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Table of Contents

Volume 7 • Issue 4 • 2015
pages: 14-22

Importance of economic and noneconomic factors in collaborative consumption

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Joanna Chudzian

ABSTRACT
The main goal of this paper is to point out the awareness and activity of young consumers in the area of collaborative activities and to indicate what factors condition such attitudes and behaviours. The study performed has comparative character and was conducted on the group of active user of one of the forms of collaborative consumption and on the control group with a use of questionnaire. Results show clearly that people who do not use this form of collaborative consumption consider economical aspects more important. Active users, on the other hand, value higher ecological, social and psychological benefits. Additionally, the research shows the profile of collaborative consumption users as well as factors that drive their activity. This research aims at answering hypotheses spread about collaborative consumption being a trend corresponding only to economic crisis.

KEY WORDS
consumer behaviour, collaborative consumption, sharing economy, mesh

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Introduction

In modern world social, economic, cultural, environmental or technological transformations have a huge impact on everyday life of consumers as well as their behaviour on the market. This is happening due to high dynamics of consumer markets, globalization, rapid development of new technologies and the ability to immediately react to changing conditions. At the same time, consumers, especially young ones, increasingly require individual communication with companies, instant feedback and offers adapted to changing situations. They become more aware of the impact production and consumption exercise on environment. In the era of high urbanization consumer trends tend to develop rapidly. On the other hand, consumption plays definitely more important role in peoples' lives than decades ago, determines their position in society and shapes their image. Thus, consumption dictates rhythm of consumer's life and is in the spotlight of people's interest. Under specific economical circumstances these long-term changes gave life to the trend widely known as collaborative consumption. The goal of this paper is to estimate awareness and activity of young people in the area of collaborative initiatives and what influences and motivates such attitudes.

1. Literature review

The phenomenon of collaborative consumption (co-consumption, shared consumption, sharing, mesh) appeared in US literature for the first time in 1978 in context of the research concerning lending cars (Felson, Spaeth, 1978), but spread widely during the economic crisis in 2008, when the model of individual consumption, where people buy what the need individually or in small communities, mainly in families, proved to be hard to maintain. Economic crisis spreading over the world forced people to think about resources they use, and how they spend their money (Gansky, 2010). At the same time some

researchers observed (Bardhi, Eckhardt, 2012) that the relationship between affection to possession of goods and wellbeing became problematic and hard to resolve for consumers. A result of these changes was the development of alternative consumption (Bostman, Rogers, 2010), defined as an economical model based on lending, exchanging, barter trade or paid access as an opposition to possession. It allows consumers to maintain access to products and services at lower financial costs but with greater use of other resources, for example time (Lamberton, Rose, 2012; Sacks, 2011).

Bostman and Rogers (2010) suggest that apart from economical aspects main driving forces of consumer collaboration development are technology, urbanization and ecology. Such model could progress due to rapid development of internet-related technologies, since the majority of collaborative initiatives take place on Internet platforms. Urbanization, in turn, leads to a situation where accumulation of people in one area on one hand facilitates access to goods and services, on the other one imposes limits on consumption and accumulation of goods due to shrinking living space. Third aspect, pro-ecological initiatives are important driver of collaborative consumption, since reflection on natural environment and sustainable development imposes restrictions on production and in consequence on creating waste (Lehmann, Crocker, 2012). Similarly, sustainable development is based on common facilities like public transportation. In turn, Owyang (2013) marks out three main reasons for such growth of collaborative consumption: funded in society (for example increasing density of population, need for being member of community), related to economics (for example sell superfluous goods, increase financial cushion) and technological (for example development of mobile technologies and modern payment systems, social networking).

Main aspects of collaborative initiatives are concentrated around three categories: product services systems (paying to access the benefit of product instead of having to own it), collaborative lifestyles (non-product assets such as space, skills or money are exchanged and traded in new, non-obvious ways) and redistribution markets (redistribution of unwanted or underused goods), (Bostman, Rogers, 2010). In the Tab. 1 main aspects of collaborative consumption in Poland broken down by categories are presented. Product services systems contain initiatives that exchange products with services corresponding to usage of these products („use rather than own"). Redistribution markets category covers actions that aim at extending lifespan of products and avoiding production of new ones and in consequence limiting produced waste. Collaborative lifestyles category covers initiatives where the main good to share are intangible assets (like time or place) and the main form of execution is building social relationships through exchange on local and global levels.

Tab. 1. Main aspects of collaborative consumption in Poland

Category	Collaborative initiatives
Product Service Systems	Car sharing (Blablacar, Carpooling, Zipcar)
	Peer-to-peer lending & loans (loans executed between strangers through social networking portals)
	Time banks (exchange of services)
Redistribution markets	Clothswap
	Exchange of toys (toyswap) and products for children
	Book & DVD swap
Collaborative lifestyle	Couchsurfing (accommodation at private homes, at various locations around the world)
	Gym co-rental
	Cohousing & roomsharing (shared accommodation, renting apartments together)
	Coworking (co-renting office space or other space to work)
	Crowfunding (co-raising money for social, artistic or business projects)

Source: own research based on the literature listed in the bibliography and categorization of collaborative portals operating in Poland.

The basis for collaborative consumption model is the need of consumers to gain temporary access to goods and services without having to own these goods, according to „use rather than own" (Leismann et al., 2013) or „access-based consumption" (Bardhi, Eckhardt, 2012) scheme. At the same time, consumers entering the relations of exchange or lending base their behaviour on trust (Gansky, 2010), since the activities are often informal and involves some risk. For that, some researches are disputing what are the main drivers for consumers to participate in collaborative initiatives. Some of them (Walsh, 2010; Bardhi, Eckhardt, 2012) look for these drivers in economical reasons and argue that economic benefits, that is low costs of such activities are the main reason for consumers to take part in such initiatives. Also, perceived lack of economic benefits may prevent consumers from participating in collaborative consumption (Buczynski, 2013). This view is supported by the fact that the majority of forms of collaborative consumption developed during economic crisis. Additionally, polish surveys from 2012 (Wardak, Zalega, 2012) show that the main motivations for consumers are economical benefits (cost reduction or possibility of earning money) and with improvement of economical conditions, consumers would be willing to give up such initiatives. At the same time, however, researchers admitted that the collaborative consumptions form they had examined was not even near to popular.

On the other hand, there are researchers who do not consider economical reasons as important in collaborative consumer behaviour. Botsmanand and Rogers (2011) argue that collaborative consumption is rather motivated by more than just cost-savings. Gansky (2010) suggests that consumers' attitude towards consumption is changing in general and is in fact main driver of the sharing economy. Consumers enjoy trying out new brands (Gansky, 2010) and are open to modern and new ways of meeting their needs (Botsman, Rogers, 2011; Bardhi, Eckhardt, 2012). Additionally, activity in areas of sharing economy is often associated with pro-environmental attitudes (Leismann et al., 2013) or voluntary simplicity (minimalism), (Bostman, Rogers, 2010).

These premises allow for judging that the collaborative consumption trend will remain in mainstream even once the economy comes fully out of the crisis. It seems that due to the fact it has been eight years since the beginning of world economic crisis and the development of the new forms of collaborative initiatives is still on the rise, there are premises to examine whether financial and non-financial factors affect this situation.

2. Reseach methods

Verification of awareness and activity of consumers in the area of collaborative consumption among young people and identification of influences and motivations behind such attitudes and behaviours was carried out with the use of questionnaire research.

While such research has not been carried out exhaustively, the experiment design took into account results obtained in international research concerning collaborative consumption. Therefore the importance of the following aspects was verified:

- consumer attitude towards ownership/usage of goods (evaluating how important is the ownership, and how important is only the access to these goods);
- motiviations to participate in collaborative consumption (studying economic factors versus other factors);
- confidence and past experience (designing experiment to consider two groups – active, regular users of one of Polish collaborative services and control group);
- self-assessment of respondents' financial status.

Research questionnaire contains 10 queries with two of them in the form of matrix of questions. Queries concerned the aided awareness of specific forms of collaborative consumption, participation and frequency as well as perceived advantages and consequences of participation in these initiatives. Respondents were also asked about their perspective on their own profile towards ownership (own over use), as well as self-evaluation of their financial status. Demographic profiles were also acquired.

Studied population consisted of 434 respondents, where 108 of them determined the group of active and systematic users of collaborative consumption initiatives, while the remaining 326 people constituted the control group. The former was obtained by examining active consumers of pilkanahali.pl platform, which unites people who play together indoor sports. Access to these respondents was possible as a result of scholarship granted through „Nauka-Biznes-Kooperacja" project, carried out under the supervision og the Mazovian Unit for Implementation EU Programmes by the Institute for Enterprise Development and Social Initiatives under

Operation 8.2 Transfer of knowledge, Sub-operation 8.2.1 Support for cooperation between science and business of the Human Capital Operational Programme.

Examined population consisted of 235 women and 199 men. The core of the group was young people (78% under the age of 25) mainly from large cities (58% of respondents). Random sampling and random sampling with filtering were applied to construct the control and active users groups. Due to the fact, that the majority of platforms providing collaborative consumption services is addressed to young people living in cities, obtained population profile is consistent with the assumptions behind the design of the research population. Subsequently, the majority of respondents have high school (60%) or higher education (32%). Questions about family statues revealed 7% of people with children and 93% childless. There were 43% of people in relationship and 57% singles. These profiles were consisted between active collaborative consumption users and control group.

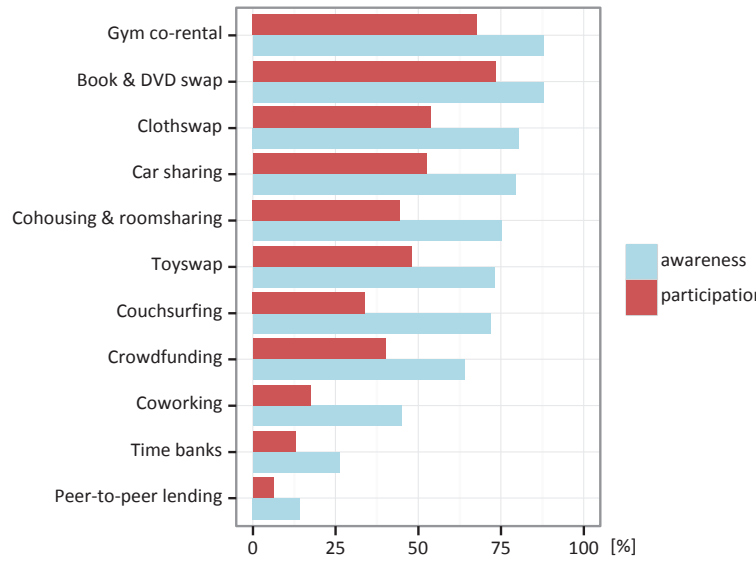

Fig. 1. Consumer awareness and participation in forms of collaborative consumption [%]

Respondents were also asked to self-assess their financial status and their attitude towards ownership/usage of goods. Majority (54%) consider their financial status as good or very good, 37% as average, while 9% of respondents find their situation with respect to finances as bad or very bad. As much as 75% of population admitted that it prefers to own the goods it uses. Consequently, 25% of people do not feel the need to own things they use and the most important is access to them.

