their exact location on the website.

Financial transaction security is an important indicator of the website assessment. Awareness of the risk associated with cyber crime regards, among others, online transaction security. Young consumers should have the knowledge and the experience related to e-commerce financial transaction security. This study attempts to answer the question to what kind of safeguards customers pay attention when doing online shopping. The results of the study have been shown in two categories, broken down by gender and by payment decisions (whether the e-customer always pays when ordering or not). Such an approach seems justified because of the spontaneity of the payment decision, whether it is thought over and considered (if I benefit from it), or if it is spontaneous (I always pay online), or because of the approach towards risk (for instance, Hallikainen and Laukkanen believe men trust e-stores more than women do).

Table 2.
Online payment security verification, by gender

Before paying, I verify the security			
Categories	**Always**	**Sometimes**	**Rarely**
On the store website			
Women	28%	28%	44%
Men	0%	0%	0%
Redirection to the bank's website			
Women	42%	42%	26%
Men	100%	0%	0%

Source: author's own studies and elaboration.

The study carried out (Table 2) shows that when doing online shopping, the respondents always verify redirection to the bank's website (100% of men and 42% of women). Women verify security on the store website and redirection to the bank's website. Such behaviours make it possible to claim women are more suspicious and prudent when carrying out online transactions.

Table 3.
Approach towards online payments

I pay online	Always	If I benefit from it
Women	12.50%	87.50%
Men	50%	50%

Source: author's own studies and elaboration.

When assessing websites, women are more cautious about financial transactions than men, which is also reflected in Table 3. Only 12.5% women pay online, but as many as 50% of men do.

Table 4.
Online payment security verification, by answer

	Before paying, I verify the security		
I pay online	Always	Sometimes	Rarely
	On the store website		
Always	50%	0%	0%
If I benefit from it	0%	12.5%	25%
	Redirection to the bank's website		
Always	50%	50%	0%
If I benefit from it	62.5%	25%	0%

Source: author's own studies and elaboration.

Further studies regarded customers who always or sometimes (if they benefitted from it) paid online when doing online shopping (Table 4). When making online payments while shopping, e-customers 'always' verify the redirection to the bank's website (50% of those always paying online), with 62.5% of those paying online if they benefit from it. E-store website safeguards are verified by 50% of those always paying online and 12.5% of those paying online if they benefit from it. What they verify the most frequently is the redirection to the bank's website (100% of those always paying online and 82.5% of those paying online if they benefit from it).

When comparing the studies, one may conclude that women are more prudent and cautious about financial transactions carried out online. Female e-customers verify e-store website safeguards and redirections to banks' websites more frequently. In the case of men, secure redirection to the bank's website is a sufficient argument proving financial transaction security.

Conclusions

When assessing websites, customers decide whether the place to shop is attractive to them or not. The choices they make are relevant to the development of e-commerce in Poland. The study aimed to distinguish the indicators which affect the assessment of websites as places to shop. The study indicates that young customers, when making their choices, pay attention to convenience, namely the ease of navigation on the website, understanding of the content available, and the transaction clarity. E-customers are interested in the ability to purchase quickly, without complicated selections and confirmations at further levels of the transaction process. Verification of the money transfer security primarily on the bank's website also supports the thesis that time is the most important factor in the online purchase decision-making process.

Attention is also paid to the fact that women are more cautious when making decisions regarding online payments. Women verify the safeguards on both the e-store website and the bank's website.

This paper does not cover all the issues regarding e-store website assessment. It presents several indicators which may affect individual customers' purchase decisions. A small survey group does not permit generalisation of conclusions, but it does make it possible to indicate the results of consumer behaviours in the virtual space. Future research should more extensively explore certain phenomena related to individual customers' purchase decisions (meaning the decision-making style and the e-commerce purchase decision-making process).

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USE OF PESTEL ANALYSIS FOR ASSESSING THE SITUATION OF POLISH TRANSPORT ENTERPRISES (PART II)

Monika STRZELCZYK[1*], Monika CHŁĄD[2]

[1] Częstochowa University of Technology, Częstochowa; monika.strzelczyk@wz.pcz.pl,
ORCID: 0000-0002-8066-2869

[2] Częstochowa University of Technology, Częstochowa, monika.chlad@wz.pcz.pl,
ORCID: 0000-0002-9925-6000

* Correspondence author

Abstract: This article constitutes the second of three parts of a publication titled: "Use of PESTEL analysis for assessing the situation of Polish transport enterprises". The aim of this article is to present the influence (positive or negative) which macro-environmental factors specified in the first part of the work have on the activities of studied enterprises. The defined factors will serve as a basis for creating a PESTEL analysis of the transport market in Poland. This analysis will be presented in the third part.

Keywords: strategic management, strategic analysis, macro-environment, transport company.

1. Introduction

National entities perform important functions in the economy. First of all, as a result of manufacturing, services and commerce processes, it is possible to provide products and/or services (supply function) that satisfy the needs of the society. Efficient and effective functioning of companies in the market is dependent on many factors. These factors can stimulate or inhibit the operations and development of an organisation. This is the reason why it is so important to constantly monitor the closer and wider environment of the company in order to adapt its activities to changing conditions. This observation can be based on an analysis of the environment. An analysis which takes into account changes of these factors in the long-term perspective has been known in the literature as strategic analysis. Multiple methods of strategic exist, one of which is the PESTEL analysis, here used to assess the situation of Polish transport enterprises. The basis for creating the analysis lies in discovering the environmental factors which determine the activities of enterprises. Generally speaking, these factors can be divided into two basic groups. The first group includes these factors that affect the operations of the company in the macro scale (wider environment), while the other group functions in the micro scale (closer environment). During the preparation of a PESTEL analysis, factors which originate from the wider environment and nevertheless have a big impact on the functioning and development of a company are of particular importance.

2. Research method

The first part of the article defines the elements of macro-environment that affect the operations of enterprises. Having analysed publications which describe the issues of strategic management (Pierścionek 1998; Sołtysik 2000; Stabryła 2000; Krupski 2003; Gierszewska, and Romanowska 2003; Obłój 2007; Romanowska, and Krupski 2010; Kozioł 2010; Lichtarski 2013; Nowodziński 2013; Assylbekova 2016), the Authors listed all factors originating from the wider environment of an organisation which affect the operations of modern enterprises, including those companies which provide cargo transport services. Among them were such factors as: economic, political and legal, demographic, socio-cultural, technological and natural.

The main goal for the Authors in the second part of the article is to examine whether the previously defined macro-environmental factors have a positive or negative impact on the activity of transport companies. Own study was carried out in order to accomplish the main objective. The research tool was a *desk research* analysis. Thanks to the analysis of secondary data, it was possible to determine the impact of macro-environmental factors on enterprises operating in the transport services market. Results of this analysis are presented below.

3. Analysis of the impact of the macro-environment on Polish transport companies

According to the Authors, all macro-environmental factors affect, to a greater or lesser extent, the activities of transport companies. Economic factors will be the first factors analysed in the article.

3.1. Impact of economic factors on the situation in the Polish transport services market

Economic factors of the macro-environment include: economic growth rate, inflation rate, interest rates, unemployment rate, currency exchange rates and their stability. All the factors listed above affect the functioning of the companies in question. Table 1 lists economical factors and the type of impact they have on transport companies, described by the following terms: "positive" (if the factor is stimulating) and "negative" (if the factor is non-stimulating).

Table 1.
Economic factors and their impact on the activity of road hauliers (transport of goods)

List of factors	Impact of factors on organisations
Rate of economic growth	positive
Inflation rate	negative
Interest rates	positive
Unemployment rate	positive
Currency exchange rates	negative
Currency stability	negative

Note: study based on own research.

The first economic factor: economic growth rate, is the percentage ratio of the real Gross Domestic Product (GDP) growth to its value in the base period (Black, 2011). Changes occurring in annual periods indicate the rate of economic growth. In 2016 in Poland, a slowdown in economic growth could be observed. Despite this fact, according to the Polish Central Statistical Office (pol. Główny Urząd Statystyczny – GUS), the real gross domestic product in 2016 was 2.8% higher compared to 2015. In 2017, economic growth gradually accelerated from quarter to quarter. In the third quarter, the seasonally adjusted GDP (in constant 2010 prices) increased in real terms by 1.1% in comparison with the second quarter and was higher than the year before by 5.0% (Central Statistical Office, 14.11.2017). It can be therefore concluded that the rate of economic growth is accelerating. The economic growth in Poland in 2017 is expected to amount to 3.6% and be 0.9 percent points higher than in 2016. In addition, the real GDP growth rate will increase gradually and amount to 3.8% in 2018 and 3.9% each in 2019 and 2020 (Polish Council of Ministers [Rada Ministrów], 25.04.2017).

Undoubtedly, this situation creates comfortable conditions for running a business. The rate of unemployment seems to be equally optimistic – it is at its lowest level in 26 years. However, the increasing rate of economic growth and the decrease in unemployment rate may contribute to inflation growth. According to the National Bank of Poland, the inflation rate CPI (Consumer Price Index) amounted to -0.6% in 2016. The phenomenon of so-called "deflation" occurred. In the following year, the same index reached 1.9%. Prognoses for the coming years do not seem equally optimistic. According to the November projection, the CPI will amount to 2.3% in 2018 to eventually reach the rate of 2.9% in 2019 (National Bank of Poland, 11.2017; National Bank of Poland, 13.11.2017). Increasing inflation will have a negative impact on the functioning of enterprises. Its effects may include an increase in consumer goods prices, resulting in lower demand for such goods. In turn, lower demand for consumer goods may cause a decrease in demand for transport services.

However, the interest rates, which remain at an all-time low, are advantageous to entrepreneurs providing cargo transport services (National Bank of Poland, 06.2017). In December 2017 The Monetary Policy Council of Poland (pol. Rada Polityki Pieniężnej) stated that the reference rate in Poland will remain at 1.50% (National Bank of Poland, Basic rates...). This rate has remained unchanged since 2015. Economists predict that interest rates will remain at their current level until the end of 2018. Low interest rates encourage taking loans. In transport companies, these loans can be invested in infrastructure, which will enable even faster development of transport.

However, haulers must take into account the risk associated with changes in currency exchange rates. In November and December of 2016, the Polish zloty witnessed depreciation. According to the National Bank of Poland, the zloty was weakened due to the occurrence of global factors. As a consequence, exchange-rate volatility increased dramatically. After this period, the rate zloty gradually increased against the euro just to continue its downward trend in the following months. This strongest impact of further decrease in the national currency's international value will be observed by companies providing international transport services. It can therefore be concluded that fluctuations in currency exchange rates undoubtedly increase the risk factor of activities performed by transport companies. The fact that these changes practically cannot be predicted also contributes to their disadvantage.

To sum up, economic factors of the macro-environment are characterised by high variability over time. At the same time, they exhibit a strong influence on the operations of business entities. Therefore, it is necessary to monitor them constantly. This will enable better planning of activities in transport companies and reduce the risk associated with running a business.

3.2. Political and legal factors and their impact on the functioning of transport enterprises

The next group of analysed macro-environmental factors are political and legal factors. They are listed in Table 2.

Table 2.
Political and legal factors and their impact on the activity of road hauliers (transport of goods)

List of factors	Impact of factors on organisations
Access to the market	negative
Tax rules	negative
Labour law	negative
Technical standards	positive

Note: study based on own research.

In terms of cargo delivery, the functioning of Polish road transport is subject to regulation through such legal instruments as acts, regulations and conventions (Bentkowska-Senator, and Kordel, 2016, p. 505). The laws, regulations and conventions regulate in the first place such issues as: access to the profession of hauler, functioning of transport companies within the territory of the European Union Member States, cabotage services, norms concerning driving time and driver labour, etc. However, in practice, many of the implemented regulations do not correspond with economic reality, thus making them impossible to apply. Moreover, European and national regulations often differ from each other, which means that entrepreneurs feel lost and unsure as to exactly which ones should be used. Legal instruments are usually too complex for entrepreneurs and prove difficult to interpret. In addition, according to a report prepared by the Polish Ministry of Development (Polish: Ministerstwo Rozwoju), Polish entrepreneurs express a negative opinion of the tax law. The entities surveyed also admitted that the labour law was also a factor that negatively impacted the functioning of enterprises (Polish Ministry of Development, 10.2016). To sum up, the factors related to obtaining access to the transport services market, the tax law and the Polish labour law undoubtedly make it difficult for entrepreneurs to run a business.

Considering aspects of transport enterprise activities through the prism of technical standards, it can be concluded that they have a positive impact on their functioning. According to the definition provided by the PWN dictionary, a technical standard is "a document specifying the properties or quantitative requirements (e.g. dimensions) that a given object should reflect" (SJP PWN). The scope of regulations contained in technical standards for transport is widely applicable. The developed technical standards relate to such things as:

– requirements which must be met by transport vehicles (especially those which transport food and dangerous goods),
– the method of packaging and labelling of transported goods,
– requirements regarding equipment for relocating and lifting the loads,
– regulations defining the method of placing and securing the loads on the means of transport.