3. Research results and discussion

3.1. Forms of collaborative consumption

In order to assess the extent of the phenomenon of collaborative consumption, respondents were asked to indicate which forms of collaborative consumption their aware of (aided awareness) and in which of them they participated at least once. The list of recognized forms of collaborative consumption presented in Tab. 1 of this paper was used for this purpose. In the Fig. 1 the aggregated responses from the questionnaire are presented.

Results presented in the Fig. 1 show, that the most recognized forms of collaborative consumption are those related to lifestyle (gym co-rental) and redistribution markets (books, DVDs and clothes swaps). Interestingly, the only well recognized form of product service systems is car sharing. The popularity of this idea in Poland increased widely due to the involvement of Blabla car – large car-sharing portal. The project consisting in arranging joint rides was free for both passengers and drivers through first years of operations. Since April 2015, the company introduced a new business model with fees charged on ride arrangements and at the same time invested further funds to promote the service. This study was made before the fees were introduced and it is interesting how the perception and results change over coming months.

It is also worth adding that the redistribution markets considered in the study are particularly popular among consumer from the 25-30 age group, especially those who live in relationships and have children. It is worth noting as well, that these people often organize collaborative initiatives informally, without awareness of the collaborative consumption trend instead of using dedicated exchange services.

The least popular forms of collaborative

consumption tend to be peer-to-peer lending and co-working, which are mostly related to reducing the cost of professional activity and were popular during economic crisis. It is clear then, that the trend that arrived in Poland from US and Western Europe is strongly anchored in local preferences since the very beginning.

3.2. ADVANTAGES OF TAKING PART IN COLLABORATIVE CONSUMPTION

Further results concern evaluation of advantages that could motivate respondents to use particular forms of collaborative consumption.

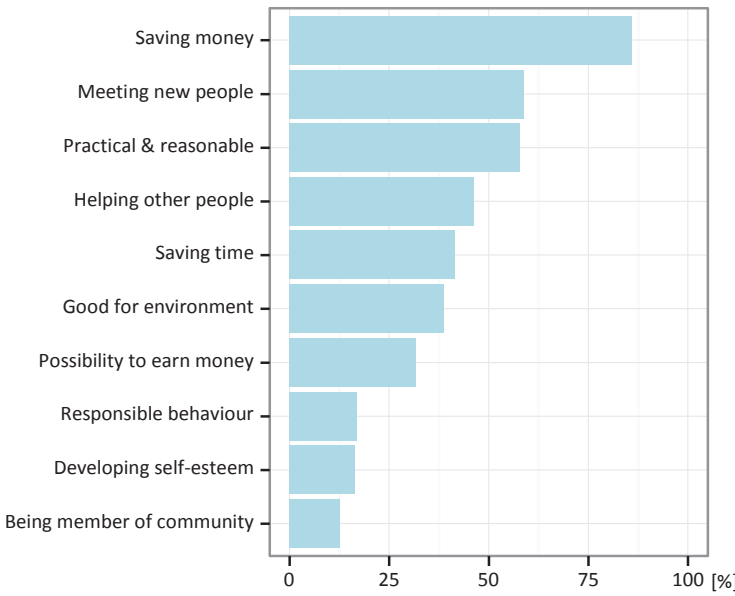

Fig. 2. Advantages of taking part in collaborative consumption [%]

In the Fig. 2 it is shown that the most frequent advantages pointed out by respondents are those with financial affiliation („Saving money"). Worth noting is the fact that the social aspect of collaborative consumption is important to people. Meeting new people, helping other people, care for common natural environment are among the most important advantages. Surprisingly, individual factors seem to have lesser importance, what is interesting enough to be a premise for further research in the area of individual features of collaborative consumption users.

At first, it seems that high score of „Saving money" factor confirms the economical motivations of consumers seen already in studies conducted in Poland and US. However, additional analysis showed that this result depends on several futher aspects.

In order to evaluate the degree in which economical factors are important to people, a specific group of respondents was seleceted. It contained people who indicated two economical advantages („Saving money" and „Possibility to earn money") of total of three important factors they were asked to point out. There were 127 such respondents and their characteristics were compared to the rest of the research population. For this purpose further statistical analysis was performed including Chi-squared test to evaluate differences of distributions of both groups. Graphical interpretation of these distributions is presented in Fig. 3 to 7.

First notable relationship was revealed between the groups of people actively participating in at least one collaborative consumption initiative. People who are already active members of collaborative initiative consider importance of financial aspects less often than those who are not active users (Fig. 3). It is therefore apparent, that financial aspects are more of an incentive for inactive people than a reward for active ones. Strong relationship was confirmed with statistic of Pearson's Chi-squared test equal to 15.44 with p-value around: 8.5e-05.

Another relationship, though slightly less signigicant, can be seen in the group of people differing in attitude towards ownership (Pearson's

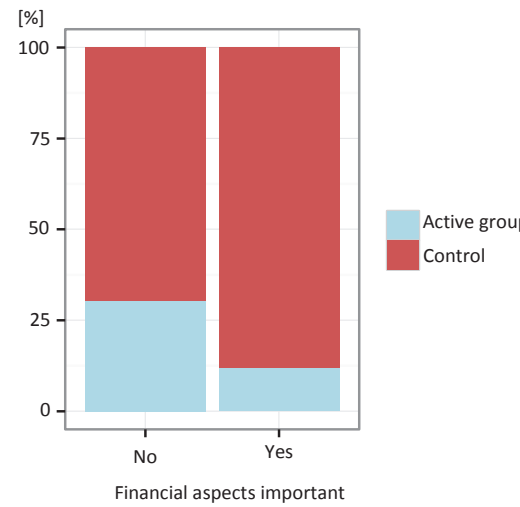

Fig. 3. Importance of financial aspects w.r.t. activity in collaborative consumption [%]

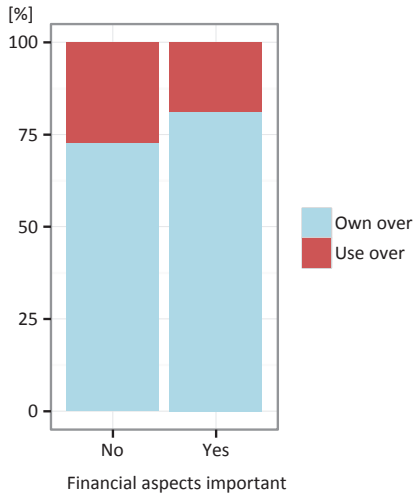

Fig. 4. Importance of financial aspects w.r.t. attitude towards ownership [%]

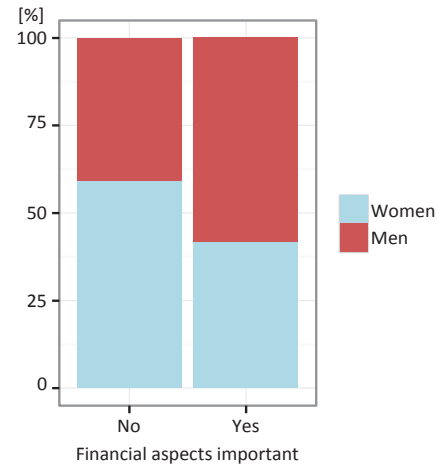

Fig. 5. Importance of financial aspects w.r.t. gender [%]

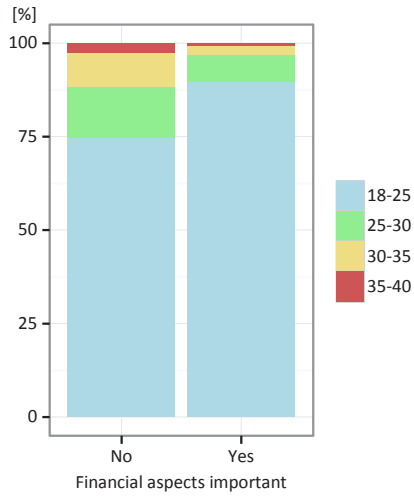

Fig. 6. Importance of financial aspects w.r.t. age [%]

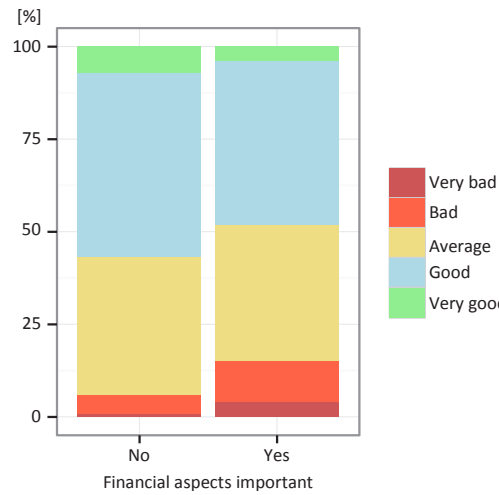

Fig. 7. Importance of financial aspects w.r.t. financial status [%]

Fig. 8. Disadvantages of taking part in collaborative consumption [%]

Chi-squared p-value: 0.083, statistic: 3.01). People who prefer to „own" over „use" consider financial aspects much more important than people who appreciate access to goods regadless of their possession (Fig. 4). It means that own-oriented people are more focused on economical side of collaborative consumption then use-oriented ones.

In futher analysis demogrpahical factors were put next to the priorization of financial aspects over other advantages. There is a strong statistical relationship between importance of financial features and gender (Pearson's Chi-squared test, p-value: 0.001, statistic: 10.45). Men pay more attention to financial advantages of collaborative consumption then women (Fig. 5). This finding stands in oposition to results of Zawadzka (2006) research who observed that women more ofthen present materialistic orientation than men. This result however, could be connected with high level of risk linked to collaborative consumption initiatives, which in turn fosters more pragmaric attitudes.

In case of age it can be observed (Fig. 6) that younger people consider financial aspects of collaborative consumption more important (Pearson's Chi-squared test, p-value: 0.004, statistic: 13.11). The most evident motive behid it is that young people are more focused on controling and maintaining their financial status and translate this attitude also on activities in the area of collaborative consumption.

The last important element differentiating valuation of importance of financial aspects of collaborative consumption is financial status of population (Fig. 7). In this case the better financial status, the less important financial aspects are. (Pearson's Chi-squared test, p-value: 0.022, statistic: 11.39). The reason is similar to the one observed in case of age. Poorer people are much more concentrated on dealing with financial aspects and tend to translate it on other areas, including collaborative consumption. In conclusion, the results of the reseatch show that financial aspects are significant motivation for people to participate in various forms of collaborative consumption, however psycho-demographic features highly differentiate these attitudes. In this case strong positive relationship between importance of financial aspects and the following features was observed: male gender, age below 24, poor financial status, own over use (materialism) and lack of experience in any collaborative consumption form.

3.3. DISADVANTAGES OF TAKING PART IN COLLABORATIVE CONSUMPTION

Another considered feature of collaborative consumption were disadvantages of taking part in such initiatives. The most often mentioned barriers were the risk of being cheated and potential abuse of trust. This confirms previous observations that trust is the most important individual driving force in collaborative consumption (Gansky, 2010).

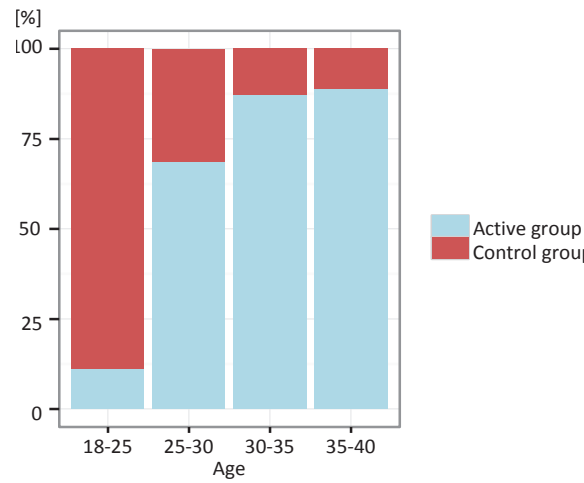

Fig. 9. Group membership w.r.t. age [%]

It is worth noting that the „risk of loosing money" was pointed out by less than half of the respondents. Considering that financial aspect was clearly more important among advantages, people consider possibility of earning money more likely than losing it.

3.4. PROFILES OF ACTIVE USERS OF COLLABORATIVE CONSUMPTION

In order to fully characterize the phenomenon of collaborative consumption further analysis was performed that compared active users of at least on collaborative initiative to control group.

First of all, collaborative consumption is strongly related to age (Chi-squared test statistic: 158.81; p-value < 2.2e-16). Very low value of p factor (lower than 2.2e-16, hence siginificantly lower than commonly accepted 0.05 level) allows for rejecting null hypothesis of independence of distribution of observations (respondents) in different groups of activity with respect to age. That said, age definitely influences how active in collaborative consumptions

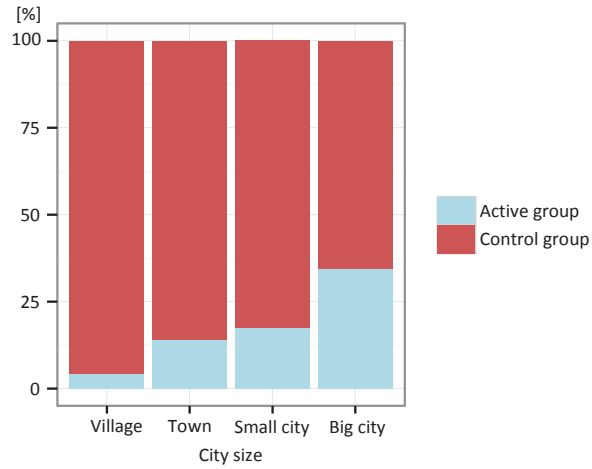

Fig. 10. Group membership w.r.t. city size [%]

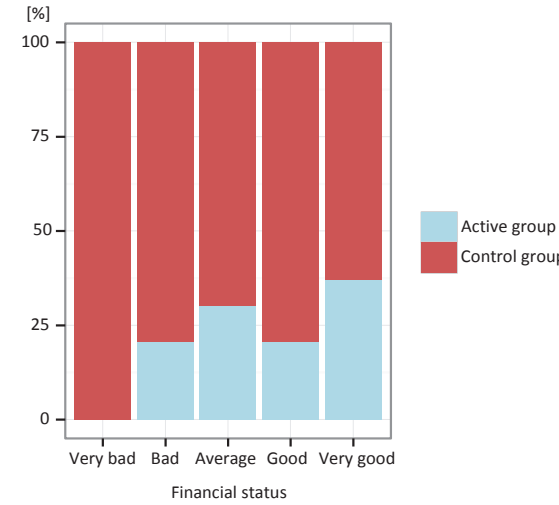

Fig. 11. Group membership w.r.t. financial status [%]

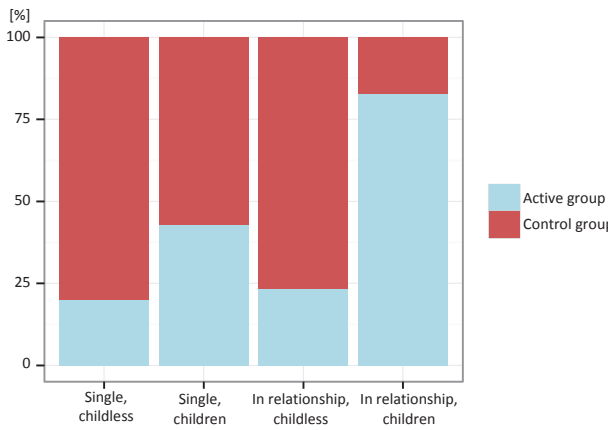

Fig. 12. Group membership w.r.t. family status [%]

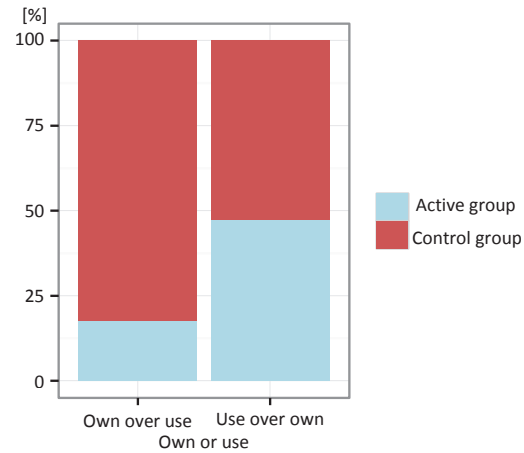

Fig.13. Group membership w.r.t. attitude towards ownership [%]

are respondents. From distribution on presented on Fig. 9 it is clear that the least active group are people from 18-25 age group and with age the percentage of active users increases.

Another considered aspect was the relationship between being active and size of the city of residence. Statistically significant relationship was identified (Chi-squared statistic: 33.71, p-value = 2.2e-07). Similarly to age, the dependence is strong, and looking at Fig. 10 one can observe that the bigger the city, the more active are the respondents. It could be due to the fact, that many forms of collaborative consumption are associated with activities carried out in large urban centers (for example Co-working, gym co-rental) or requires efficient access to goods and services (all kinds of swaps, time banks).

Significant relationship was also observed between activity and self-assessment of financial status (Chi-squared statistic: 9.52, p-value = 0.049). The distribution of groups (Fig. 11) show that the better financial status people declare, the more active they are. This result is strictly related to previously presented conclusions about economical advantages of collaborative consumption.

Interesting findings were revealed while analyzing relationship between the level of activity and family status. Statistically significant results (Chi-squared test statistic: 44.65, p-value = 2.01e-10) show that family staus greatly impacts the collaborative activity. Plots of distribution (Fig. 12) show that the most active are people raising children. One possible explanation could derive from observation that parenthood happens to bind with other social trends

related to responsible and ecological parenthood, more regular lifestyle, seeking relationship with other parents and more time for collaborative activities.

The last observed relationship concerned the dependence of collaborative activity and attitude towards ownership. Strong statistical relationship was observed between highly active people and attitude towards using over owning (Chi-squared test statistic: 36.81, p-value = 1.31e-09), what can be seen in the Fig. 13. It shows that people oriented more on „use" than „own" are more active in the area of collaborative initiatives. This clearly stands in line with the main idea of collaborative consumption, which emphasizes the importance of access to goods as a solution to dilemma of limited financial resources and pursuit of wellbeing.

Conclusions

Results obtained in this research show that collaborative consumption in Poland involves all main forms of consumer activities known around the world, like service systems, redistribution markets and collaborative lifestyle. On the other hand, it has different unique aspect in contrast to countries from which this trend originated. Motiviations to participate in collaborative initiatives are more related to declarative financial and social aspects than to individual factors. It seems therefore, that the awareness of these trends in Poland along with activity of users is still more accidental than stongly related to particular profile of a user. The performed research does not confirm visibly increased activity among people already involved in at least one of the collaborative consumption initiatives.

On the other hand consumers orientated towards collaborative consumption are clearly different than those who do not take part in any of such activities. Features that reveal these differences are related to demographic profile (mature people, from big cities, raising children) as well as economical profile (positively assess their financial status, do not have high demands with respect to consumption. that is prefer using over owning). Possibility of conducting extended research on particular profiles of consumers seems to be particularly interesting. It could reveal answers to questions concerning individual factors and involvement in other forms of collaborative consumption and allow for anticipating directions of further development of this consumer trend.

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Biocidal products using nanotechnology from a legal perspective

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ABSTRACT

Nanotechnology means the design and the manufacture of structures in which at least one size is less than 100 nanometers and which have new properties resulting from the size. Restrictive criteria for the marketing authorisation of biocidal products containing nanomaterials as defined in Regulation 528/2012/EU (separate risk assessment and approval of the active substance in the form of nanomaterial) contribute to the strengthening of their safety for the health and the environment. The purpose of listing on the label of a biocidal product and an article treated with a biocidal product of components present in the form of nanomaterials and the word „nano" in brackets after the name of such components is to inform buyers of the presence of nanomaterials in such products; buyers' knowledge of the atypical properties of nanomaterials, including benefits and potential risks associated with their use, should be increased by means of information activities of the EU institutions and competent authorities of the EU Member States.

KEY WORDS

nanomaterials, biocides, EU legislation

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Introduction

Various innovative applications of nanotechnology are available due to atypical properties of nanomaterials in comparison with their macroscopic counterparts; such properties are the result of a small particle size of nanomaterials. Due to specific characteristics of nanomaterials, it is possible to manufacture substances and products with new parameters and applications. Because of their small size, however, nanomaterials may cause hazards to human health and to the environment as their enhanced reactivity and mobility may cause toxic effects. The legal basis for the placing on the market of biocidal products, including those containing nanomaterials, in the EU are Articles 30, 34, and 35 of the Treaty on the Functioning of the European Union – TFEU (OJ C 326, 2012, p. 47) whose purpose is to guarantee a free movement of goods on the single market; these regulations introduced the prohibition to collect customs duties and charges having equivalent effect, as well as the prohibition to impose quantitative restrictions in import and export, and any measures having equivalent effect among the Member States of the EU. The single market, according to Article 26 item 2 of the TFEU, comprises an area without internal frontiers in which the free movement of goods, people, services and capital is guaranteed.

The purpose of this article is to describe and justify the EU legislation and to present the perspective of a legal doctrine in relation to the placing on the market and the use of biocides containing nanomaterials; in addition, this is an attempt to assess the legal regulations in this area – with the use of dogmatic-legal and theoretical-legal research methods.