Application of technical standards that guarantee the correctness of performed processes ensures, among other things, safety in transport. In addition, national standards developed on the basis of international standards guarantee the correct implementation of transport operation both at home and abroad. Their application allows us to ensure that the customers receive transport services of appropriate quality.

The political and legal environment is not advantageous to running a freight transport service company. Technical standards, which enable the improvement of transport enterprise operations, are the only positive sign of the introduced regulations.

3.3. Socio-demographic impact on the functioning of Polish transport companies

According to the Authors, not all socio-demographic factors presented in the first part of the article affect the activities of Polish transport companies. Those relevant to the subject at hand are detailed in Table 3.

Table 3.
Socio-demographic factors and their impact on the activity of road hauliers (transport of goods)

List of factors	Impact of factors on organisations
lifestyle	positive
international migration: – positive balance; – negative balance.	 positive negative
internal migrations	neutral

Note: study based on own research.

Currently, an ever-increasing pace of life can be observed. In order to provide for themselves and their families, Poles are undertaking more and more work. In 2016, a clear improvement occurred in the material situation for all socio-economic groups of households in Poland (Polish Central Statistical Office [GUS], 02.06.2017). A certain paradox emerged as a result. A society which is in possession of sufficient financial resources does not have time for shopping outings. The occurrence of this phenomenon contributed to an increase in demand for transport services. There are many sources of such demand. One of the sources is the implementation of transport services providing delivery of goods purchased in super- and hypermarkets to any specified address. Another source is connected to operation of online shops and the necessity to deliver the ordered products directly or indirectly to their final consumers. The development of the Internet was conducive to the occurrence of this phenomenon. Thanks to the development of Internet technology, it is possible to shop without leaving one's home at any given time. As a result, as many as 13 million people (45% of the total population) aged 16 to 74 made online purchases at least once in 12 months in 2017 (CSO [GUS], 14.12.2017), which is 3.1% more than in the preceding year (CSO [GUS], 09.12.2016). This without a doubt led to an increase in the number of transports, especially those that the literature describes as "last mile" delivery (Gajewska 2009; Chodak and Łęczek 2014; Amodeo et al., 2015; Faccio and Gamberi 2015; Iwan et al., 2016; Smyk 2017). It is assumed that the importance of e-commerce will continue to increase in the coming years, resulting in an increase in demand for transport services.

The improvement of the material situation of the society also contributed to an increase in consumption. According to the data published by the Central Statistical Office (GUS), total consumption in the third quarter of 2016 amounted to 4.1% and increased by 1.2% in real terms (CSO [GUS], 30.11.2016). In the first quarter of 2017, total consumption slightly decreased (to 3.9%), just to increase back to 4.3% in the second quarter (CSO [GUS], 31.08.2017). It can be thus concluded that the increase in consumption definitely contributed to the rise in demand for transport services connected to both enterprise supply and distribution of goods among customers. As a result, in the third quarter of 2017, an increase of 10% in gross value added within transport and storage was observed in comparison with the corresponding quarter of 2016 (CSO [GUS], 30.11.2016). It is a very good score.

Migration of people may also affect the functioning of transport enterprises. Internal migrations are defined as a "change of place of residence (permanent or temporary) in the territory of Poland, related to crossing the administrative border of a gmina, including – in case of urban-rural gminas – changes of the place of residence within a gmina, i.e. from rural to urban areas and vice versa" (CSO [GUS], Terms used in official statistics). According to the authors, internal migrations are neutral to the situation of Polish transport companies. The case is different for international migration. Internal migration involves both migrating abroad (emigration) and arriving in the country to settle (permanent residence) or for temporary stay (immigration) (CSO [GUS], Terms used in official statistics). In 2010-2014, a negative balance of international migration was recorded in each consecutive year. The situation changed in 2016. It was only then that a positive migration balance was observed (it amounted to 1.5 thousand people (CSO [GUS], 30.10.2017)), i.e. more people came to Poland than left it. This situation may be caused by tensions occurring abroad. In this case, contrary to a negative international migration balance, it is possible for an greater demand for products, goods or services, to occur, which will result in an increased demand for transport services fulfilled by Polish transport companies.

Socio-demographic factors influence the operations of hauliers in multiple ways which can be positive, negative or neutral. It should be noted that according to the Authors of this article, socio-demographic factors are closely connected to economic as well as political and legal factors of the macro-environment. Shifts in one of these areas lead to changes in the society. In turn, these changes shape the reality in which Polish transport companies operate.

3.4. Impact of technological factors on the development of Polish transport enterprises

The progress of civilisation influenced the initiation of revolutionary changes in technology. Innovative solutions in various areas of human activity are being developed all over the world. One of them is transport itself. According to the Authors, technological factors are of particular importance for ensuring efficient and effective operation of carriers. Presented in the table below is the type of influence by discussed factors.

Table 4.
Technological factors and their impact on the activity of road hauliers (transport of goods)

List of factors	Impact of factors on organisations
new technologies	positive
pace of changes occurring in technology	positive
attitude towards innovations	negative
new technologies	positive

Note: study based on own research.

Without a doubt, the development of modern technologies has an impact on the evolution of transport services. They allow for better organisation of processes in transport companies. The pace of changes occurring in technology is significant. In most cases, implementing innovative solutions involves significant costs and necessary reorganisation of processes.

However, to maintain a competitive position on the market, entrepreneurs are forced to take risks and introduce changes in these areas.

According to research, the innovativeness of Polish enterprises deviates from European standards. Poland can be found far down the international innovation rankings. According to an European report titled *European Innovation Scoreboard* 2017, Poland belongs to the group of moderate innovators: in 2010, the total innovation index was 52.8 points. As time went on, the score was gradually increasing. In 2016, it amounted to 54.8 points, placing Poland on 25th position among the Member States (European Commission, 16.06.2017).

A slight improvement in the field of Polish innovation can therefore be noted. In fact, 2012 can be considered the year when this disadvantageous trend was reverted. At that time, the share of innovative enterprises in both the industrial sector and services increased. In service companies contrasted with industry companies, an increased share of funds spent towards software purchases (10.2% compared with 1.7%) and marketing of innovative products and services (17.9% compared with 2.2%). However, it must be stressed that this beneficial trend in the industry has continued from that moment on, while the index of innovation in service companies is systematically decreasing (Polish Ministry of Development [Ministerstwo Rozwoju], 10.2016). In summary, it can be concluded that managers recognise the need for applying innovative solutions in production, service and trade enterprises. Nevertheless, the amount of funds necessary to engage in this process, and the insecurity about the changes introduced, hinders the development of innovation in Polish enterprises.

3.5. Functioning of transport companies and the natural macro-environmental factors

The environmental (natural) factors listed in Table 5 influence the functioning of enterprises in the transport market to a greater or lesser degree. According to the Authors, the most significant factors include: the availability of natural resources, the cost of energy and the rate of its increase. Factors related to environmental protection are also important.

Table 5.
Natural factors and their impact on the activity of road hauliers (transport of goods)

List of factors	Impact of factors on organisations
Availability of natural resources	neutral
Natural environment requirements and protection standards	negative
Costs of energy and the rate of their fluctuations	negative

Note: study based on own research.

Environmental pollution is a major problem occurring during the transport of goods. Published data clearly indicate that within the European Union, transport is responsible for generating 28% of the total CO_2 emission. It should be emphasised that within that amount, as much as 84% is generated by road transport (Sivets, and Jacyna, 2014, p. 137). This led the issues related to environmental protection to increase in importance over time, becoming particularly important for ensuring a sustainable development of the transport sector (Nowakowska-Grunt, and Strzelczyk, 2014; Kadłubek et al. 2016; Nowakowska-Grunt, and Strzelczyk, 2016). In 2006, certain solutions were proposed to allow transport to become more environmentally friendly. Special attention was paid to the need to limit the adverse impact of transport on energy consumption and the environment (European Comission, 11.2014). Solutions aimed at reducing environmental problems include regulations on exhaust emission, promotion of alternative sources of energy to fuel transport, and propagation of means of transport (incl. railway and water transport) that allow to reduce fuel consumption (Sivets, and Jacyna, 2014, p. 137).

One of the options aimed at solving the problem was to use alternative power systems in the vehicles. The most popular among them are LPG (Liquified Petroleum Gas (Buczaj, 2006, p. 14)) and CNG (Compressed Natural Gas (Buczaj, 2006, p.14)) installations. Currently, another natural gas deposit has been discovered in Poland. This is good news for entrepreneurs who want to make use of more eco-friendly forms of vehicle fuel. Nevertheless, as emphasised by M. Wysokiński and A. Gromada, it is impossible in Poland to extract an amount of natural gas sufficient to meet the demand and ensure continuous delivery to all users, especially that consumption of this resource is increasing year by year. For this reason, Poland remains dependent on natural gas supplies from abroad. Currently, the largest supplier of natural gas is Russia (Wysokinski, and Gromada, 2016, pp. 103, 106-107). In addition, Poland has signed gas supply agreements with the USA and Quatar.

Reducing the harmful impact of transport on the natural environment will also be made possible by introducing the European exhaust emission standards. However, the application of these standards has become problematic for carriers. On 1 July, 2011, under the "user pays" Directive 1999/62/EC (European Parliament and of the Council, 17.06.1999) the Electronic Toll Collection System came into force in Poland. Its introduction became disadvantageous from the point of view of carriers in possession of outdated fleets that did not meet the strict emission standards. As a consequence, the costs of business activity increased significantly, especially in terms of road tolls and environmental fees (Sivets, and Jacyna, 2014, pp. 139, 144).

In addition to the aforementioned fees, fuel costs constitute a significant share of transport companies' operating costs (ca. 40% of the total). According to S. Kot, it is those large transport companies that are most affected by fuel price fluctuations on the market (Kot, 2015, p. 393). An important role in the shaping of these prices is played by excise duty rates. Recently, politicians have been seeking to raise this tax. These efforts have been fruitless so far, which does not imply that the problem will not reoccur in the near future. Increasing the excise duty will lead to a rise in fuel prices and will undoubtedly contribute to the emergence of a difficult situation on the transport services market.

Continuous pollution of the environment by road transport has led to actions undertaking to limit this phenomenon. In addition, limited access to natural resources and the high exploitation costs thereof are of no help to the entrepreneurs, instead only generating additional costs. Without a doubt, this aspect of the environment paints the future of Polish transport companies in bleak colours.

3.6. Prosperity on the international market and its impact on the situation of Polish transport companies

The opening of borders has resulted in greater freedom to provide transport services across the European Union. Polish enterprises were also those to take this opportunity. Nevertheless, the current situation on the international market is difficult. This fact may adversely affect the operations of Polish transport companies, in particular those operating in international markets on a large scale. Table 6 presents the degree of impact that each element constituting the international macro-environment factors has on the hauliers.

Table 6.
International factors and their impact on the activity of road hauliers (transport of goods)

List of factors	Impact of factors on organisations
degree of globalisation of a country	positive
international political and legal regulations	negative
political and legal circumstances in other countries	negative
occurring armed conflicts or a threat thereof	negative
threats of terrorism	negative

Note: study based on own research.

The process of globalisation has been observed to progress for many years. Globalisation is a "process based on expanding international trade and increasing the flow of capital, people and technology as well as diluting cultural differences (SJP PWN)". According to M. Nowicka-Skowron and A. Mesjasz-Lech, this phenomenon led to an increase in the intensity of traffic in all kinds of goods (Nowicka-Skowron, and Mesjasz-Lech, 2013). As a result, there was an rise in demand for all types of transport services.

Transport of goods is subject to Polish and EU legal regulations. While national legal regulations are part of the political and legal factors of the macro-environment, it is the EU acts that have been included as an international factor of the macro-environment. Due to the fact that EU regulations form the basis for national acts and regulations, they govern the same issues, above all:

- access and practices in the profession of road transport operator,
- rules for access to the international road transport market,
- norms on working and driving hours of drivers and their rest periods,
- requirements related to recording devices installed in vehicles, including their design, installation, use and supervision.

International regulations are very complex and complicated, which causes some difficulties in their application. In the case of international transport services, the problem lies in legal provisions implemented by other Member States. These provisions should be known to entrepreneurs obligated to strictly adhere to them. They may concern such things as: the possibility of importing/exporting certain product groups to a given country, the mode of transport, equipment of transport vehicles etc. For example, in May 2017 legislation on the place of weekly rest was introduced in Germany. Weekly rests are to take place at home, at a company base or at a designated accommodation equipped with sanitary facilities. Failure to comply with this obligation will result in a fine imposed on both the driver carrying out the transport and the company. This situation will surely contribute to increased operation costs and can negatively impact the financial state of Polish transport companies.

The functioning of Polish carriers is also influenced by the political and legal situation in other countries. The tense situation on the international market gives rise to many dangers lurking for carriers. Armed conflicts and the growing threat of a terrorist attack mean that the current risk of operating on the international market is quite high. In most cases, the elements which constitute international factors have a negative impact on the activity of companies in charge of cargo transportation. However, this negative impact will be smaller in the case of enterprises providing national services and will increase appropriately with the introduction of international transport services into the offer.

4. Summary

Activities of Polish transport companies are determined by their wider and closer environment. The wider environment, which the literature refers to as the macro-environment, has a negative impact on the situation of carriers, while the carriers have no (or little) influence over them. Elements that define the macro-environment include: economic, political and legal, socio-cultural, technological, natural and international factors.

Some of these factors are beneficial to running a business. These include those factors which have been considered as positive in the study. Taking into account the realities of cargo transport enterprises, the Authors considered the following macro-environment factors as positive: the rate of economic growth, the interest rates and the unemployment rate, technical norms introduced voluntarily in the companies, the lifestyle of the society, a positive international migration balance, the pace of changes occurring in technology as well as implementation of modern (innovative) technologies, and finally the progressing globalisation.

The following factors can be mentioned as negatively impacting the activities of Polish transport companies: the inflation rate, the exchange rates and stability of the Polish zloty, political and legal regulations which define terms and conditions of access to the transport services market, tax norms and the labour law, a negative international migration balance, companies' attitudes towards implemented innovations, requirements related to environment protection, increasing costs of energy and the dynamics of changes thereof, international political and legal regulations, the political situation in other countries, armed conflicts and the danger of their occurrence, and finally the growing threat of terrorism in Europe. According to the authors, internal migrations and the availability of natural resources are the only factors neutral to the activity of carriers.

There is a large number of factors which constitute the macro-environment of a company. Some stimulate the development of the transport services market, while others inhibit this process. It is important to remember that enterprises are unable to directly influence the shaping of these factors. All they can do is observe the situation on the national, European and international market and adjust their activities to the existing conditions. The macro-environment factors specified and described in tis article will serve to perform a PESTEL analysis of transport companies engaged in cargo delivery in Poland. This analysis will be presented in the third part.

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EFFECTIVENESS OF SELECTED DATABASE MODELS IN MANAGEMENT INFORMATION SYSTEMS

Edyta SZCZEPANIUK[1*], Hubert SZCZEPANIUK[2]

[1] Polish Air Force Academy, National Security and Logistics Faculty; e.szczepaniuk@law.mil.pl, ORCID: 0000-0002-6707-2987

[2] Warsaw University of Life Sciences, Faculty of Economic Sciences, Warsaw; University of Information Technology, Faculty of Information Technology, Warsaw; hubert_szczepaniuk@sggw.pl, ORCID: 0000-0001-7613-4281

* Correspondence author

Abstract: In this paper, the authors attempt to identify the universal factors of the effectiveness of selected database models used in Management Information Systems. Selection of an appropriate database model at the stage of design and implementation directly determines the effectiveness of the Management Information Systems within an organisation. The relational database model and database models based on NoSQL paradigms, including in particular graph databases and document-oriented databases, will be evaluated. NoSQL-class database models demonstrate properties in terms of effective application for business purposes.

Keywords: effectiveness of databases, Management Information Systems, NoSQL databases.

1. Introduction

The architecture of Management Information Systems (MIS) implemented in organisations with a view to improving the information and management processes usually involves, at the architectural level, an adequate data model. An effective management process requires efficient acquisition and processing of information resources coming from the organisation and its environment. Information needs of today's enterprises are often fulfilled under the conditions of processing heterogeneous datasets, the expanding Big Data phenomenon and the development of the process management concept. The entirety of the indicated processes poses new requirements on the contemporary Database Management Systems (DBMS).

The relational data model is a popular technology used in the implementation of business solutions. However, there are alternative data models, called NoSQL-class databases, which include graph databases, key-value databases and document-oriented databases. In a DB-Engines January 2018 ranking of the most popular database systems, the first four places were occupied by relational database models (from first to fourth: Oracle, MySQL, Microsoft SQL

Server and PostgreSQL), the fifth place belonged to the document-oriented MongoDB, places six and seven were again taken by a relational data model (DB2 and Access, respectively), Cassandra took the eighth place with its column data model, while the ninth place was taken by Redis as a key-value type database (DB-Engines, 10 January 2018).

Selection of the database system architecture directly determines the structure of the database model, the process of implementing a database access layer and the effectiveness of the entire system in terms of performing access and manipulation operations on the database. Given the availability of a variety of architectural solutions and the fundamental significance of an adequate data model in information systems implemented in organisations, the need for research on the effectiveness of applying a variety of databases for business solutions is justified.

2. Methodology

The subject of this research is the data models applied in information systems implemented in organisations. The aim of the research is to identify the fundamental factors of efficiency of data models applied in information systems which are implemented in modern organisations under the conditions of processing heterogeneous datasets. The effectiveness of a database model will be understood in this study in terms of the adequacy of the database model to the expected information needs of the organisation.

The adopted methodology involves an interdisciplinary research approach in the field of information technology and management, including a theoretical analysis and synthesis of the subject literature and the use of elements of programming, system analysis and mathematical modelling.

3. Databases in Management Information Systems

One of the main objectives of MIS is to streamline the information processes within an organisation. The thusly defined objective requires an appropriate database model and database management system (DBMS) to be applied. The market of database solutions is mainly dominated by relational databases. However, other database systems which can form the basis of MIS are also available on the market. These include first and foremost the NoSQL-class databases. It should be noted that the leading NoSQL-class solutions are mostly key-value and graph databases.

The theoretical formal model of relational databases was designed by E.F. Codd, who had based his considerations on the mathematical concept of relation calculated from an extended Cartesian product (Codd, 1972). Codd assumed that the extended Cartesian product $x$for n D_1, D_2, …, D_n sets and the r relation determined from its subset have the following form (Codd, 1972, p. 5):

$$x\ (D_1, D_2, \dots, D_n) = \{(d_1, d_2, \dots, d_n): d_j \in D_j, dla\ j = 1,2, \dots, n\}, \tag{1}$$

r is the relation on sets D_1, D_2,...D_n if it is a subset$x(D_1, D_2, \dots, D_n)$.

In the relational model proposed by E.F. Codd, the database is a set of individual relations. The theoretical formal model of relational databases is conducive to maintaining the consistency of data stored in the database.

In practice, relational database modelling involves determining the scheme of tables consisting of columns of a specific value type out of the set of types supported by the Database Management System. Tables are a representation of the individual relationship in the database. Data is stored in the rows of individual tables (tuples, records). Each table has a specific name and a primary key, defined on the non-empty set of columns, which uniquely identifies each record in the table. Tables included in the database may be subsequently connected to the relationships of the following types: one – one (1 – 1), one – many (1 – n), many – many (m – n).

Currently, relational database management systems are one of the most popular groups of the solutions used in business applications. The set of such solutions may equally include the commercial software, namely, Oracle Database, Microsoft SQL Server and the software based on the open-source licenses, such as MariaDB.

Another type of the analysed databases is the graph database, based on the mathematical graph structure. Graph is one of the elementary abstractions in IT and is widely used within this field. Databases are one the effective applications of the concept of graphs. Graph representation in the database is based in particular on the use of directed multi-graphs and refers to the concept of nodes and edges in the graph. Attributes may be assigned both to the nodes and edges of the graph. Model of a directed multi-graph has been shown in Figure 1.

For the multi-graph shown in Figure 1, it is possible to define a set N of the graph nodes, $N = \{1,2,3,4\}$a set of binary relation R defined on the N set, as a set of graph edges $R = \{(1,2), (1,3), (2,4), (4,3), (4,4)\}$ and a set of attributes assigned to the graph edges $A = \{e_1, e_2, \dots, e_5\}$.

Representation of the database in the graph-based concept may use the nodes of graph as data entities and the edges of graph as relations. Such assumption enables data storing in the graph representation. It is possible to effectively perform database operations by using mathematical algorithms for processing such graphs.

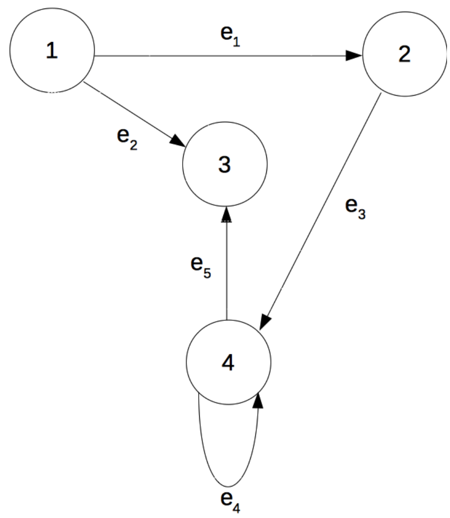

Figure 1. Directed multi-graph with attributes.

Neo4J is one of the leading software in the field of the graph database management systems, which is currently available on the market and used in the information systems of business solutions. It should be noted, that it is difficult to identify a uniform standard of queries in the case of graph database, unlike the relational data model in which there is a standard database queries in the form of SQL query language and its extensions. This means that there exists a variety of standards for the query language, depending on the specific implementation of the graph database management systems. Providing an example, the graph database management system Neo4J uses the Cypher Query Language (CQL).

Syntax of an exemplary query for a graph database in the Cypher Query Language, which searches reports, made by Jan Kowalski since 2018, may be presented as follows:

```
MATCH (employ: Employee {name: "Jan Kowalski"}) - [: AUTHOR] -> (report: Report)
WHERE report.year <= 2018
RETURN report
```

Figure 2. The query structure for the graph database in the Cypher language.

CQL language operates mainly on clauses such as MATCH, WHERE and RETURN, which refer to the vertices, edges and attributes pf the directed multi-graph, representing the database. On the other hand, the SQL language operates on the SELECT, FROM, WHERE, GROUP BY, HAVING and JOIN clauses in terms of access to the data relational model.

The advantage of graph databases are relationships expressed in the form of a set of attributes of the directed edges of the graph. Description of a relationship in a directed multi-graph allows the provision of an additional layer of semantics for the data representation and facilitates the process of machine learning, e.g., algorithms of the artificial intelligence or algorithms of the data-based knowledge extraction.

Another kind of the analysed databases is the document-oriented solution, which assumes that the data is stored in the form of documents identified by keys. Documents describing the data may have any specific structure. The database may include many documents of the differently specified structures. Such approach creates opportunities to adjust the data model to the information needs of an organisation at various stages of the system implementation in a flexible and appropriate manner.

Data storing documents may have a variety of formats, depending on the specific implementations of the Database Management System. XML and JSON are the most popular standards for recording documents. Exemplary data document encoded in the XML standard has been shown in figure 3.

```
<person>
        <name>Jan</name>
        <surname>Kowalski</surname>
        <city>Warszawa</city>
</person>
```

Figure 3. Data document encoded in XML.

On the other hand, the analogous data document encoded in the JSON standard may have the form as shown in figure 4.

```
{
        „name”: „Jan”,
        „surname”: „Kowalski”,
        „city”: „Warszawa”
}
```

Figure 4. Data document encoded in the JSON standard.

Encoding data documents in XML and JSON indicates that the document-oriented databases facilitate the integration with modern programming technologies, e.g., in terms of eliminating the need for mapping objects to the relational data model.

According to the DB-Engines ranking, the most popular document-oriented Database Management System is MongoDB (DB-Engines, 10.01.2018). MongoDB is a management system of databases, of which the data document structure is formatted using the JSON standard.

Graph technologies of databases are successfully used in situations where there is a need for processing the dynamically changing, heterogeneous datasets. According to the official server of MongoDB database, it was used, inter alia, by New York Times (MongoDB, 01.10.2018).

4. Discussion

Information systems of modern organisations operate in the environment of large, structurally diverse and changeable datasets. At the same time the information systems must provide adequate information and adequate data model allowing the accomplishment of business processes of the organisation. Despite the growing requirements regarding the information systems being implemented in contemporary organisations, majority of them still use the architecture of relational database management systems. It is advisable to discuss the individual dimensions of the database management systems, oriented on the relational and the alternative NoSQl model, in terms of efficiency factors against business applications.

Table 1.
Comparison of the relational model with the NoSQL model

Feature	Relational model	NoSQL model
Formal model	One formal model based on assumptions of the relation assigned on the expanded Cartesian product of sets.	Many formal models include, inter alia, graph databases, key-value databases and document-oriented databases.
Data model	Database contains a finite set of tables consisting of tuples. The following is a set of primary and foreign keys and the relations are defined between tables (1-1, 1- n , m - n).	Depending on the formal model, database may contain associative tables (key-value database type); implementation of the graph model; a set of documents, e.g., in the JSON or XML standard for the document-oriented database.
Data schema	Data static schema modelled at an early phase of the designed information system.	Dynamic data schema, easier editing of the data model at the later stages of the life cycle of the information system.
Query language	The generally accepted standard of the query structured SQL and its PL / SQL and Transact-SQL extensions.	A variety of the database query languages depending on the specific implementation of the data management system.