1. EU NON-BINDING ACTS CONCERNING BIOCIDAL PRODUCTS CONTAINING NANOMATERIALS

The nanotechnology, according to a definition formulated by R. Michalczewski and A. Mazurkiewicz, means the design and the manufacture of structures in which at least one size is less than 100 nanometers and which have new properties resulting from the nanosize (Michalczewski, Mazurkiewicz, 2007, p. 23). E. Stokes points that nanomaterials, due to very small sizes, have a large specific surface area in proportion to their mass so as a consequence they are potentially more reactive and toxic than their conventional, macroscopic counterparts. So despite significant benefits, nanotechnology poses substantial problems – nanomaterials may cause a serious risk to human health and to the environment. In addition, the effects of an exposure to the action of nanomaterials are uncertain due to very limited data and substantial gaps in knowledge in this area (Stokes, 2009). R.D. Porter et al. list key areas where the existing gaps in scientific knowledge of nanomaterials need to be filled: definitions – terminology, nomenclature, classification, characteristics – physical and chemical characteristics of nanomaterials (especially the length, shape, composition, aggregation, catalytic properties, surface chemistry), metrology – measuring methods and instruments, tests – safety tests and risk assessment methods (Porter et al., 2012).

It is advisable for the EU institutions and the competent authorities of EU Member States to carry out information and educational activities addressed to the public, on benefits and potential hazards resulting from specific properties of nanomaterials. R. Falkner et al. stress the necessity for a significant increase in funding of scientific research related to the risks for the human health and the environment associated with nanomaterials. They also emphasise the advisability of information exchange related to such risks among the EU institutions and the competent authorities of EU Member States. It is essential to increase the mandatory requirements regarding the data transmitted by entities placing nanomaterials on the market and the commercial applications of nanomaterials; there is a lack of comprehensive knowledge of the presence of nanomaterials in products placed on the market (Falkner et al, 2010). J. Ejdys and E. Krawczyk-Dembicka state that the development of nanotechnology should be supported by relevant cooperation at the international level. In the recent years, an increase in the financial support from the EU, both for the scientific research and the industrial applications in the field of nanotechnology, has been observed. An important role of nanoscience and nanotechnology in the contemporary world was also presented in documents that specified the directions of research planned to be financed and developed within the 7th EU Framework Programme. The fourth thematic area of the 7th EU Framework Programme was dedicated to the research in the field of nanosciences, nanotechnologies, materials, and new production technologies. In accordance with the assumptions of the 7th EU Framework Programme, nanoscience and nanotechnology, materials, and new production technologies are very significant to the industry, and their integration for sectoral applications may be accomplished, inter alia, through actions in the field of chemistry as well as nanoelectronics, industrial production, power generation, steel sector, transport, construction industry, industrial safety, textile industry, ceramics and wood industries, and nanomedicine. In the course of the 7th EU Framework Programme, also an analysis of the impact of nanotechnology on the society and the significance of nanoscience and nanotechnology in solving social problems were included (Ejdys, Krawczyk-Dembicka, 2013). Currently, in the course of the Horizon 2020 EU Framework Programme, the research in the area of nanotechnology, advanced materials, advanced manufacturing and processing systems, and in biotechnology is a part of a specific objective „Leadership in enabling and industrial technologies". Activities in these areas are aimed at stimulating the development of the European industry, creating new jobs, and meeting the needs of the society (http://www.kpk.gov.pl, 24.01.2015).

According to the „Opinion of the European Economic and Social Committee on the Proposal for a Regulation of the European Parliament and the Council concerning the placing on the market and the use of biocidal products" (COM 2009/267, 2010), the European Economic and Social Committee supports the introduction of the Regulation of the European Parliament and the Council 528/2012/EU concerning the making available on the market and the use of biocidal products (OJ L 167, 2012, p. 1) as a legal act directly applicable in the legal systems of the

EU Member States – facilitating the standardisation of legal regulations concerning the marketing authorisation of biocides within the EU territory. The European Economic and Social Committee states that the Regulation 528/2012/EU should contribute to an increase in free movement of biocidal products in the EU by simplifying the licensing procedure and reducing administrative barriers to entities placing biocides on the market. In terms of the marketing authorisation and the use of biocidal products, including those composed of nanomaterials, a major role in facilitating the interpretation legal provisions to entities placing such products on the market is fulfilled by informal measures, in particular the guides and guidelines of the European Chemicals Agency (ECHA) related to the Regulation 528/2012/EU. These are, among others: „Guidance on Human Health Risk Assessment", „Guidance on Applications for Technical Equivalence", „Guidance on Information Requirements", „Guidance on Active Substance Suppliers" and „Guidance on Data Sharing" (http://echa.europa.eu, 24.01.2015).

Examples of improved products available on the market with biocidal properties containing nanomaterials and products treated with biocides containing nanomaterials are: household and industrial chemicals, sport products including handle plating composed of nanoparticles of silver, dressings containing silver nanoparticles, joints, silicones and adhesive mortars, dental fillings, toothbrushes, equipment casings, products for the manufacture of biocidal protective coatings applied on virtually all surface types, products for surface protection, cleaning, and maintenance, household appliances including washing machines and refrigerators (http://www.nano-technologie.pl, 24.01.2015).

2. Description of research methods applied

The dogmatic-legal and theoretical-legal research methods were used in the research. The dogmatic-legal method refers to an interpretative and descriptive way of analysing and explaining the texts of EU legal acts relating to the placing on the market and the use of biocidal products containing nanomaterials; these are interpretative activities that is the interpretation of the law consisting in reconstructing the standards of conduct from legal regulations and commenting on their contents. The theoretical-legal method consists in analysing opinions in the legal literature in the field of nanotechnology. Based on the conducted analysis, conclusions concerning the implementation of the EU legislation's objective in relation to the marketing of biocides containing nanomaterials – the use of innovative applications of nanotechnology by the society in a way that is safe for the health and the environment – were drawn.

3. The use of nanotechnology in biocidal products according to the legal regulations of the European Union

The purpose of the Regulation of the European Parliament and the Council 528/2012/EU concerning the making available and the use of biocidal products, according to Article 1 item 1, is to improve the functioning of the EU single market through the harmonisation of the rules on the making available on the market and the use of biocidal products, whilst ensuring a high level of protection of both human and animal health and the environment. Biocidal products, in particular those containing nanomaterials, commonly used in everyday life to combat harmful organisms, may pose a threat to the health and the environment; the facilitation of a free movement of biocides in the EU should therefore be carried out taking into account both advantages and risks associated with the abolition of administrative restrictions in this area.

The Regulation 528/2012/EU applies to biocidal products, including those containing nanomaterials, and articles treated with biocidal products (Article 2 item 1). A biocidal product, according to Article 3 item 1 letter a, means any substance or mixture consisting of, containing or generating one or more active substances, with the intention of destroying, deterring, rendering harmless, preventing the action of, or otherwise exerting a controlling effect on, any harmful organism by any means other than mere physical or mechanical action. Based on Annex V, biocidal products are divided into the following product groups: disinfectants, preservatives, products used to combat pests, and other biocidal products. An article exposed to the action of biocidal products, in accordance with Article 3 item 1 letter l, is any

substance, mixture or article that has been exposed to the action of at least one biocidal product or as a result of an intentional action contains at least one biocidal product.

According to Article 3 item 1 letter z of the Regulation 528/2012/EU, „nanomaterial means a natural or manufactured active substance or non-active substance containing particles, in an unbound state or as an aggregate or as an agglomerate and where, for 50% or more of the particles in the number size distribution, one or more external dimensions is in the size range 1-100 nm"; furthermore: „Fullerenes, graphene flakes and single-wall carbon nanotubes with one or more external dimensions below 1 nm shall be considered as nanomaterials"; at request of one of the EU Member States, the European Commission, pursuant to Article 3 item 3, may decide by means of implementing acts whether a given substance is a nanomaterial, considering in particular the Recommendation of the European Commission 2011/696 on the definition of nanomaterial (OJ L 275, 2011, p. 38). It should be noted that a harmonised definition of nanomaterial introduced by the Regulation 528/2012/EU is adapted to the current state of scientific knowledge and compliant with the definition of nanomaterial expressed in the Recommendation 2011/696/EU on the definition of nanomaterial. Both definitions specified in the Regulation 528/2012/EU and in the Recommendation 2011/696/EU are based on the material's component particle size as a parameter which should be used to determine whether a given material is a nanomaterial; this factor determines specific properties of nanomaterials in consequence of which they may pose a risk to the health and the environment. The purpose of the establishment of the definition of nanomaterial by the Regulation 528/2012/EU is to assure the transparency of legal regulations with respect to entities operating on the market of biocidal products by determining whether additional conditions for placing on the market of biocidal products containing nanomaterials apply to a given material; restrictive criteria for the marketing authorisation of such biocidal products (separate risk assessment and approval of the active substance in the form of nanomaterial) contribute to their safety for the health and the environment.

An approval for the placing on the market of a biocidal product, including those containing nanomaterials, includes conditions relating to the making available and the use of a given biocidal product or a group of biocidal products and the characteristics of the biocidal product (Article 22 item 1); it is granted for a period not exceeding 10 years (Article 17 item 4). An approval under Article 19 item 1 is granted if the criteria of sufficient effectiveness and absence of unacceptable effects on target organisms, both human and animal health, and the environment are met. An active substance contained in a biocidal product is approved for an initial period not exceeding 10 years if at least one biocidal product containing that active substance may be expected to meet the abovementioned criteria (Article 4 item 1). The Regulation 528/2012/EU also applies to the placing on the market of articles treated with biocides. An article exposed to the action of biocidal products may be approved for the market only if all active substances contained in biocidal products to whose action it has been exposed or which it contains have been approved in the EU (Article 58 item 2).

Applicants who place biocidal products on the market may apply for an EU authorisation (granted by the European Commission based on an evaluation of the application by the competent authority in an EU Member State and the opinion of the ECHA), a national authorisation (issued by the competent authority of an EU Member State) or an authorisation through mutual recognition of national authorisations by other EU Member States (Article 17 item 2). A simplified authorisation procedure according to Article 25 applies to a biocidal product which meets the following conditions: all active substances contained in that biocidal product appear in Annex I and satisfy any restriction on their use specified in that Annex, the biocidal product does not contain any substance of concern and any nanomaterials, the biocidal product is sufficiently effective and the handling of the biocidal product and its intended use do not require personal protective equipment. If a product meets the above conditions, the applicant may submit an application to the ECHA, informing it of the name of the competent authority of an EU Member State that it proposes should evaluate the application (Article 26 item 1). If the authority gives an authorisation in the simplified procedure, the biocidal product may be made available on the market in all EU Member States without the requirement of mutual recognition (Article 27 item 1).