Note: based on (NoSQL Databases Explained, 01.10.2018).

Both the concept of formal model and the data model is critical to the efficiency of the entire MIS in an organisation. Analysing the data models shown in Table 1 it is possible to distinguish the following set of efficiency factors, relevant when choosing a database management system for a particular MIS project:

– adjusting the data model – the chosen architecture should allow the correct mapping a set of business processes in the organization in the data model,
– data schema flexibility – ability to expand the data schema with new structures when the organisation is being developed or the concept of business processes is being changed,
– database performance – access and data manipulation operations should be realised within a fixed time horizon,
– safety – the database system should comply with the assumptions set out in the safety information policy of the organisation,
– ability to integrate – integration ease with other information systems in the organisation and technologies used in the implementation,
– database management system purchase costs – the market offers commercial systems, both payable and free-of-charge, which are distributed on open licences,

When considering the adjustment and flexibility of the data model, it is necessary to take into account the possibility of mapping and supporting business processes in a given organisation. Relational data model may prove to be a good choice for organisations which process the structured datasets and a small number of business processes that are repetitive and well-characterised. Database which is based on the NoSQL assumptions may be a better choice for organizations which process large, heterogeneous datasets of a dynamic and changing structure.

Results of an experiment comparing the efficiency of a relational database (RBD) and the graph database (GBD) for the specified data model have been described in the article titled „Neo Technology Commercializes Next Generation Graph Based Database" (Cubrilovic, 27.09.2018). In the quoted experiment the database performance was evaluated by the defined query response time through the database engine. Both databases reflected the structure of one thousand people, with each person having fifty friends assigned (Cubrilovic, 27.09.2018). A query was determined both for RBD and GBD, which were to return the data of each the friend from a defined set of people. Query response time amounted to 2000 ms for the RDB and 2 ms for GBD, implanted in the Neo4j system (Cubrilovic, 09.27.2018). In the next step of the experiment, a set of people was increased up to one million and a number of connections was increased by an order of magnitude, whilst the query execution time for the graph database was not changed (Cubrilovic, 09.27.2018).

Query response time is of fundamental importance for end-users of the MIS implemented in the organisation. By way of illustration, the time to generate reports concerning employees of various organisation departments and the company's management depends on query execution time to the database. Therefore, the right selection of the database system translates directly into the efficiency of information processes in the organisation.

Object-relational mapping, referred to as ORM, is a frequent problem encountered in the field of integration capabilities of relational database management systems with modern programming technologies. Modern programming languages such as Java or C# are object-oriented, whereas relational databases store data in the form of a finite set of tables. In such a situation it may be necessary to translate the data from tabular form into objects in a particular programming language, and vice versa. Although modern database management systems are a formalised, stable and safe technology, translation of the object-oriented application logic into the relational database may be problematic and time-consuming. It should be taken into account that the object-oriented application logic, e.g., in the Java programming language may additionally implement mechanisms that support inheritance, polymorphism, interfaces and collections. Range of technologies, e.g., Java language may use the Hibernate technology was created to solve the problem of object-relational mapping. The ORM mapping issue may be reduced by using the NoSQL databases, especially the document-oriented ones, which may map the specific objects in the data documents corresponding to the logic of the object-oriented program.

5. Summary

Management Information Systems at the level of the database management subsystem architecture may be based on a variety of database systems. Selection of an appropriate database system directly determines the effectiveness of the Management Information Systems within an organisation.

Relational databases are the most common class of database systems in the business solutions. However, not always, the choice of the relational data model at the MIS design and implementation phase is an optimal solution. Modern economic organisations operate in conditions of processing the large, rapidly changing and diverse datasets. It is possible to use the databases based on NoSQL paradigms to handle the processing of such sets. Graph database should be distinguished in this respect, because thanks to mathematical searching operations of the graph they provide highly efficient algorithms of access and data manipulation. Document-oriented database is another database model, which shows high potential for businesses. A key advantage of such a database model is a dynamic structure of the data schema, allowing for flexible processing of heterogeneous and changeable datasets. In addition, the document-oriented databases offer API for modern programming languages eliminating the need for the object-relational mapping.

According to the authors, the efficiency factors, which should be considered when choosing a database model at the phase of designing and implementing MIS include: data model adjustment, data schema flexibility, database performance, safety, integration capability and the purchase costs of the Database Management System (DBMS).

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FOUNDATIONS OF MANAGEMENT INFORMATION SYSTEM QUALITY

Hubert SZCZEPANIUK[1*], Edyta SZCZEPANIUK[2]

[1] Warsaw University of Life Sciences, Faculty of Economic Sciences, Warsaw;
University of Information Technology, Faculty of Information Technology, Warsaw;
hubert_szczepaniuk@sggw.pl, ORCID: 0000-0001-7613-4281
[2] Polish Air Force Academy, National Security and Logistics Faculty, e.szczepaniuk@law.mil.pl,
ORCID: 0000-0002-6707-2987
* Correspondence author

Abstract: Software engineering comprises many methodologies focused on the software manufacturing processes. Effective management of the implementation and deployment of the Management Information System (MIS) project requires the use of a interdisciplinary system approach. IT methodologies, oriented on the level of manufacturing processes, may be supplemented with universal methods in the area of management science, which allow for the management of activities related to ensuring the realisation of the organisation business goals. The aim of the article is to identify the MIS quality determinants, which constitute determinants of the effective quality management at the stage of modelling, implementation, deployment and operation of MIS.

Keywords: Quality of Management Information Systems, Quality Function Deployment method, quality management of IT systems.

1. Introduction

Implementation of Management Information System (MIS) in an enterprise is included in the high risk and high complexity projects. At the design stage of the Management Information System, the concept of business process x-engineering is being increasingly applied in order to effectively use the IT systems and to increase the enterprise productivity.

From the point of view of an enterprise, which introduces the Management Information System, the computer software implementation is one of the project objectives, but it does not guarantee that the needs of the business enterprise will be met. At the MIS design stage, special attention should be paid to the recognition and reorganisation of the business processes supported by IT solutions within an organisation. This will allow for rational selection of the system architecture by including an appropriate database management system constituting a key element of an effectively functioning IT system of the organisation. If the analyses regarding the aligning of IT solutions to an organisation's business goals are conducted too late, e.g., after the implementation of a development team, they may result in high costs of introducing changes within the project. Taking the above into consideration, there is an urgent need to implement scientific research to develop methodologies enabling an increase in the degree of meeting the business needs of the organisations, which have decided to implement MIS.

2. Methodology

Quality of Management Information Systems is the subject of research in this elaboration. The aim of the research is to identify the MIS quality determinants, which constitute determinants of effective project management at the stage of modelling, implementation, deployment and operation of MIS. The research methodology, adopted in this elaboration, includes an interdisciplinary research approach considering theoretical analysis and synthesis of the subject literature, as well as the normative acts, use of elements of the system analysis and general theory of systems and mathematical modelling.

3. Quality of Management Information Systems

Functioning of the Management Information Systems in an enterprise may be analysed in terms of quality. In order to consider the concept of quality of the Management Information System, it is reasonable to define first the concept of the IT project success (Dobrosielski, 2010). The question, if it is justified and sufficient to apply the general criteria in the field of project management for the IT projects, should be analysed. The success is achieved only when the product was realised within the scheduled time and budget (Dobrosielski, 2010). The life cycle of MIS may comprise multiple stages, starting from modelling of the system architecture and database design through software implementation and equipment configuration to the implementation, training and system maintenance. As a result, there are many parameters and characteristics within the area of the IT project success evaluation, which may include, inter alia, proper implementation of the system modules in a selected programming technology, software testing, the server stability with regard to hardware and software, bandwidth and ICT networks reliability, database engine performance, measured by the query response time, successful training of personnel in terms of the MIS use or the IT safety level provided by the system.

When the above set of characteristics is taken into account, the concept of the IT system project success should be in multidimensional terms (Dobrosielski, 2010). Implementation of the Management Information Systems in the enterprise should be accomplished within the scheduled time and budget and translate directly into optimising economic processes implemented within an organisation, e.g., by reducing the costs and shortening the execution time. Fundamental guidelines for software engineering, individual stages of implementation and testing, risk management and product quality, which is MIS, should result from such assumption (Dobrosielski, 2010).

The problem related to the quality of information systems is one of the software engineering main issues. According to the PN-EN ISO 9000 standard, quality is generally defined as "the extent to which a set of inherent properties of the object fulfils the requirements" (PN-EN ISO 9000 standard: 2015-10). General systems theory may be used to bring the above quoted definition to the IT systems field. In the subject literature it is common to assume that the systemic quality of the object may be considered as a function of usability, functionality, reliability, safety and efficiency, which may be registered as (Bojarski, 2010; quoted after: Skopiński, and Zaskórski, 2010, p. 111):

$$Jakość = f(U, F, R, Ry, E) \tag{1}$$

where:
U – usability,
F – functionality,
R – reliability,
Ry – safety,
E – efficiency[1].

At this point it is worth quoting the international standards regarding the quality of computer software, which is ISO/IEC 9126-1: 2001 and its subsequent series ISO/IEC 25000. The former standard distinguishes the following properties of the information system describing its quality (ISO/IEC 9126-1: 2001):

- usability – performing basic functions expected by the system user,
- functionality – ability of the system to meet the needs expected by the user,
- reliability – ability of the system to guarantee efficient operation under certain conditions and time,
- efficiency (performance) – determined by the relation between the software performance and the system resources employed for this purpose,

[1] More on the issue of the quality and efficiency at the level of business processes of an organisation has been presented by (Skopiński, Zaskórski, 2010, p. 105-117).

- maintainability (ease of maintenance) – susceptibility of the system to perform certain modifications,
- ability to migrate – ability to transfer the system to a different organisational, hardware and software environment[2].

It is possible to define the individual properties describing the system quality through assigning a set of specific attributes. According to the quoted ISO/IEC standards, feature of the system functionality may be described by the attributes of interoperability, functional compliance, accuracy, usefulness and the protection quality (standard of ISO/IEC 9126-1: 2001). On the other hand, the property of system efficiency may be described by the attributes of reaction time, used resources and performance compliance (ISO/IEC 9126-1: 2001).

Among the series of ISO/IEC 25000 the standard, which is significant regarding the quality related to MIS is ISO/IEC 25010: 2011 "Systems and software engineering – Systems and software Quality Requirements and Evaluation (SQuaRE) – System and software quality models". The ISO/IEC 25010: 2011 standard supplements the distinguished properties with additional ones, i.e., safety and compliance and introduces a number of changes.

It is noteworthy that there are other models which provide the basis for the possible development of a formal set of the software quality criteria. The McCall, Boehm, Boeing models as well as the FURPS methodology must be distinguished in this respect.

Appropriate adjustments of the distinguished properties and attributes to the customer needs at the design stage of MIS is of key significance for the effective functioning of the system within an organisation. Such adjustment is enabled by applying the appropriate methodology of software development, which will include the distinguished set of the information system quality attribute in addition to the orientation on the program code implementation and its testing.

4. Quality function deployment (QFD) method as an opportunity to improve the quality of Management Information Systems

In software engineering, there are many software development methodologies focused mainly on the implementation of the program code and its testing. From the perspective of the organisation implementing MIS, as indicated in the introduction, software is the only objective of the IT project and may not guarantee achieving the business goals of an organisation. It is reasonable to supplement methodologies oriented exclusively on software development with the methods enabling to manage the achievement of strategic goals related to the implementation of MIS.

[2] More information on the evolution of the software quality standards has been presented by Kobyliński, 2015, p. 91-101).

The Quality Function Deployment (QFD) method is known in the management-related sciences, and since the moment it was created, it has been successfully used to design and improve the quality of material products. QFD was used, among others, by Mitsubishi, Ford and General Motors (quoted after Toruński, 2013). Release of ISO 16355-1: 2015 by the International Standards Committee, which is the formal standardisation recognition of the QFD method, shows the method's potential.

It may be generally described, that using the QFD method enables formal translation of the identified customer requirements into technical characteristic of the product. QFD method may be applied without limitations exclusively for material goods. OFR method shows properties to being efficiently used at the level of information systems design as well, such as the Management Information Systems.

A set of matrices, referred to as "the house of quality" is a basic analytical tool in the QFD method. It is generally accepted that forming "the house of quality" matrix is performed according to an algorithm, which comprises a set of subsequently following steps (Hamrol, and Mantur, 1999; quoted after Sikorski, 2002, p. 122):

1. identifying requirements of the customer, the future user of the product,
2. determining the importance of customer requirements,
3. customer benchmarking – comparing with competitors,
4. determining the relative importance of the customer requirements,
5. identifying technical factors, which affect meeting the customer's identified needs,
6. determining the strength of relationship between the technical factors and the identified requirements of the customer,
7. determining the importance of technical factors,
8. technical benchmarking – comparison with the competition,
9. determining the relation between technical factors,
10. determining target values of the technical factors and indicators of complexity.

A set of customer requirements for the Management Information System, which is being created, is defined as the first step of the above algorithm. A set of functional and non-functional system requirements, corresponding to the identified and the newly designed business processes of an organisation, is determined by means of the information technology methodologies in the area of software engineering at the initial stage of the project. From the perspective of the system architect and development team, the set of customer requirements provides the basis for the database model and subsequent work related to the implementation of individual modules of MIS. However, by means of the QFD method, the set of customer requirements may be translated in a formal way into the technical parameters of the designed system. Degrees of importance, which determine the priority factors for completion of the implementation objectives of the proposed MIS, are determined for individual elements of the set of customer requirements in accordance with the QFD method.

At the stage, when the customer benchmarking is being performed against competitive systems for the proposed MIS, the QFD method assumes the assignment of areas in which the designed system may have an advantage over competing solutions. Another important stage in the QFD method is determining the importance of requirements of the future system user. When this step is being implemented, it is possible to use the table shown below (Sikorski, 21.09.2018).

Table 1.
Determining the relative importance of the system user requirements

Requirement	Customer benchmarking			Comparative indicators					
	N	Y	Z	A	P	B	C	D	E
Report generation time	4	4	3	5	4	1	1.3	6.5	0.02
Safety of information with respect to ...	4	4	5	5	5	1.25	1.9	11.88	0.04
….	….	….	…	….	…	…	…	…	…
								total	1

Note: based on (Sikorski, 21.09.2018).

M. Sikorski presents that Table 1 may consist, inter alia, of the following columns (Sikorski, 09.21.2018):

- i – customer requirements (system user),
- N_i – level of fulfilment of the *i-th* requirement of the customer by the designed MIS,
- Y_i, Z_i – state of fulfilling the *i-th* requirement of the customer by the competitive systems,
- A_i – degree of importance of the the *i-th* requirement of the system user,
- P_i – target level of the fulfilment of the *i-th* requirement, which is aimed to be as a result of the system implementation by an organisation,
- B_i – indicator of improving the fulfilment of the *i-th* requirement of the customer requirement.

$$B_i = \frac{P_i}{N_i} \tag{2}$$

- C_i – indicator determining if the improvement of the fulfilment of the *i-th* requirement is a strong point of the designed MIS,
- D_i – absolute weight of the *i-th* requirement of the system user:

$$D_i = A_i B_i C_i \tag{3}$$

- E_i – relative requirement for the *i-th* requirement of the system user:

$$E_i = \frac{D_i}{\sum_{i=1}^{n} D_i} \tag{4}$$

where n – number of the requirements of the system customer.

Determining the importance of customer requirements through the QFD method enables the formal identification of priorities in the project and provides the system architects and development team with a new set of information useful at the design stage of MIS.

Attributes describing MIS, regarding the customer requirements, are determined at the stage of identifying technical characteristics according to the quoted algorithm of the QFD method. The QFD method assumes that technical characteristics should be expressed in a measurable manner and should reflect real characteristics of the product in the manufacturing process. In the process of translating the proposed assumptions into the designing of MIS, it is necessary to assign technical characteristics of the system, which create conditions for a proper selection of the database architecture, the implementation of individual modules of the system and the software and hardware level.

The next step in the QFD method of QFD is to determine the correlation between the customer's requirements and technical characteristics through determining the strength of relationship between a given requirement and its corresponding technical parameter (Sikorski, 21.09.2018). Relative importance of the T_j technical elements in the QFD method is determined as the sum of the products of coefficients of the importance of *i-th* requirements and coefficients of their dependencies from *j-th* technical parameter, which may be represented as follows (Sikorski, 21.09.2018):

$$T_j = \sum_{i=1}^{n} A_i \, Z_{ij} \tag{5}$$

where:

A_i – degree of importance of the *i-th* requirement,

Z_{ij} – correlation between the *i-th* requirement and the *j-th* technical parameter.

Values of the obtained T_j coefficients allow the system architect to identify, in the formally objectified manner, the key technical characteristics of the proposed MIS in terms of the applied technology and ICT solutions.

It is possible to determine a set of technical characteristics of the system, which is being modelled, by using the QFD method at the initial stage of the MIS designing. This set may provide the basis for the system architect and the development team within the scope of the proper selection of information technology applied in the project. Depending on the set of formal system characteristics, defined by the QFD method, it is possible to properly select technologies in the following areas:

- database systems: using the classical relational database model or choosing the NoSQL solutions, including, the types of key-value, document and graph database; the latter types are recommended for organisations with specific information,
- front-back and back-end programming technologies

- software level in the field of operating systems for the customer computers and server services,
- layer hardware in the field of server solutions and the ones related to the customer computers,
- layer hardware solutions in the area of computer networks.

It is worth noting that using QFD method makes it possible to take into account the quality properties and attributes of the information systems, defined in ISO/IEC 9126-1 and ISO/IEC 25010 standards, at the MIS designing stage.

Proper selection of the technology used in the MIS project, which has been supported by a formal set of technical characteristics of the system, determines the achievement of business goals related to the implementation of the Management Information System from the viewpoint of an organisation. Use of the QFD method enables the support of the classical methods of software development, which are oriented on the code program by formal assignment of the system characteristics in the area of meeting the needs of the system users.

5. Summary

Software development methodologies, which are oriented exclusively on the process of implementing the program code and its testing, cannot guarantee the achievement of business goals of the organisation implementing the MIS. The authors postulate that the effective management of the process of design, implementation, deployment and maintenance of MIS within an organisation requires a systemic approach, which involves an interdisciplinary approach in the field of computer and management sciences. The Information methodologies, oriented on the software implementation, may be successfully supported by universal methods and tools in the area of management sciences, enabling the management of activities related to quality assurance of the product.

The QFD method may successfully support traditional software methods, because it allows for a formal translation of identified customer requirements into the the technical parameters of the Management Information System. Determining technical characteristics of the product by means of the QFD method may provide the basis for the appropriate selection of technologies applied in the project, which increases the chances of meeting the business goals of the organisation implementing the MIS.

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FINANCIAL BENEFITS OF LOGISTICS OUTSOURCING: A STUDY OF SELECTED HIPERMARKET

Bożena SZCZUCKA-LASOTA[1], Radosław WOLNIAK[2*], Iwona KRZYŻEWSKA[3]
[1] Politechnika Śląska, Wydział Transportu, Katowice; bozena.szczucka-lasota@polsl.pl, ORCID: 0000-0003-3312-1864
[2] Politechnika Śląska, Wydział Organizacji i Zarządzania, rwolniak@polsl.pl, ORCID: 0000-0003-0317-9811
[3] ZTE Katowice, Sp. z o.o., ul. Bytomska 39, Siemianowice Śląskie
[*] Correspondence author

Abstract. The paper presents selected financial benefits for organizations resulting from the use of outsourcing in logistics services. The research conducted in the organization indicated that conducting transport services on their own requires significant cash outlays related to: the employment of employees, purchase and maintenance of means of transport, insurance, purchase of fuel, etc. Estimated costs were compared with expenses incurred by the hypermarket as a result of employing an outsourcing company. The results of the research have confirmed the importance of using outsourcing in the analyzed organization. The aim of the study is to compare the costs that the organization would incur without excluding transportation services and the outsourcing costs of the aforementioned services, the profit of a company can have from using outsourced services is estimated in the paper.

Keywords: outsourcing, logistics processes, transport, outsourcing of logistics services, logistic services.

1. Introduction

The aim of the study is to compare the costs that the organization would incur without excluding transportation services and the outsourcing costs of the aforementioned services, the profit of a company can have from using outsourced services is estimated in the paper. We have following research questions:

- What is the average salary level of serial employee and deputy manager?
- What are the costs of third-party services use?
- What solution is better – to use own activities or outsource it?

The four-year hypermarket was in operation. The company's financial policy was analyzed, the average salary of the employees and deputy manager was calculated and the costs related to maintenance of the employee in the years were calculated. The costs of outsourcing logistics services were also calculated. Estimated costs incurred if the company did not use outsourcing, including: the cost of purchasing the cars necessary for the proper functioning of the transport logistics, the cost of employment of additional employees, insurance costs, fuel etc. The calculation does not include depreciation.

2. Literature review

Logistic service is an activity aimed at satisfying logistic needs of business entities and people. The area of operation of logistic operators increases as the complexity of production processes increases. This phenomenon can be seen primarily in the automotive industry, a leading industry in the areas of modern management, production and logistics Grabowska, 2012; Wolniak 2012; Domagała, and Wolniak, 2014; Wolniak et al., 2014; Wolniak et al., 2015; Markowska 2008; Odlanicka-Poczobutt, 2011; Pałucha 2012).

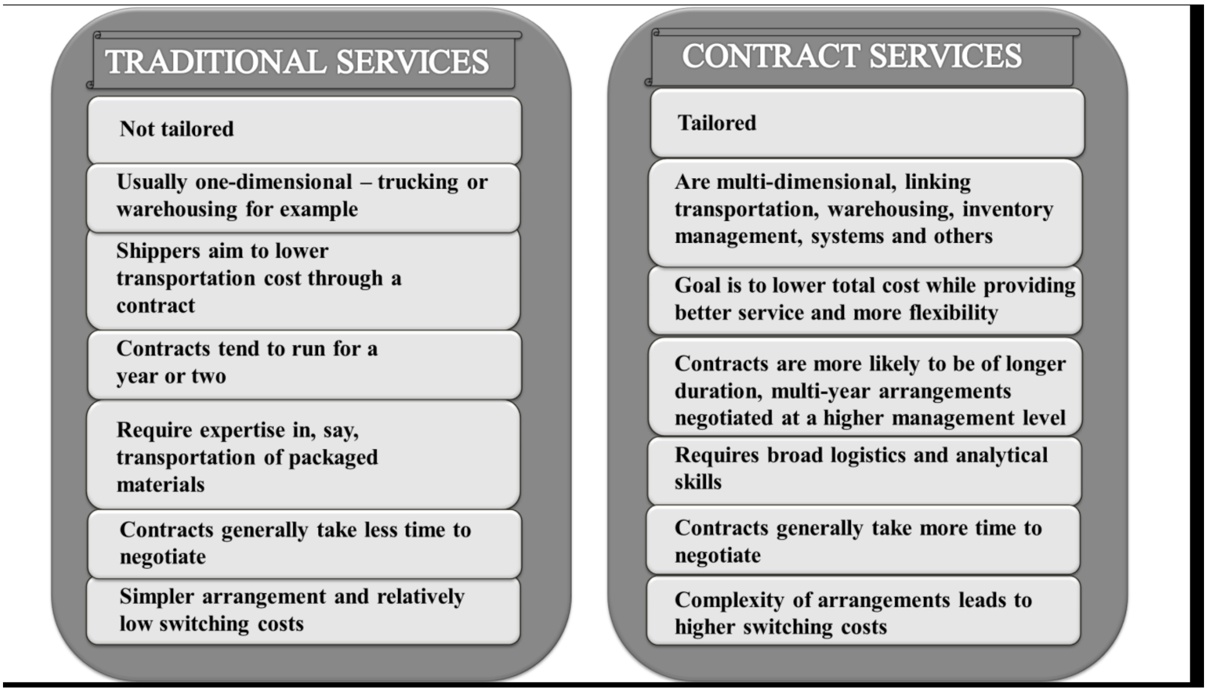

Figure 1. Differences between traditional and contract transport service. Source: Adapted from (Razzaque, and Sheng, 1998).

In organizations logistic services like transport are the most often transmitted to an external unit (fig.1). Such a process is referred to as "outsourcing". The word itself comes from English and stands for outside-resource-using (the word "outside" means outside, "resource" "using"). Outsourcing is now considered one of the most important concepts in the field of management. Outsourcing is defined as the "practice of turning over all or part of an organization's function to an vendor" (Peslak, 2011; Odlanicka-Poczobutt, 2006; Matusek, and Odlanicka-Poczobutt, 2012; Pacana et al., 2016).

The concept of outsourcing came from American terminology “outside resourcing”, meaning to get resources from the outside. The term was later use in the management and economy terminology to indicate the external use of sources to help developing the business, which typically were using internal sources. The process of outsourcing is often accompanied by a transfer of material and human resources to chosen provider. The phenomenon brings many benefits to the partners and is mostly used by organizations in advanced economies, which directs part of the work by companies located in developing countries in particular to reduce costs (Troaca, and Bodislav, 2012).

We can define outsourcing as contracting out of a business function to an external supplier, involving the transfer of people, processes and assets. This contracting activity can be done by either an onshore or off-shore location, and to one (single-sourced) or more (multi-sourced) outsourcing partners (Deloitte, 2013).