With regard to the use of nanotechnology in biocidal products, the Regulation 528/2012/EU provides in Article 4 item 4 that the approval of the

use of an active substance in a biocidal product does not cover such substance in the form of nanomaterial except where explicitly mentioned; where the tests presented for the purpose of obtaining the approval of an active substance in a biocidal product are applied to nanomaterials, an explanation of their scientific relevance in relation to nanomaterials should be provided, and if appropriate – technical adjustments or changes made in order to take into account special properties of nanomaterials. Where nanomaterials are used in a biocidal product, when applying for the authorisation of that product, a separate assessment of risks to human and animal health and to the environment is to be made (Article 19 item 1 letter f). In addition, a biocidal product may be placed on the market under a simplified authorisation procedure if it does not contain any nanomaterials (Article 25 letter c). It should be emphasised that the properties of a substance in the form of nanomaterial contained in biocidal products are atypical in relation to substances in the traditional form. Substances with nanoscale particles may have toxic effects, and the state of scientific knowledge of their safety to the health and the environment requires improvement. The assessment of the risks associated with biocidal products containing nanomaterials is therefore, according to the Regulation 528/2012/EU, carried out individually in each case. In addition, the approval of an active substance in the traditional form in a biocidal product does not apply in principle to this substance in the form of nanomaterial which requires a separate approval.

The EU Member States are required to monitor the biocidal products placed on the market, including products containing nanomaterials and articles treated with biocidal products – through official controls (Article 65 items 1 and 2), and the obligation of authorisation holders to keep records and make available the documentation relating to biocidal products they place on the market for at least 10 years after placing on the market, or 10 years after the date on which the authorisation was cancelled or expired, whichever is the earlier (Article 68 item 1). In addition, the EU Member States are required to submit to the European Commission every 5 years, commencing from 01 September 2015, a report on the implementation of the abovementioned Regulation in their respective territories; such report includes in particular information on the use of nanomaterials in biocidal products and the potential risks thereof and is published on the website of the European Commission (Article 65 item 3). So the purpose of the obligation of the EU Member States to exercise control over biocides placed on the market and to submit reports to the European Commission on the implementation of the Regulation 528/2012/EU in their respective territories, containing the data on the use of nanomaterials in biocidal products, is to determine the degree of implementation of the objective of that Regulation with regard to biocides containing nanomaterials. This objective is to ensure a free movement on the single market of biocidal products containing nanomaterials and to minimise the risks to human and animal health and to the environment associated with the use of nanomaterials in such products.

In accordance with the Regulation 528/2012/EU, a label of a biocidal product must contain information (legible and indelible) on nanomaterials which are contained in the product and on any specific related risks, and, following each reference to nanomaterials – the word „nano" in brackets (Article 69 item 2 letter b); in addition, a label of an article treated with biocidal products must also include the names of all nanomaterials contained in the biocidal products, followed by the word „nano" in brackets (Article 58 item 3 letter d). The purpose of listing on the label of a biocidal product and an article treated with a biocidal product of components present in the form of nanomaterials and the word „nano" in brackets following the name of such components is to inform buyers of the presence of nanomaterials in such products. The EU institutions and the competent authorities of the EU Member States should also carry out information activities to provide buyers of nanoproducts with the knowledge of specific properties of nanomaterials in order to enable them to make conscious decisions when buying such products.

Conclusions

Products with enhanced biocidal properties containing nanomaterials are currently widely available on the market. However, atypical characteristics of nanomaterials, especially their increased reactivity and mobility as a result of their small size, may cause hazards to human and animal health and to the environment associated with the use of such biocidal products. Successive research

studies are required, in particular to obtain information on potential toxic and ecotoxic effects of nanomaterials. The purpose of precise requirements for the placing of biocidal products containing nanomaterials on the market in accordance with the Regulation 528/2012/EU, including a risk assessment prepared individually in each case and the approval of an active substance in the form of nanomaterial is to ensure the safety of their use for the health and the environment. However, the very detailed data that need to be submitted by entities placing biocidal products containing nanomaterials on the market together with an application for the authorisation of such products may hinder the development of such innovative articles. Legal regulations concerning biocides containing nanomaterials should therefore take into account the balance of reducing administrative barriers to the marketing authorisation and the use thereof in a way that is safe for the health and the environment.

The purpose of the obligation of listing on the label of a biocidal product and an article treated with a biocidal product of components present in the form of nanomaterials and the word „nano" in brackets following the name of such components is to inform buyers of the presence of nanomaterials in such products; at the same time, it is advisable for the EU institutions and the competent authorities of the EU Member States to carry out information activities in relation to specific properties of nanomaterials in order to increase the knowledge of buyers on the benefits as well as the potential risks related to the use thereof.

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The significance of the safety network in the financial system of an open economy

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ABSTRACT
In the article solving of a research problem presented in the introduction of the article is described. The aim of the article is to explore and verity the hypothesis that the complete structure of the Safety Network is the tool towards greater stability of the financial system. The research was based on a methodology that included descriptive and comparative analysis. The bibliography of the article consist of scientific works, as well as reports and expertise knowledge. The results of the research present the new structure of the safety network institutions that can be applied to the business practice and the theory of the financial markets. This arrangement broadens the structure and functions of the Safety Network and should result in better stability of the financial system, especially in relation to crisis.

KEY WORDS
safety network, financial markets, global economy, crisis

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Introduction

The financial system that covers economic relations should also be seen in the context of the public duties of the state, in which its construction and smooth operation is the subject of public trust.

Meeting the high safety standards of financial transactions requires, firstly, to ensure the safety of financial processes determining the security of business transactions in the functioning of the economy and, secondly, to take into account the fact that the financial sector entities almost exclusively invest the money entrusted to them, which requires proper public oversight (Żukowski, Żukowska, 2009). Therefore, the role of the Safety Network institution is to provide stability to the financial system. In the conditions of an open, global economy this task is becoming more and more complex. Especially in the post-crisis era this function is very challenging, therefore a new, holistic approach to the matter of a Safety Network is need. The aim of the article is to propose an optimal structure of a Safety Network for the financial markets, that would meet the needs of the post-crisis economic reality.

1. Financial system as mechanism of the flow of liquidity and capital in an open economy

The concept of the financial system is very comprehensive and multidimensional. Colloquially the financial system fulfils a similar function in the economy as the human bloodstream. This illustrative comparison is very appropriate because it has many analogies. The most important is that this system supplies all entities operating in the economy in streams necessary for the economic existence that is flows of cash and capital (Fedorowicz, 1991). These flows are multidirectional, as shown in the Fig. 1.

Generally, within each financial system, the transfer of cash and equity takes place between the parties with a surplus of cash and capital and the ones that need funding (Sullivan, Sheffrin, 2003). This surplus is directed to those who have a deficiency through financial markets (Mishkin, 1995), financial intermediaries, or a combination thereof. Thus, the financial system is the broadest term for the mechanism of the cash flow in the economy.

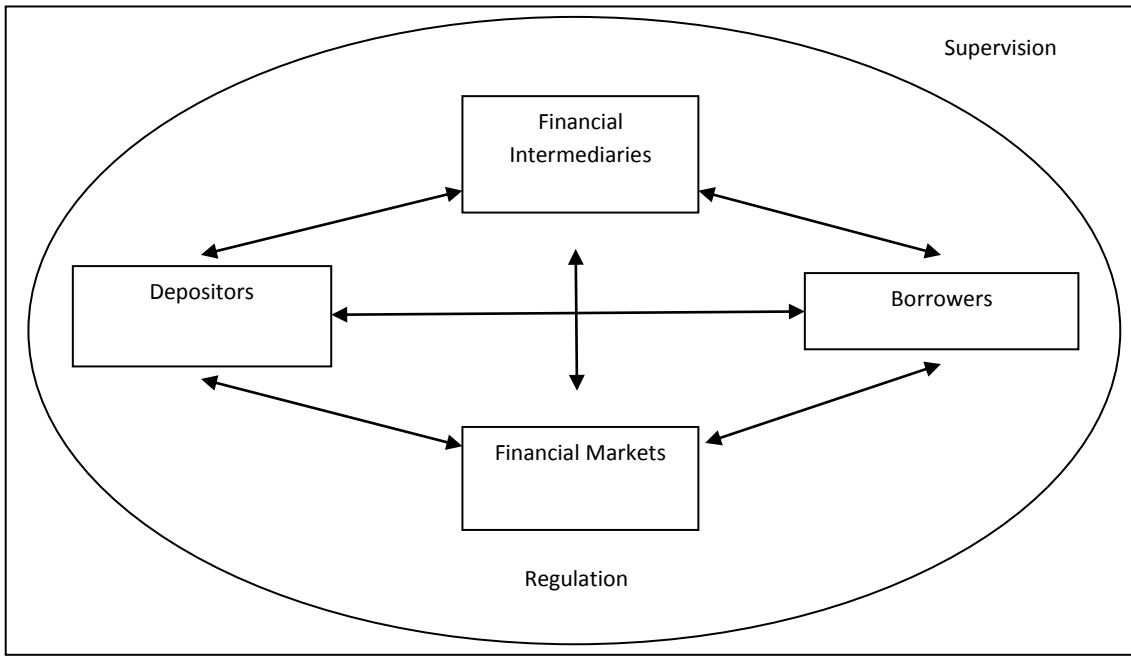

Fig. 1. The flow of cash and capital in an economy
Source: author's concept based on (Ritter et al., 2004, p. 34).

The core features of this system are essentially the same in all economies, but due to differences in size, complexity, technology, culture, politics and institutional mechanisms, can vary greatly (Merton, 1990). Therefore, especially under conditions of dynamic changes in technology and processes that integrate global interdependence through the financial markets, various analytical approaches regarding the financial system can provide useful complementary information in order to reliably reproduce the real processes taking place in the financial system in the created analytical perspective. The diversity of approaches to the concept of financial system in the economic literature is presented in the Tab. 1.

Knowledge of the financial system, which affects the economy, determines its smooth functioning and leads to reflection over its effectiveness and evaluation of its efficiency. It is known that the proper functioning of the financial system plays a fundamental role in the economic development of the state. Regardless of the approach, the financial system has a crucial impact on the allocation of resources and the construction of a modern economy (Berthelemy, Varudakis, 1996).

2. The role of the safety network in an open economy

The risk level of transactions in the financial services market depends on many market and non-market related factors. The level of risk is greatly affected by the level of confidence in the financial system. Trust is a derivative of the positive experiences of various market participants, as well as the derivative of institutional, regulatory and supervisory framework. A high level of trust plays a key role not only in terms of the strategy of raising capital through a single financial institution, but also affects the assessment of the efficiency of the financial services market and the entire financial system (Dobosiewicz, 2003).

The lack or loss of trust by groups of investors caused even by a single, negative information may cause a snowball effect, and consequently, a sharp decline in investor confidence in the whole system. Low levels of trust causes the disappearance of demand for financial services, and potentially can trigger run on banks, which in turn will lead to financial crisis. It is therefore in the public interest to preserve the stability of the financial system and in particular the efficiency of the markets (Zaleska, 2001). The social cost of the collapse of even one bank

Tab. 1. Overview of different approaches to the concept of the financial system

Analytical approach		Characteristics	View on the financial system
Institutional		It recognizes the financial system from the point of view of financial institutions, focusing on their description and classification; the selected feature of institutions (for example the level of competition, protection of investors, the quality of financial regulation) can be the subject of analysis	Financial system as a set of financial institutions defined and classified into distinct groups
Functional narrow	Monetary	Analyzes the financial system primarily in the context of the supply of money in the real economy through the system of the central bank and commercial banks	The financial system as a mechanism for supplying the real economy with money
	Based on intermediation	It analyzes the financial system from the point of view of the two most important functions, that is redistribution and transformation	The financial system as a mechanism of mediation of parties with surplus and deficit of funds
Functional broad		The analyzes of the financial system focus on the functions of the system. Advocates of this approach argue about the relative stability and comparability of the functions of national financial systems	The concept of the financial system consists of a network financial markets, financial intermediaries and other institutions through which financial plans of households, businesses and government are realized
Systemic		It analyzes the financial system in terms of relationships between individual elements of the system and the impact of these compounds on the functioning of the entire financial system (using concepts of complementarity and coherence)	The financial system as a structured set of complementary and coherent components or subsystems

Source: (Matysek-Jędrych, 2007, p. 40).

can be very diverse and difficult to estimate (Jaworski, 2001), but also very dangerous economically. For this reason, in most developed economies in the world, despite being free-market economies, the financial system is subjected to public supervision via the so-called. safety nets (Iwanicz-Drozdowska, 2008; Szczepańska et al., 2008).

The safety network can be understood as the set of regulations that ensure financial stability and protect the interests of market participants that use the services of financial intermediaries, as well as the institutions responsible for monitoring compliance with these regulations.

Nowadays it is common to speak about the economy as a unified global system. It's cells – the open economies of individual countries, have in most cases abandoned the administrative control of the flows of goods and services, and thereby have lost the opportunity to influence the processes of global nature. This means that in times of prosperity there are no limitations to the expansive processes of trade, but in difficult times, it is not possible to isolate the impact of negative external processes. Under these conditions, growth is becoming increasingly dependent on the interaction between economies (Brodzicki, 2006). Consequently, the phenomena of recovery and crisis are put in the international context (Kindleberger, 1999).

In an open economy the international market and the external determinants by the nature of things are primary to the internal factors, and interact more strongly on the internal situation. In terms of global interdependence the interaction between domestic supply and demand and the impact of regulatory tools can be seriously distorted. Conducting operations across national borders creates difficulties in their control and adequate risk assessment of these processes (Komorowski, 2010). Thus globalisation

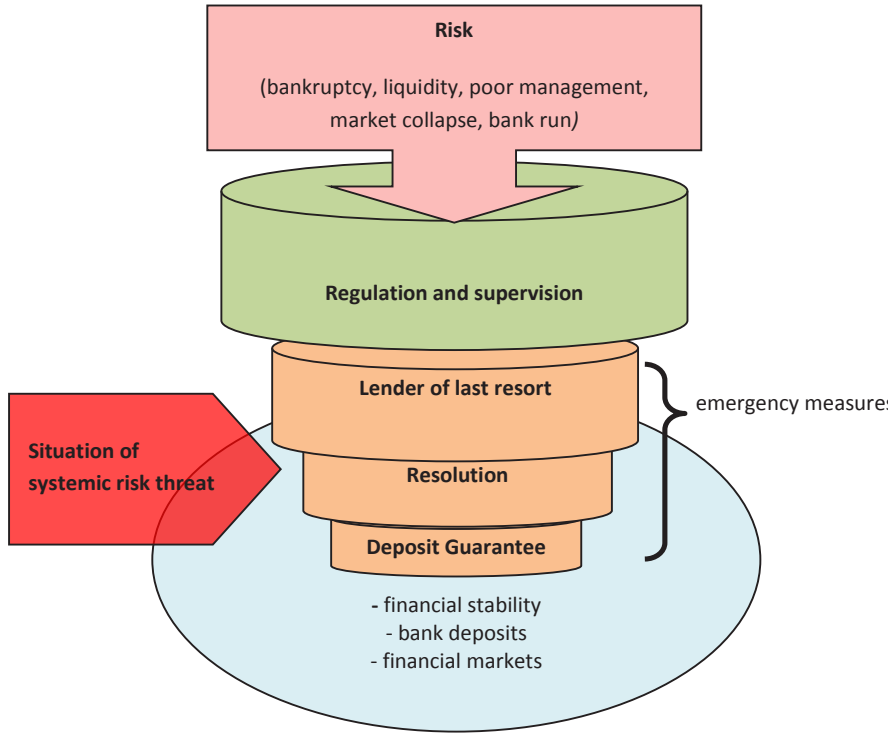

Fig. 2. Stages of the defense of the of the financial system by the security network against the situation of high systemic risk
Source: author's concept based on (Banking Resolution Failure Seminar, 2009).

as an inevitable and irreversible phenomenon poses both opportunities and risks (Robertson, 2000). However, it appears that the balance of these phenomena is more on the side of its positive features (Kołodko, 2001).

3. An optimal structure of the safety network institutions in an open economy

It is impossible to completely immunise the banking sector to risk, but the review of several key aspects of the functioning of the sector will have a positive impact on improving its stability. This revision requires actions leading towards:

- an increase of safety of banks (Iwanicz-Drozdowska et al., 2010), achieved by:
  - establishment of an optimal system of guarantees for bank deposits (Demiruguc-Kunt, Detagiache, 2000);
  - maintenance of safe levels of liquidity of the banking system (Global Financial …, 2010);
  - minimisation of the effect of moral hazard for banks, referring to the too big to fail concept (Burton, et al., 2010);
  - smooth and continuous banking supervision and effective macro prudential regulation;
- an increase of transparency of the functioning of the financial system, by:
  - increasing the transparency of the fiscal policy of the government;
  - the cooperation of financial sector institutions in building stability;
  - international coordination of actions towards the improvement of transparency.

Given that today's conditions are the embryo of the potential future crisis, it is important to focus on the functioning of the safety network of the financial system. These are institutions that fulfill the extraordinary functions in the conditions of high systemic risk, as shown in Fig. 2.

The traditional safety network institutions consist of:

- Minister of Finance,
- Central Bank,
- Financial Supervision Authority.

The functions of the above institutions is widely discussed in the international literature.

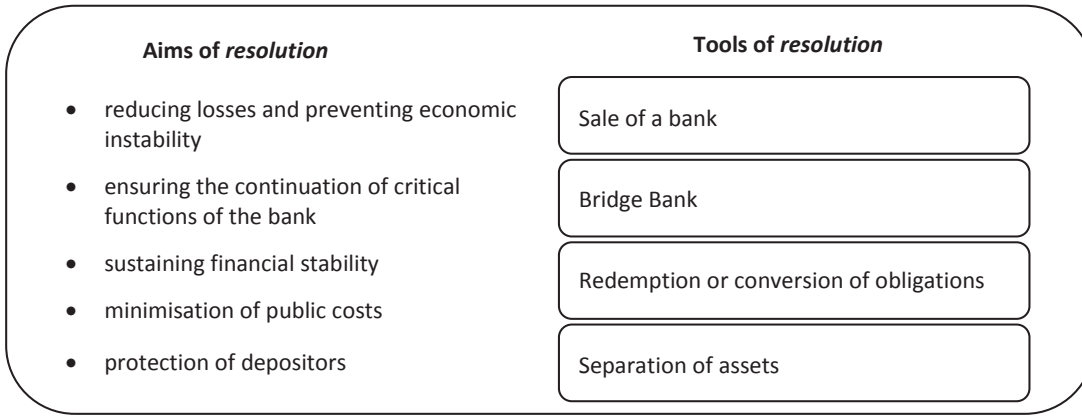

Fig. 3. The Aims and Tools of Resolution function during a crisis
Source: author's concept based on (Pruski, 2012).

However the complete safety network should also include:

- Deposit Guarantee Fund,
- Resolution Authority,
- Macroprudential Supervision Authority.

The Deposit Guarantee Fund should be responsible for:

- reimbursement of funds held in bank accounts, to the degree specified by the legal act that regulated the functioning the Guarantee Fund, for banks that are participating in the deposit insurance system;
- providing financial assistance to banks in case of danger of insolvency;
- support of the process of merging threatened banks with stronger banking units;
- collection and analysis of information regarding the entities covered by the guarantee, including the analysis and forecasts for the banking sector (http://www.bfg.pl, 12.10.2015).

The aims and functionality of the Resolution Authority are pictured in the Fig. 3. This institution would be responsible for carrying out a non-judicial procedure involving the restructuring and liquidation

Fig. 4. Structure of institutions in the Security Network

of the bank at risk of insolvency (bankruptcy), in particular critically undercapitalised, that most likely is not able to raise sufficient capital, or a bank with liquidity problems and running a risky or illegal business.

Due to the limited possibilities of influence the exogenous destabilising factors, the way to increase the stability of the domestic economy is to limit systemic risk. For this purpose the Macroprudential Supervision Authority should be established, which would act as an independent institution performing the function of macro-prudential (systemic risk) supervision and coordinate the activities of all other bodies of the safety net. An structure of a complete safety network is presented in the Fig. 4.

The change of the architecture of the safety network should be done as the first step in the aftermath of a crisis, so the new regulations should consider the new safety infrastructure. The institutions if the Safety network should cooperate and function towards building a stable financial system. A clear set of duties and responsibilities for each institution is necessary for the effective collaboration (Alińska, 2011/2012).

Conclusions

Financial stability is a state of dynamic and enduring equilibrium within interconnected financial markets. Its maintenance is especially difficult in the conditions of opened economies, where shocks are transmitted globally. It is impossible to completely immunise the banking sector to risk, but the review of the structure and responsibilities of the Safety Institutions are key in terms of internal stability. Despite the fact, that the Safety Network may have slightly various structure in different economies, the chosen structure should be constructed to perform its functions presented in the article in most effective way.

The new structure should result in better stability, especially in relation to a crisis. Firstly, it should support better predicting and preventing of the crisis thanks to the macroprudential authority. Secondly, the mitigation of the negative effects of a crisis should be more efficient during and after the crisis, thanks to the deposit guarantee fund. At this moment this proposed structure seems to be complete in terms of fulfilment of all the functions of the Safety Network.

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The need of BIM technologies implementation to design companies

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ABSTRACT
The aim of this article is to analyze BIM technologies need to the design companies. Increased effectiveness of design companies using BIM was assessed. Article discusses BIM design challenges, barriers, problems and solutions. In order to assess the need of BIM technologies for design companies right, 10 BIM programs using companies designers were interviewed. Also there were identified factors which influence design firms to implement BIM programs. According to the respondents the greatest influence of BIM software installation for their company had calculations of 3D construction. Furthermore, there was assessed the increased effectiveness of the design services using BIM. The paper discusses the BIM technologies need for the design companies. There was estimated demand for BIM technologies for micro company which carries out design work in Lithuania. When project ordering demand is moderate, company in not willing to expand and economical situation in the country stays the same, it is not profitable to implement BIM for ,,micro" company when it is not making complex projects.