Delivering some or all processes using the outsourcing results in logistical processes often carried out by external operators even at the manufacturer's premises. These logistics processes, in addition to transport and transshipment, include: packaging, warehouse management or handling such as sub-assemblies (Deloitte, 2013). The process of logistics outsourcing is one that often involves the use of external logistics companies (third-party) to perform activities that have traditionally been performed within an organization. A third party is neither the seller (first party) nor the buyer (second party) in the supply chain. The term “logistics company”, “logistics service provider” or “outsourcer” is used to denote the firm that operates the logistics activities; and the term “service user” or “outsource” is used to denote the firm to who the contract for services is given (Ksin-I Hsiao et. al., 2011; Srabotic, and Ruzzier, 2012).

The decision to outsource is often made in the interest of lowering firm costs, redirecting or conserving energy directed at the competencies of a particular business to make more efficient use of labor, capital, technology or resource. The business case of outsourcing varies according to particular situation. We can distinguish followings reasons of outsourcing (Constantin, 2007):

- lower costs (due to economies of scale or lower labor rates),
- variable capacity,
- the ability to focus on core competencies by ridding yourself of peripheral ones,
- lack of in-house resources,
- getting work done more efficiently or effectively,
- increased flexibility to meet changing business and commercial conditions,
- tighter control of budget through predicable costs,
- lower ongoing investment in internal infrastructure,
- access to innovation and thought leadership.

By we also can distinguish some risks of outsourcing the logistic processes outside the organization (Denisa et al., 2015):

- Contract risk – the risk that a third party logistic provider cannot fulfil all requirements in required quality or required time.
- Management risk – this type of risk can be caused by the difference between the management methods and the culture of the company used by the provider and client.
- Information risk – the risk of poor quality information sharing which can result in serious problems and dramatic losses.
- Market risk – this type of risk refers to market fluctuations such as labor price, raw materials price, the changes in customer demand, etc.
- Financial risk – financial risk means that the real return on investment of logistic outsourcing is lower than the expectation.

External services benefit both private companies and public institutions. According to the data contained in about 65% Managers outsource their services to outsourcing companies (Orzechowska-Przybyła, 2009; Wieczorek 2004; Gajdzik, 2016; Bahha et al. 2015). This direction is mainly related to the search for savings in the organization. Using outsourcing aims at optimizing customer service costs, improving your organization's security, and accepting more orders. It also reduces the risk of employee acquisition costs, training, and reduces the cost of contract management. An undoubted advantage of outsourcing is the ease of access to professionals in many areas, and thus the higher is the flexibility of the organization. Outsourcing solutions allow reducing the cost of business activities by about 20-70% of their value. The aim of the work is to estimate the financial benefits for the hypermarket resulting from replacing outsourced services.

3. Research methodology

In our study we analyzed cost of logistic activities in hypermarket. We use the case study method using one of the biggest hypermarkets existing on the market. To analysis we use actual cost comparison method to compare various costs of hypermarket activities in the case of: salary and third-party services. We compare some variants of decision taking by hypermarket, especially possibility of using outsourcing.

The estimated costs of buying cars were based on the lease of commercial vehicles with parameters similar to the cars offered by the outsourcing company. The aim of the study is to compere the costs that the organization would incur without excluding transportation services and the outsourcing costs of the aforementioned services, the profit of a company can have from using outsourced services is estimated in the paper.

4. Calculation and analysis of results

Table 1 and table 2 shows the average monthly remuneration of the employees and the deputy manager, including retirement, disability, sickness and NFZ (National Health Fund) benefits, as well as the average annual cost of living for the employee in the calendar year. The result was increased by a factor of 1.5 resulting from guaranteed bonuses. The estimated cost of maintaining the serial worker and deputy head of the transport department is shown in Table 3. The data is based on the accounting data provided by the company.

On the basis of data collected in the table 1 we can say that the gross salary of serial employee is 2460zł and the net salary is 1782,82zł. The cost for the employer is 3922,55zł. In the case of deputy (table 2) we can say that the gross salary is 2807zł and the net salary is 2022,17zł. The cost for the employer is 3329,89zł. In the table 3 we have the comparison of the salary and the estimated cost of living.

Table 1.
Average salary of a serial employee

	Average salary of a serial employee:										
		social security contributions [PLN]							the cost of the employer [zł PLN]		
1	2	3	4	5	6	7	8	9	10	11	12
I	1 663,00	162,31	108,10	40,74	311,15	121,67	84,00	1 146,18	300,34	42,40	2 005,74
III	1 827,00	178,32	27,41	44,76	250,49	141,89	107,00	1 327,62	293,43	46,59	2 167,02
IIII	2 154,00	210,23	32,31	52,77	295,31	167,28	124,00	1 567,41	345,93	54,92	2 554,85
IV	2 464,00	240,49	36,96	60,37	337,82	191,36	152,00	1 782,82	395,72	62,83	2 922,55

Caption: 1 – year, 2 – gross salary, 3-5 retirement, disability, sickness contributions, 6 – sum of contributions, 7 – NFZ (National Health Fund), 8 – payment on account, 9 – net amount, 10 – ZUS (Social Security), 11 – FP (Labour Fund) i FGŚP (Guaranteed Employee Benefits Fund), 12 – sum, I-IV – years of hypermarket operation.

Source: Based on (Kotarz, 2011).

Table 2.
Average salary of the deputy manager

	Average salary of the deputy manager										
		social security contributions [PLN]							the cost of the employer [zł PLN]		
1	2	3	4	5	6	7	8	9	10	11	12
I	2 097,00	204,67	136,31	51,38	392,36	153,42	123,00	1 428,22	378,73	53,48	2 529,21
II	2 213,00	215,99	33,20	54,22	303,41	171,86	145,00	1 592,73	355,41	56,43	2 624,84
III	2 573,00	251,12	38,60	63,04	352,76	199,82	161,00	1 859,42	413,22	65,61	3 051,83
IV	2 807,00	273,96	42,11	68,77	384,84	217,99	182,00	2 022,17	450,91	71,98	3 329,89

Caption: 1 – year, 2 – gross salary, 3-5 retirement, disability, sickness contributions, 6 – sum of contributions, 7 – NFZ (National Health Fund), 8 – payment on account, 9 – net amount, 10 – ZUS (Social Security), 11 – FP (Labour Fund) i FGŚP (Guaranteed Employee Benefits Fund), 12 – sum, I-IV – years of hypermarket operation.

Source: Based on (Kotarz, 2011).

Table 3.
Average cost of living

	Average cost of maintaining $K_{ŚPS}$- a serial employee [zł PLN]				**Average cost of maintaining $K_{ŚZK}$- deputy manager [zł PLN]**			
formula	$K_{ŚPS} = L_M{°}K_p + 1.5{°}\ K_p$ (1) L_M – NUMBER OF MONTHS K_P – MONTHLY EMPLOYER COST 1.5 - the premium resulting from the bonus				$K_{ŚZK} = L_M{°}K_p + 1.5{°}\ K_p$ (2) L_M – NUMBER OF MONTHS K_P – MONTHLY EMPLOYER COST 1.5 - the premium resulting from the bonus			
Year	I	II	III	IV	I	II	III	IV
Cost [PLN]	27077.49	29254.77	34490.48	39454.43	34144.34	35435.34	41199.71	44953.52

Caption: I-IV – next years of functioning hypermarket.

Source: Authors own work.

5. Cost analysis in case of non-use of third-party

An analysis of the state of the existing logistic allows finding that carrying out transport services on its own requires:

1. Employment of at least 4 employees serving as drivers to ensure the continuity of transport services (at present the company has 3 employees and two deputy managers).
2. Purchase of three delivery vehicles with a maximum permissible weight of 3.5 tonnes.

Transportation costs will also increase with vehicle maintenance (insurance, inspections, repairs, fuel purchases, etc.). These costs would be transferred to customers (transport charges). Estimated costs of maintenance of newly hired transport staff are shown in Table 4.

Table 4.
Estimated maintenance costs for newly hired transport staff

	The cost of maintenance of 1 employee				**The cost of maintenance of 4 employee**			
Yesr	I	II	III	IV	I	II	III	IV
Cost [PLN]	27077.49	29254.77	34490.48	39454.43	108309.96	117019.0	137961.92	157817.72

Caption: I-IV – next years of functioning hypermarket.

Source: Authors own work.

The costs associated with buying a car in the form of a lease are based on the data of the Authorized Dealer. They were respectively: 90400.00 PLN, 106150.00 PLN and 86450.00 PLN for selected 3 vans. Leasing term was assumed 48 months, assuming installments (Table 5).

On this basis, the total cost of the lease of 3 cars in the 4-year period was estimated at PLN 360,775.47.

Table 5.
Lease installments for selected vans

No. of car:	R_1 – Instalment 1	R_2 – Further installments	Form of insurance AC/OC/NW- proposed by the lessor 3.2% of the invoiced value of vehicles
Car 1	9040	2259,36	3.2 * 110288.00 / 100 = 352921.6
Car 2	10615.00	2653.00	3.2 * 129503.00 / 100 = 414409.6
Car 3	8645.00	2160.00	105468.00 / 100 = 337497.6

Source: Based on (Kotarz, 2011).

Car insurance in 1th year was estimated at 11048,29 and in the period of 4 years over 44 000 PLN. In addition, the cost of inspections should be added every 30 000 km of mileage, which in comparison to the amount of assumed km running by the car during the year (30 000 km) gives min. 1 review/year. The price of the first review is about 819 PLN, the next inspections is about the range of 1400-2000 PLN and depend on the maintenance of the technical condition of the vehicle. Estimated value of reviews (assuming 1700 PLN for reviews in years 3th and 4th) is approx. 12 657 PLN. Consumption of diesel (depending on the market price in the given year) and the so-called. car burning (assumed 12000 l/year) was estimated at 153,480 PLN. Estimated additional expenditure related to maintenance of the transport department is presented in Table 6.

Table 6.
Sum of incurred costs (PLN)

Year	Total costs incurred (employee retention, vehicle purchase, vehicle insurance, vehicle inspection, diesel consumption) [PLN]	Sumy paid by the customer (transport costs) [PLN]
I	(108 309 + 106 147 + 11 048 + 0 + 36 600) = 262 104	196 452
II	(117 019 + 84 816 + 11 048 + 2457 + 40 200) = 255 600	218 265
III	(137 961 + 84 876 + 11 048 + 5100) = 274 385	223 550
IV	(157 817 + 84 876 + 11 048 + 5100) = 300 121	190 972

Source: Authors own work.

The data analysis shows that the total costs incurred to maintain the transport department's resources are 1092,220 [PLN], and the total costs (maintenance costs minus the sums paid by the customer) are approximately PLN 263,000 [PLN] over a 4 year period.

6. Cost analysis in case of outsourcing

The number of courses performed was analyzed by the carrier (Table 7) in the given zone and year, as well as the price list of transport services (Table 8), depending on the delivery zone: zone I – distance to 5 km, zone II – distance 5-15 km, zone 3 – distance 15-30 km and zone IV – distance over 30 km.

Table 7.
Number of courses performed by the carrier [number]

Year	Zone 1	Zone 2	Zone 3	Zone 4
I	1477	2644	728	22
II	1729	3108	642	27
III	1663	2854	847	34
IV	1403	2482	748	33

Source: Authors own work based on internal data of the company.

Table 8.
Price of outsourcing services

Delivery area	Price list
Zone I	30
Zone II	40
Zone III	70
Zone IV	70 + 2,2 zł for every one started km

Source: Based on (Kotarz, 2011).

Analysis of the data in tables 7 and 8 shows that the carrier made 4871 courses in year I, 5506 courses in year II, 5398 in year III and 4666 courses in year IV. Taking into account the price of services (Table 8) and taking into account the amounts paid by the customer (Table 9), the cost incurred by the hypermarket associated with the outbound transport service is estimated at (net) level:

- 5713,11 [PLN] in year I,
- 4748,36 [PLN] in year II,
- 2808,19 [PLN] in year III,
- 5434 zł [PLN] in year IV.

Table 9.
The amounts paid by the customer

Year	Total cost incurred(depending on the number of kilometers traveled, zones and prices in a given zone) [PLN]	Sums paid by the customer (transport costs) [PLN]
I	203422	196452
II	218265	218265
III	226976	223550
IV	197602	190972

Source: Authors own work.

The total cost of the hypermarket is estimated at over 18,500 [PLN].

7. Comparison of expenditures

The calculations (data in column 3 – Table 10) show that, as a result of the use of outsourced transport activities, the company saved over 240 000 PLN net in 4 years. This is the better solution comparing to using own transport activities.

Table 10.
Total cost incurred [PLN]

Year	Costs – own activities [PLN]	Costs – outsourcing [PLN]	Estimated net profit [PLN]
I	65652	5713	59939
II	37335	4748	32587
III	50835	2808	48027
IV	109149	5434	103715
Sum	262971	18703	244268

8. Conclusion

On the basis of data we can say that the gross salary of serial employee is 2460zł and the net salary is 1782,82zł. The cost for the employer is 3922,55zł. In the case of deputy we can say that the gross salary is 2807zł and the net salary is 2022,17zł. The cost for the employer is 3329,89zł. In the table 3 we have the comparison of the salary and the estimated cost of living.