KEY WORDS
BIM, BIM technologies implementation, design companies, BIM implementation affecting factors

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Introduction

Nowadays construction industry is very demanding, specialist must have knowledge about different construction areas, be able to work with multifunctional complex computer programs. BIM design has many advantages, which make the traditional design model gradually lose its value. Many design firms gradually switch to BIM design. Editing of the project becomes easier when using BIM programs in design companies, whereas graphical subjects are spaces, walls, structural elements. When information about chosen structures physical and functional characteristics is collected comprehensive complete project is beeing generated. Design company efecctiveness is evident when complex project with all parts is needed.

Results of this design methodology is not just a creation of the Architects design intentions and spatial relationships shown in 3D, a BIM is a repository for digital information and data generated by the design process and simulations; it is the design, fabrication information, erection instructions, specifications, materials palette, schedule, and project management logistics in one database (Schinnerer, 2006). Data models will exist for the life of a building, can be used to manage the client's asset, and will exist as the „As-Built"

documents for future additions, renovations, and upgrades (Kuehmeier, 2008). The question is, when does the need to implement BIM technologies to design companies arise?

1. BIM technologies need to design companies

Despite the fact that the development of the ArchiCAD software program in 1982 in Hungary is wieved as the real beginning of BIM, implementation of BIM has been relatively slow in the construction industry compared to industries such as manufacturing and engineering for over two decades. There was a significant shift in momentum over the past five years as technology and implementation issues improve and the industry realizes advantages (Smith, 2014). McGraw Hill (2014) has been tracking the evolution and implementation of BIM in the global construction industry since 2007 through extensive global surveys. They have found significant cnage over that period and quite dramatic implementation increases over the past few years in particular. In North America their survey results showed that BIM adoption by contractors escalated from 28% in 2007 to 71% in 2012. The Unated States have long been a global leader in BIM development and implementation in the construction industry. The Scandinavian region is also a global leader in BIM adoption and implementation. BIM technology is ideally suited for popular in the region prefabrication construction methodology. A survey undertaken by the China Construction Industry Association in 2012 found that less than 15% of 388 surveyed Chinese construction companies used BIM (McGraw Hill, 2014). McGraw Hill found that the Chinese industry had structural barriers such as difficulties with changing traditional methods and that on many projects the Chinese law requires the design and construction stages to be separated with contractors not involved in the design stages. Therefore, it is not possible to use one of the main advantages of BIM collaboration in the work process.

Among small design companies BIM programs for complex design are used rarely because small companies usually engage in the small objects design. Therefore it is not possible for them to feel benefits, changes and payback for their companies fast. In addition, most of the companies are specialized, work in design area making projects of certain buildings or structures, engineering communications.

Building information model technologies are more popular among large design companies, manufacturing enterprises, design centers, and so on. The use of BIM creates an opportunity for construction companies to create workplaces in the design companies subdivisions: buy BIM programs, train staff. The most important benefit is received in the construction management area, because BIM helps to prevent from errors occurring during construction stage.

BIM technology is suitable for all construction objects, but it became popular after using BIM for the design of complex buildings and construction: multi-storey buildings and skyscrapers, bridges and flyovers, roads, highways, and etc. Today, construction productivity lags behind other industries. There was made a research, which analyzed 100 tallest skyscrapers in the world (Reizgevičiūtė et al., 2013). The study analyzed construction period, when BIM was not yet used in the world. There was compared the productivity of the construction of skyscrapers built before 1990 and after 1990. According to the research results, it is noted that the construction speed in the last years dicreased more than 36%.

According to foreign authors, once BIM technology is widely used by small and medium enterprises, it would be worthwhile to investigate the difference between the perceptions of architects in large organizations and architects in small and medium sized organizations (Son et al., 2015).

Despite the many advantages of BIM design many companies delay buying expensive BIM programs. There are several reasons which influence designers' hesitation to use BIM:

- companies accomplish small objects and errors during different construction stages occur rarely;
- it is not possible to carry out the project without the 2D CAD drawings (detailed drawings, site plans and etc. are required);
- designer of a project is chosen by the lowest price and designer's work is not valued considering wasted time or quality, so return of investment is doubtful;
- lack of information about the copyrights (when project is made in BIM environment question is who will ownership copyright because client owns the model);
- when client owns model and builds similar or typical project he might choose a cheaper designer.
- it is important to assess designers priorities when thinking about the need of BIM technologies.

It is important for the designer:
- to design a building, which complies the essential requirements and regulations;
- to provide list of materials, quantities, provide technical specifications, base constructional solutions;
- to provide major non-standard detailed drawings;
- work with project as long as it is profitable.

It is not important for the designer:
- how long construction of a building will take;
- erection of a building delay.

Factors, affecting BIM design implementation in the building industry:
- builders can see that a lot of time is spent for downtime (meanwhile employees receive hourly wage);
- errors calculating materials and quantities estimate for large objects can ocurr (diference of 10-30%);
- it is hard to control the work of employees;
- it is hard to plan work for several months ahead;
- it is important to ensure workers' safety and health;
- right plot exploitation in urban areas (storage places) is very important factor.

Therefore it is very important that the materials and equipment arrive to the object at the time when they are needed. Using BIM design and planning platforms, it is possible to exploit the construction site effectively. Delay arising on the construction site is significantly rising the construction price. Different factors may influence the rise of downtime. The main reason for the difficulties on construction site-inadequate planning. Without BIM it is difficult to control the delivery of materials in time, correct mistakes. Also delay can occur because of a lack of cooperation between the contractor and the designer. Without BIM technologies these parties do not contact, the work is not coordinated, often work must be repeated, additional time for changing the project is needed.

2. Challenges, barriers, problems and solutions of building information modelling

In order to assess the need of Building Information Modelling for the company, it is necessary to consider BIM barriers, challenges that should be solved. Before starting to use BIM usually there are considered these issues: software cost, staff training, training time, downtime. However, when company starts to use BIM there are faced much more barriers which are different for each individual company and are depending on its size, number of employees, status in the construction sector.

During BIM implementation to design companies there are seen three types of barriers: legal, technical and commercial. One of the biggest legal threats is fluid collaboration. Furthermore, it is important to indicate responsibilities of a different project parties, assess the risks of model ownership. Technical barriers: interoperability, the lack of standards (national). Commercial barriers: inertia (stagnation), needed investments, asymmetric risks and rewards, no standard business models, no standard contract models (Ashcraft et al., 2015).

There are three critical BIM installation issues in the design company:
- selecting software;
- addressing IT issues;
- training up and rolling out.

It is noted that many BIM programs are similar, have following characteristics: 3D modelling environment, „domain" toolkits, cutting drawings, possibility to import and export. However, professional user sees the differences between different BIM programs: some are easier to use, some are geared forward through „traditional practice in 3D", some handle more complex geometries, some handle larger scale.

The question is how to choose the right software, which would fulfill all the requirements for the quality and planned finances. When commercial software proposals are received, price, opportunities of a program and adaptation for specific design company should be evaluated. In order to choose right it is advised to try at least a couple programs (trial versions). This would create an opportunity to compare strengths and weaknesses of a different programs (Ashcraft et al., 2015).

Fig. 1 illustrates connection between the owner (builder), a building contractor and designer (design company/architect). This model describes standard cooperation model. When project is already made, contractor is searched. It is noted that owner transfers the instructions directly to contractor, who coordinates the construction issues with subcontractors, suppliers, and other participants in the construction. In this case, the designer is left behind and cooperates only with the owner implementing his instructions and tasks. This model

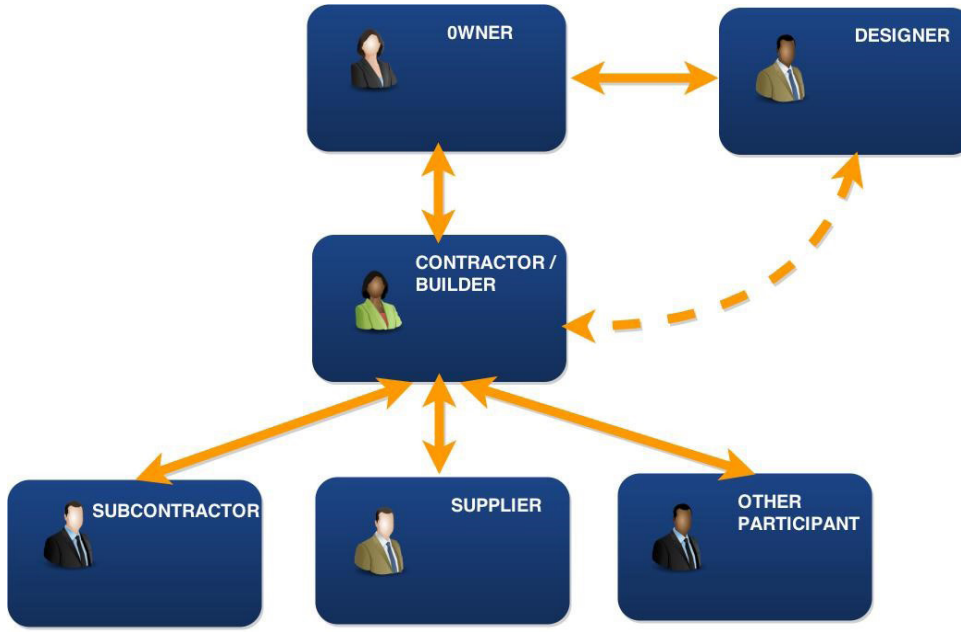

Fig. 1. Standard cooperation model between construction parties
Source: author's elaboration on the basis of (Ashcraft, Shelden, 2015).

refers to a hierarchical management system, individual construction project participants do not communicate, there is no cooperation between the different parties.

Using a Construction Management (CM) firm early in the design process will result in more accurate preconstruction estimates that will keep the owner more informed for bankroll and cost purposes. Fully integrated BIM design process links the CM to the architect at the beginning of the design phase. Each of them will have input to the design of the building, and the end result will be a more cost effective building due to the increased productivity from this type of relationship. They enable the exploration and improvement of the project executing strategy, facilitate improvements in constructability with corresponding gains in on-site productivity, and make possible the rapid identification and resolution of time-space conflicts (Fischer et al., 2004). Although this model is based on a much more complex design process, but it creates opportunity to create the most effective construction project „script". Fig. 2 illustrates the relations during construction process when building information model is used. Model changes from hierarchical, which is common in today's construction industry, to collaborative model. One of the biggest advantages is the feedback between participants of the construction process.

The biggest disadvantage of BIM model is equal rights to the common project. Everyone can express their opinion in the design phase, so the design process may significantly slow down. Contractor cares to erect building as fast as it is possible. Meanwhile, engineer cares about constructional simplicity, so it would be easy to calculate constructions and building statics. Architect seeks that his/hers designed building would be interesting and impressive. Furthermore, architect cares about comfortable building usage. Often some exterior-interior details cost a lot and are difficult to build. The owner usually seeks to profitably sell, rent premises, as fast as it is possible. Different participants of the project sees design work through a different angle, so this model brings new winds and is very complex in respect of fast design and different opinions.