The data analysis shows that the total costs incurred to maintain the transport department's resources are 1092,220 [PLN], and the total costs (maintenance costs minus the sums paid by the customer) are approximately PLN 263,000 [PLN] over a 4 year period.

Utilization in the supply chain of an outsourced transport company allowed to obtain financial benefits in the examined enterprise at the level of over 240 000 [PLN]. This is the better solution comparing to using own transport activities. Within four years of hypermarket existence the company reduced its own costs. It would be wise to consider whether or not to use outsourcing companies in other departments such as the security or maintenance department.

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SENSORY BRANDING AND MARKETING IN STIMULATING THE RELATION BETWEEN THE BUYER AND THE BRAND

Agnieszka WALA[1*], Krzysztof CZYRKA[2], Józef FRĄŚ[3]

[1] The Jacob of Paradies University in Gorzów Wielkopolski, carla74@wp.pl, ORCID: 0000-0001-5931-044X
[2] Collegium Da Vinci in Poznan, kczyrka@interia.pl, ORCID: 0000-0001-7550-6098
[3] Poznan University of Technology, jozef.fras@put.poznan.pl, ORCID: 0000-0002-7263-7006
* Correspondence author

Abstract: Classical marketing is becoming less effective. Senses and emotions, as well as a buying mood, the atmosphere of the place, where the decision to purchase is made by a buyer have key importance in stimulating both the creation of shopping behaviours and the consumer – brand relationship. The use of sensory (sensual) branding is a departure from the 2D brands, communicating through sight and hearing, towards the 5D brands, which affect the five different human senses. Sensory marketing and branding enable building a relationship with the brand, keeping the brand awareness alive, increasing sales, and exceeding the competition to a higher extent. New technologies create and strengthen the space of the buyer's experiences with the brand. The neuromarketing research shows that emotions play a significant role when making the purchasing decisions.

Keywords: sensory marketing, sensual brand, emotions, purchasing behaviors, neuromarketing.

1. Introduction

The holistic approach to the sensory marketing involves all five of human senses, which results in providing buyers with a specific range of sensory experiences using all the five senses and affecting their purchasing decisions. To some extent, sensory marketing supports the process of marketing communication. Brand, which affects the five senses takes on this individual and distinctive character against competitive brands. Understanding the importance of senses regarding their influence on the human brain and evoking emotions related to the receiving of specific stimuli are of key importance for the development of the sensory marketing and sensual brand strategy. The synergy effect of senses increases the impact on purchasing decisions, perception of brands and the buying mood. What becomes an additional challenge is adjusting the sensory (visual, auditory, olfactory, tactile, gustatory) strategy and respective stimuli to buyers' preferences to produce the desired sales effect.

The aim of the discussions conducted by the authors was to present the concept and tools of sensory marketing compared with the potential of influencing the sensory branding, aimed at inducing certain purchasing decisions and building a relation with the brand. Authors of the article used the modern theory of sensory marketing concepts, research findings, including the neuromarketing-reltated ones as well as the sensual brand market application references.

2. Atmosphere of the place and its importance in sensory marketing

The task of the sensory marketing creators is to express the brand identity and the goodwill to create such a sensual image, which will affect the five human senses (Krishna, 2011, p. 9; Grzybowska-Brzezińska, Rudzewicz, 2013, p. 69). Sensory marketing uses the well-perceived actions aimed at evoking certain associations and reactions (Hultén, Broweus, van Dijk, 2011, p. 12; Lindstrom, 2009, p. 10). American Marketing Association defines sensory marketing as techniques that aim to seduce the consumer using senses and to affect their emotions and behaviours. S. Rieunier understands it as a set of all activity variables controlled by the manufacturer or retailer to create this specific, multi-sensory environment related to the product or service, or through the product itself, the message or the point of sale environment (Valenti, Riviere, 2008, p. 8). Formation of the term "atmosphere" dates back to the first half of the seventeenth century as a combination of two Greek words *ατμός* (atmos) – water vapour and *σφαίρα* (sphaira) – sphere. It was initially used to determine the planet activity zone. The development of science has given the term "atmosphere" a new meaning, hence the word is also understood as a zone of gases, the coating surrounding the Earth. Its metaphorical sense has been used since the eighteenth century to describe the atmosphere, the emotional colour of the space (Wala K., 2018). The term "atmosphere" defined by the American Marketing Association indicates the physical characteristics of the place of sale, such as architecture, layout, signs and displays, colour, lighting, temperature, noise and smell. It is to create an image in the mind of a customer. The term "atmosphere" understood as a concept of the consciously designed space was introduced to the marketing by P. Kotler as early as in 1973. The space perceived in such manner was to generate certain emotions and behaviours of buyers. Sight, hearing, touch and smell are said to be the atmosphere perception channels. In the opinion of P. Kotler the atmosphere elements include: in the area of sight: colour, brightness, size, shape; in the area of sound: volume and pitch; in the area of smell: the colour of smell, freshness; in the areas of touch: softness, smoothness, temperature. On the other hand, Rieunier S., when approaching an issue of the atmosphere components, includes taste as one of them and recognises the atmosphere elements as the following factors: visual ones: the environment colours, materials, lights, the place layout, cleanliness); auditory ones: music, noises; olfactory ones: natural aromas, artificial fragrances; tactile ones: materials, temperature, weight; and gustatory one: food samples (sampling) (Högskola, Halmstad Marketing Dissertation, 2008, p. 9).

The enhanced composition of atmospheric factors presented by L.W. Turley, and R.E. Milliman distinguish five categories including: external factors (e.g. size and colour of a building, architecture, environment, an exhibition window), internal factors (e.g. scent, music, temperature, light, cleanliness, colours etc.), layout and design (arrangement of the space, direction, location and the exhibition of goods etc.), a point of sales and decorations as well as the human factor (the employee characteristics, uniform, crowd, privacy) (Wal, 2018).

Atmosphere is also frequently understood as a specific combination of its elements. The fact that they have a direct impact on the nervous system of buyers is used to stimulate certain parts of the brain to evoke a desired response in the field of emotions and behaviours resulting from a proper selection and concentration of the atmosphere components. The challenge lies in recognising the relation and the extent to which a combination of the specified atmosphere elements should be formed to achieve the desired response of buyers by stimulating their behaviours. It is of great importance in relation to the expected range of the increased period of time spent by the buyer at a point of sale, an increase in the number of impulsive buying tendencies and ultimately to the increase in sales. Reactions to the atmosphere may vary, since they are determined by gender, age, culture or experience of buyers (Wal, 2018).

The research shows that 2/3 of the purchasing decisions have been taken when in a shop. Half of the respondents indicate that the corresponding atmosphere may incline them to remain at the point of sale longer. For that reason, atmosphere is regarded to be the main reason of the sensory marketing (Maleszka D., 2018). Modern marketers are coming to understand that referring to many senses reinforces the communication, the message concerning the brand, and for that reason it has become the tool so frequently used by them.

2.1. Sensory marketing tools

In order to succeed in applying the sensory marketing strategy it is significant to stimulate the greatest possible number of sense, optimally five ones, in buyers and to evoke the desired response and positive sensations by the applied stimuli/atmosphere elements.

Sensory memory is of great significance in this respect, because it enables the buyer to memorise e.g., the experience quality and at the appropriate moment to recreate and associate it with a particular brand, situation, person or product. The effect of sensory memory is to create an emotional bond with the recipient and to evoke desire to purchase the brand/product.

Sense of sight. M. Lindstrom states that "efficiency and precision of the eyes and brain are incomparable with any device that has been invented up to now" (Lindstrom, 2009, p. 133). Most people regard sight to be the most important receptor and trust the vision-based perception entirely. The importance of the sight as a sense has been confirmed by the fact that human eyes, as an organ, represent two-thirds of all the sensory cells of the human body.

Sight enables an individual to distinguish differences between objects in terms of their size and colour, colour intensity, to capture contrast, evaluate the distance from the objects being observed, as well as to identify both their movement and the movement direction (Grzybowska-Brzezińska, Rudzewicz, 2009, p. 69). Taking into account the marketing perspective, it is of great significance in terms of perceiving new products, interior design of a point of sale, as well as the customer service and the employee dress code. In order to create visibility and expose identity of both the brand and the organisation it is necessary to visualise sensual experiences. When being visualised, the sense of sight is of crucial importance in the process of building and maintaining brand awareness as well as in creating its image. Visual chaos, as well as a great number of images surrounding people weaken the stimuli affecting their vision and subsequently make them pay much less attention to them at present (Lindstrom, 2013, p. 120-121). The product is estimated to have only 0.06 seconds to draw the attention of a prospective buyer to itself in the large-area store.

Sense of hearing. Sound has for a long time been present in marketing messages and the brand communicating manners, as well as in the process of informing about the organisation and its products, usually with the use of the radio and television. Currently, the Internet has also become a space for the sound-based communication exposure. Technology development enables sound to be incorporated within a variety of advertising systems in such an innovative way, which facilitates drawing the attention to the marketing communication.

The sound is to single out the advertising message and to focus attention on it. Practical uses of the auditory stimuli affecting the sense of hearing involve audio advertising, jingles, sound logo of a brand/company, voice characteristic for the brand communications, phone sounds specific to the certain mobile phone brands as well as music associated with a particular brand. Slow music makes buyers remain at the point of sale even up to 18% longer and may increase the purchasing decisions by 35% (Grzybowska-Brzezińska, Rudzewicz, 2009, p. 70). When it is appropriately selected, it favourably affects both the customers' well-being and their purchasing tendency. This is how the brand atmosphere is created. Millward Brown research has shown that more than 65% of buyers change their mood when simply being influenced by the received sounds. Both the pace and repertoire of music influence the behaviours and tendency to spend money.

Sense of smell. The human body responds to the olfactory stimuli very quickly. They reach directly into the brain at a pace much faster than the impulses provided by other senses. The volatile substances, causing olfactory sensations, reach the brain from where they are subsequently transmitted to the limbic system. It is the structure system of the brain, which regulates emotional behaviours. According to D. Rock, the limbic system gets easily stimulated (Rock, 2011, p. 149). The sense of smell affects both the memory and the emotional state of people. The aroma, which accompanies the event, makes its near-photographic image be stored in the human memory. Furthermore, it is the smell, which enables one to recall memories associated with it. Smell and taste are described as chemical senses, which are closely related to each other. Research has proved that a pleasant fragrance improves the mood by 40%, especially when the scent is associated with a happy memory (Lindstrom, 2009, p. 121). Psychologists P. Aarts and J.S. Jelinek, who explored the subconscious impact of smell on emotions and human behaviours, have referred to it as the Hidden Memory of Scents. This confirms the theory indicating that smell is one of the factors influencing either the buying decision-making process or using a specific product. Smell is the associative sense. Responding to scents is associated with the events memorised along with the smell. This is referred to as the Proust effect. This also involves the effect of exposure, namely "the more known something is, the more appreciated it becomes". Research has shown that 80% of men and 90% of women identified their intense memories when triggered by smells and which resulted in strong emotional reactions. Scent stimulates buying decisions faster and affects higher loyalty to specific brands (Maleszka, 2018). The significant role of the sense of smell is also observed when brands are accepted by buyers. Smell is being increasingly used as a branding medium by marketers (Lindstrom, 2009, p. 122). The use of scent marketing (aromamarketing) is targeted to create a pleasant atmosphere at the point of sale/service or work, to make people spend more time in these places when shopping or working. Just like in the case of the following premium car brands: Audi, BMW, Mercedes or Volvo – they are characterised by the specific fragrance used in the production of the subsequent models (Kuczmar-Kłopotowska, 2014).

Sense of taste. Scientifically, taste is seen as the chemical gate leading to the brain. That is enabled by the number of approximately 9,000 taste buds, which enable recognition of hundreds of chemicals. Science indicates that all people are born with a natural preference for a sweet taste and avoidance of a bitter one, since the latter has for ages been associated with poisons (Walewski, 2018). An average inhabitant of the Earth is able to distinguish the taste of approx. 4.000 substances. Taste buds transfer information concerning the type of taste, salty, sweet, sour and bitter, to the brain. The bitter taste is the most sensitive and the most complex one and may involve up to 25 different receptors. Since 1985, when the existence of another taste "umami" was recognised, it has been distinguished in, amongst other, soy or fish-based sauces, as well as in the so-called "Chinese soups". They are greatly enriched with its source – the monosodium glutamate, which affects all of the taste buds, enhances and improves other flavors, as well as increases the culinary attractiveness of dishes. Taste is also referred to as a "near sense", because it cannot be used at a distance. Taste identification, including appetite, is affected by mood (Hulten, Broweus, 2011). It may be disturbed, e.g., by certain drugs or hormones and it varies with age. Taste buds are stimulated by the scent. Taste is closely associated with smell, shape and colour. Products are rarely marketised through taste. "Taste is not structured, it cannot be proved" (Lindstrom, 2009, p. 122). Many experiences are the result of olfactory sensations.

Sense of touch. Man would not be able to function properly without touch. It is perceived by skin. Touch is sensed and registered by the brain due to the sensory receptors located in the skin. Temperature, humidity, pain, smoothness, roughness, softness, sharpness and movement may all be experienced by man. Touch is psychologically significant in the process of establishing and deepening relationships with another person. In view of biology, the superficial (exteroceptive) sensation, represented by the touch and vibration sensation and by the reception of pain stimuli and temperature is distinguished. On the other hand, the deep (prioproceptive) sensation is a sense of orientation related to one's own body position. This feeling enables receiving information concerning both the body position and its movement. The proper visual and spatial coordination is determined by an efficient system of the deep sensation. From the marketing and sales perspective, the sense of touch is regarded to play an important role in perceiving both the products themselves and their quality, especially in the process of buying, inter alia, cars, food, clothing, electronic equipment, because the decision to purchase results from the physical contact with the product. Both the material and surface used to manufacture certain products are of great significance in the touch-based sensations. Equally important are weight, softness/hardness, shape and temperature. In communication, the materials used in the product constitute a significant factor of identity and of building associations with strength, naturalness, cosiness. It is frequently observed that before the customer ultimately chooses and buys the product, they touch it (e.g. bedding, clothes, shoes, underwear, ceramics, furniture, cosmetics) in order to check its high-quality workmanship (Grzybowska-Brzezińska, Rudzewicz, 2009, p. 71). The studies performed by M. Linstrom found that tactile sensations are an important criterion when purchasing a car for 49% of the respondents as it is connected with touching the steering wheel and all the switches, whilst for only 4% respondents they are considered to be irrelevant (Lindstrom, 2009, p. 110). Tactile sensations are also significant in terms of services. This is related to the importance of packaging service perception, which is understood through the atmosphere, equipment of the place where it is provided and the customer service. The examples include the warm, cosy interior, characteristic for the slow food restaurant, and the ascetic one of the fast food ones.

3. Sensory branding - the concept and application of sensual brands

For ages, the object of interest for researchers, marketing practitioners, and many others, has been the response to the question on the manner, in which the buyers make purchasing decisions as well as on the type of stimuli and their way of influencing the purchasing choices? Why are certain brands bought more willingly than others? How do recipents respond to advertising? The concept of neuromarketing is associated with applying the measuring tools used in the analysis of psycho-emotional behaviours of people to the marketing stimuli optimisation process. Neuromarketing is based on the knowledge regarding the brain being used by people to make decisions. The main hypothesis in the neuromarketing assumptions is that people make purchasing decisions following emotions rather than rational thinking. The neuromarketing research, which is being increasingly applied, is to provide a complement to the traditional methods of measurement. These studies focus on categorising an emotion along with the intensity the emotion is expressed with when the brain is exposed to an advertising communication, or products, packaging and other facilities. The elements of a testing method combination, frequently used for this purpose, which enable such observation are: electroencephalography (EEG), GSR (the galvanic skin response study) and the eye movement observation. Application, as described by M. Lindstrom, of the most sophisticated brain imaging tools, i.e., fMRI and the advanced version of electro-encephalograph (SST – Steady State Typography), allows to register the brain changes in real time. The study started in 2004 and chaired by Dr Gemma Calvert has shown, inter alia, that posting the images of cancer victims on cigarette packs does not only discourage smokers from the cigarette buying and smoking, as was expected, but contrarily, it stimulates the region of the brain referred to as its pleasure centre (nucleus accumbens). When the body desires something, the specialised neurons within the nucleus accumbens area give light (e.g., when there is a craving for alcohol, nicotine, sex, gambling, drugs) (Lindstrom, 2009, p. 110). It has become understandable, e.g. in the process of product placement. The research conducted in the USA has shown that this particular type of sponsorship must be integrated with the program storyline or the movie plot in a clever and sublime way in order to increase the brand profitability. The product must also make sense within the story. If both the brand and its product do not intersperse with the movie content they will be ignored by viewers. For the recipients to memorise the brand, it must be of a significant role in the scenario. Discovery of the mirror neurons, responsible for, amongst other, our imitating of other people turned out to be a groundbreaking issue. "Mirror neurons play the same role in psychology as DNA in biology". (Lindstrom, 2009, p. 62). They are responsible for people's unintentional imitation of others (we smile when seeing happy and become sad in the presence of the hurt ones). This is of great significance in the context of stimulating the behaviours of buyers through brand messages and communications. Mirror neurons also correspond to human empathy by providing impulses to the limbic system (representing certain emotions as well as the adjustment to other people's feelings and behaviours) (Lindstrom, 2009, p. 65). Use of the mirror neurons enables the recipient to be excited with sensations resembling the actual touching of the advertised product. Knowledge concerning the response to mirror neurons results in creating the kind of advertising which activates this type of cells (Chmielewska, 2018). The study conducted by the Oxford professor, Ch. Spence, on synesthesia, a neurological condition, in which sounds are perceived as fragrances, scents as colours, flavours as sounds, has shown that "the high-pitched sounds and the piano-related sounds are associated with a sweet taste. On the other hand, low frequencies and brass instruments are connected with a sensation of bitterness. To provide an example – Starbucks commissioned Spence to select a piece of work, that would enhance the taste of coffee. Sound of the defined letters may also evoke appropriate sensations. For that reason, the deliberate use of the "I" letter in the IKEA or LIDL names is associated with cheap shopping. Associations are also evoked by shapes, e.g., the symbol of a star placed on the beer packaging is combined with a beverage.

3.1. Sensory branding – creating the sensual brand

Marketing and brand management require a change in approach. It is estimated that as much as 8 in 10 of the new products fail in the first quarter of their presence on the market; in Japan, the ratio is even higher and it amounts to 9.7. As it has been estimated by the IXP Marketing Group, approximately 21 thousands of new brands are launched to the market annually, whilst, 52% of brands and 57% of individual products decline after a year (Lindstrom, 2009, p. 35). Sensory Branding (experiential, sensual) is an important direction of changes towards the XXI century development of branding. In its essence, the experiential brand is based on the following beliefs:

- sensual sensations stimulating emotions have a greater impact on people's behaviours than reasonable arguments,
- the product may be assimilated to a sum of sensory experiences (through sight, hearing, smell, touch, taste), which results from touching/using the product,
- the brand identity also creates the space, where the brand is experienced, the environment, where the brand is exposed as well as the atmosphere of the space. The service space, referred to as "service landscape" is understood as a space in real terms, including stationary shops, shopping malls, cinemas, travel agencies, restaurants, hotels and in virtual one – online shops. This is not only the space to make transaction, but to create the brand image as well as to experience, namely to sense the brand.

Foundations of the sensory brand include:

- expressions embedded in a rich brand identity, aimed at buyers, receiving incentives as specific sensations using the five senses; they are also the way to reveal the soul of the brand, to expose its essence. What is recommended here is the holistic approach, also referred to as the 5D model of the brand, which engages all the five senses and affects the buyers in both emotional and rational manner;
- personalisation and individualisation of the communication – the more significant is to build a relationship with an individual client than with a homogeneous market segment and to engage them through a dialogue or an experience;
- brand identity is generated through the desired, from its perspective, styles of life, consumption and personality of buyers. This is the basis for creating the space and atmosphere of a contact with the brand through the service- and trade- providing places and commercial events associated with a particular topic. According to

M. Lidstrom, sensual branding currently enables the creation of the strongest relationships between the brand and the buyer ever seen (Lindstrom, 2009, p. 135). Brands should aim for sensory perfection. It is possible only if the brand is provided with a specific potential, formed by: 1. application of the sensory elements, which are already present in the existing activities (the goal is to optimise the brand foundation. A stronger foundation is created by more sensory elements, which contribute to forming and strengthening the relationship with the client); 2. the synergy effect between the sensory elements – creating this effect is necessary for the brand. The research results conducted by NASA show that the strong synergy effect is observed between human senses. It is possible to double the branding communication effectiveness with the use of sensual synergy; 3. innovative sensory thinking allows to exceed the competition; 4. Sensory consequence as a reflection of all the brand values typical only for the brand itself – sound, colour, logo, smell, shape, design. This is one of the most significant brand foundations. It allows to generate the brand trust, as well as to attract and retain the loyalty of buyers. The elements significant in this respect are the brand history, its tradition and rituals; 5. sensory authenticity – composed by the subjective factors (reality, relevance, ritual, repetition); 6. definite and positive sensory associations with the brand – indicates controlling a specific sensory experience by the brand. That is the manner in which 1% of the largest world brands operate; 7. permanent development of all the sensory elements – including identification of all the potential sensory factors that may be associated with the experiencing and using of the brand products, and subsequently with their selection and the reduction of the ones, which may harm the brand, as well as the selection of the most positively important ones; 8. Brand breakdown – if the logo is hidden, will the brand still remain characteristic and recognisable. Breaking down the brand into the sensory elements (name, symbol, language, shape, colour, image, navigation rules, ritual, tradition, service, behaviour, sound), as well as obtaining the synergy effect, which results from the composition of all the elements and the manner they are managed. Each of these elements should be independent and easy to be broken down, which means constituting individually a characteristic element of its identity. The research conducted by M. Lindstrom in 18 countries has shown the increase in brand loyalty by 30% if more than one sense of a buyer is involved, and by 70% if three senses are integrated together.

3.2. Sensory marketing application

Application of the digital signage, also referred to as digital merchandising, narrowcasting or the "digital house exit" is a growing trend within the area of sensory marketing and the sensory brand communication. This is an integrated form of managing the system of electronic displays (digital signage, infokiosks), being the information, advertising and other communications (through e.g., LCD , LED, plasma display and multimedia projector media). These screens are referred to as public displays. The digital signage system displays are applied as reference to the place in, inter alia, travel agencies, shopping centers, and shopping malls, stores and service networks and airports). Adjustment is significant if the sensory strategy in marketing is to be successful. Fragrance mixtures, playlists, point of sale or service equipment to be applied in interaction with the sensory brands should be selected based on the role of smell, sound and/or touch in the marketing strategy considering the buyers' preferences. Improper adjustment may prompt buyers to a rapid, irretrievable exit from the point of sale.

Sensory marketing has become a business discipline. In Poland, it is still rare to recognise the brands using the full range of its possibilities. Music, scent and digital signage are applied to a very limited extent. The sense marketing, which involves all five senses of buyers, is widely used in the United States, Australia, as well as in the Western Europe contries. The effect of influencing the behaviour of buyers additionally strengthens the application of new technologies and the use of the augmented reality elements, including mobile applications. The currently used tendencies Include the so-called Experience Design. Comprehensive sensory connections and mobile applications, enabling creative and effective communication with the clients, are developed on the request of business customers. The architecture of positive experiences evokes emotions affecting the desired perception of brands (e.g.: virtual fitting-rooms in one of the famous clothing chain for young people). Sensory marketing is also observed on the Internet. The 3D image technology has increased the marketing and visual potential of images. Spatial sound also contributes to the increase in the sensation range. The touch screen technology makes it possible to expand the scope of the two applied senses (image and sound) by the third one, the touch, which results in increasing the buyers' involvement and extending the space of experiencing the brand. It also must be noted that the multi-sensory approach is transferred to the world of advertising in a manner other than before. In the United States the fragrance of a new car model of a well-know brand was promoted in the printed press. According to the research conducted by M. Lindstrom, at the top of the 20 global brands, which use their sensory potential to the highest percentage are: 1. Singapore Airlines (96,35), 2. Apple (91,3), 3. Disney (87,6) (Lindstrom, 2009, pp. 254-256).

Summary

The concepts of sensory marketing and branding, presented by the authors, in relation to their significance and impact on the behavior of buyers, making impulsive purchases and building the brand relationships/bonds are consistent with the current and future challenges of marketers, especially in the context of a high degree of assimilation of many brands and difficulties in ensuring their market success. Some important aspects of the sensory marketing strategy include creating the right atmosphere, composing sensory stimuli in the right and unique adjustment, evoking emotions and shaping the experience space of the buyer. The important thing to consciously create and apply the sensory brands as a model involving all the five senses is to understand the scope and strength of emotional impact on the buyers' behaviour and their purchasing decisions. The research cited by the authors confirms the effectiveness of the presented sensory marketing solutions and strategies with regard to increasing sales and relationships with the buyer. The pursuit of brands to achieve the sensual excellence allows them to exceed the competition. New technologies develop the experience space of the buyer and they also may engage the senses by supporting the purchasing behaviour and strengthening the bonds with the brand. Emotions are an important factor, which influences the behaviour of buyers. The multi-sensory approach is understood as the future in terms of influencing the buyers.

However, in the light of the above considerations, it must be remembered that the offer-related factors, such as product/service quality, value for money, service, brand integrity and level of innovation, remain significant apart from the application of the sensory marketing different forms and the use of the brand sensory potential.

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wydawnictwo_mark@polsl.pl

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