Important disturbance when deciding to start using BIM is uncertainty whether the investment will return. Complication is that the technology is always envolving and a lot of time and expense can be spent on software and training with unceratin outcomes. The „pioneering" path can be high risk as firms become „test pilots" for certain technologies whilst their competitors wait in the wings to see if the „testing" will result in commercial value and competetive advantage. But this „wait and see" approach is no longer viable for firms that want to be key players in the construction market particularly at the top end (Smith, 2014).

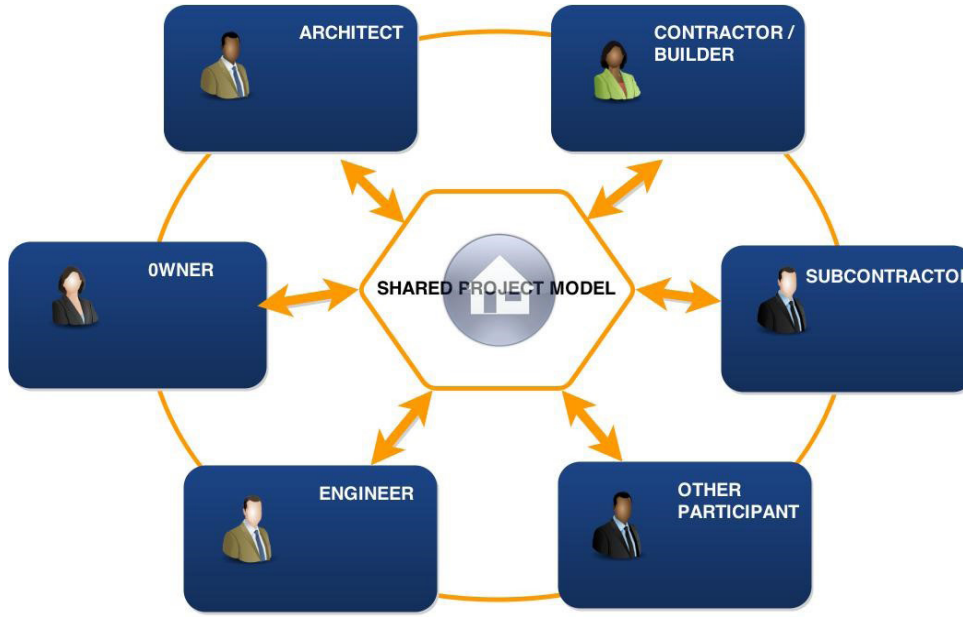

Fig. 2. Reciprocal relationships between various parties involved in the design process and the BIM project
Source: author's elaboration on the basis of (Ashcraft, Shelden, 2015).

Because the true benefit of a BIM is to the project owner, the push to use a BIM will most likely be a client-driven development. Many owners see the single point of responsibility in integrated practice as an attractive alternative to the „over-the-wall method" of design and construction in which an architect completes a design and hands it over to a contractor for construction. Speed, accessibility, communality, and adaptability are achieved by the use of a common database, early information user input, knowledge representation and information technology, team collocation, and information exchange in small batches (Elvin, 2007). Based on expert studies, other benefits of BIM include reduced risks, improved productivity, streamlined production, maintenance of design intent, and facilitation of quality control through clear communication and sophisticated analytical tools (Guidelines for Improving Practice, 2007).

Fig. 3 presents different needs of participants in the project. BIM helps to fulfill these needs. In addition, table shows issues, which do not interest particular project participants. Architects and engineers do not care about the construction time

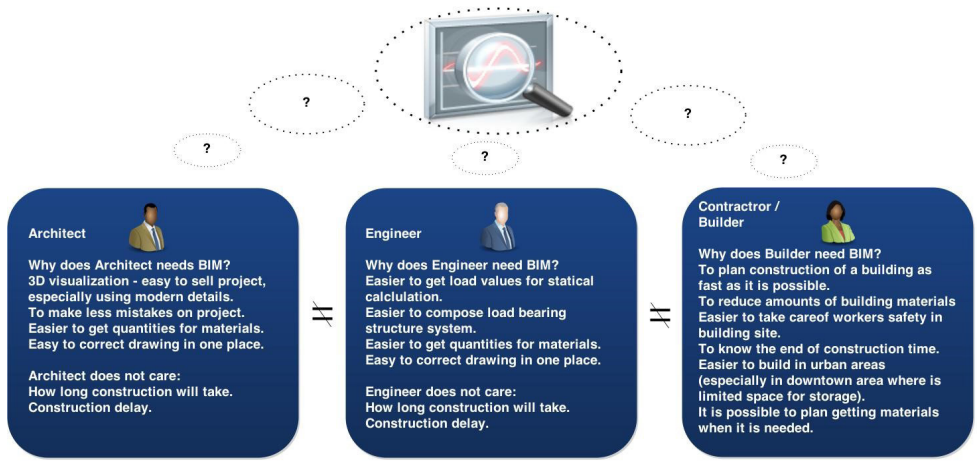

Fig. 3. Different needs of participants in the project

delay. When considering the need of BIM implementation, architect does not care, how long construction of a building will take, project delay. According to the provided information, it is noted that contractor/ builder feels the biggest benefit using BIM. BIM model helps to shorten the construction time, reduce the quantities of materials, to accurately plan the ending of construction. It also helps to ensure workers' health and safety. Building Information Model makes it easier to build in urban areas, plan the arrival of materials on construction site at the right time.

3. Identification of factors, which affect BIM implementation

In order to assess the need of BIM implementation correctly and identify factors which affect the design companies to invest in expensive technologies, there were interviewed 10 designers whose companies are using BIM. 12 factors which generally encourage design companies to start using new design software were randomly presented for the respondents. The respondents evaluated BIM installation affecting factors, which influenced their company in 10-point system. 10 points for factors which had the greatest influence; 1 – had least influence. Fig. 4 shows results of the survey.

According to the respondents the greatest influence of BIM software installation for their company had calculations of 3D construction. This factor unanimously got 10 scores from all respondents. It can be assumed that companies maintain a full complex project so it is convenient to use a single BIM program because constructions are calculated in the same model, which is created and holds information of all building information model in the central file. Therefore, information is always updated and there is no need to change formats, convert files.

According to the respondents second place of the most affecting factors got easy drawing correction (it is enough to change something in one drawing and it automatically changes in all model). This factor got high rating because it helps to decrease time resources – during initial project stage primary project proposals are changed a lot depending on the client's needs.

3-4 places were taken by the list of materials generated by one click and factor that automatically created material list is more accurate. This factor describes the need to accurately calculate materials, also there is less labor cost because data is generated automatically.

Design of complex objects demand got averagely 8 points and was left in 5th place by importance. According to the respondents' opinion, it can be assumed that the object size when choosing BIM programs is not an essential factor, since surveyed companies do not have a large amount of great projects. In addition, it can be assumed that despite the challenges of re-working when using 2D programs, professional designers implement large projects as well as successfully and smoothly as smaller projects.

6-7 places were shared by these factors: multiple model usage and visualization opportunity, which affects easier project sale. Repeated model usage does

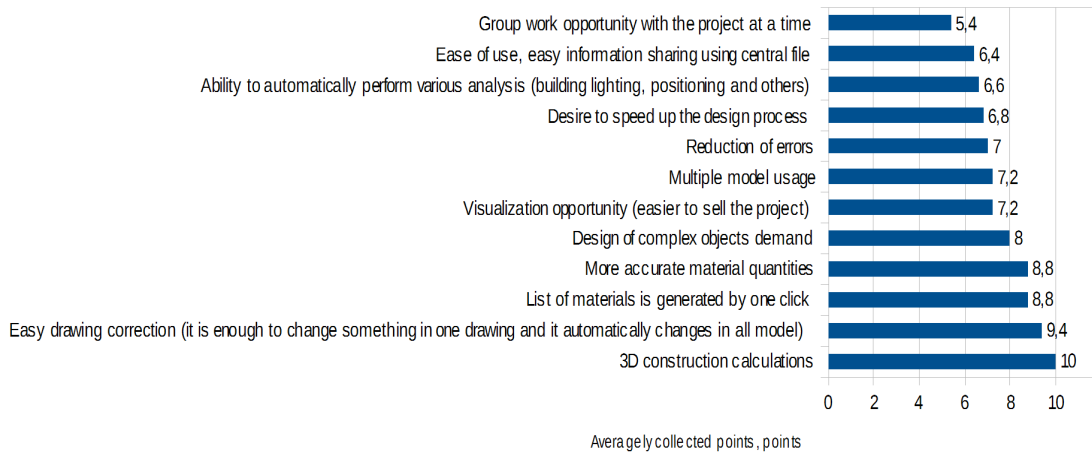

Fig. 4. Factors, which affect BIM implementation

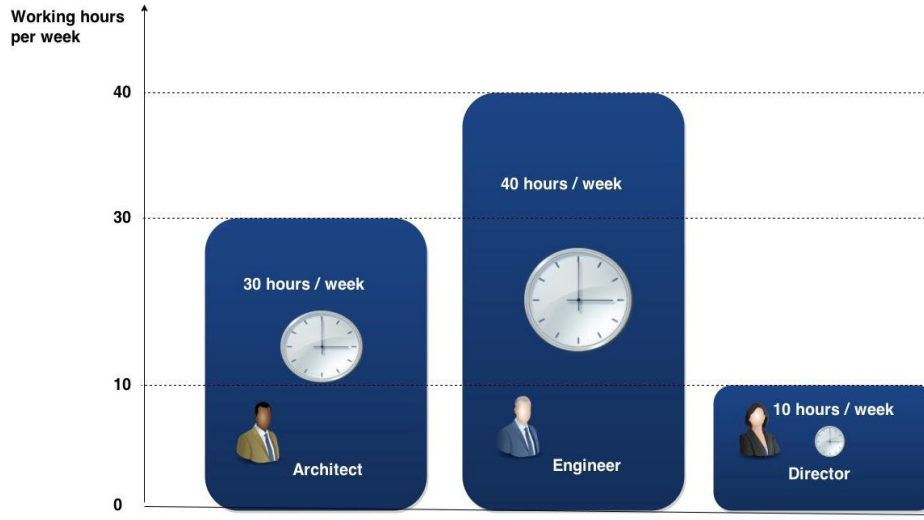

Fig. 5. Distribution of employees in the company

not have a decisive influence, since the projects are rarely similar, so the value of one central file model is mostly beneficial to the builder, who possess the purchased project for his needs during the period of the whole building. Design companies do not get obvious benefits for visualization, because 3D view is often unnecessary for the customer, especially when building is residential, constructed for its own use and not for sale.

Reduction of errors which occur in the project averagely has collected 7 points. It can be concluded that professional users working in the surveyed design companies make few mistakes, so this factor is in 8th place.

The desire to speed up the design process has collected 6.8 points. It is believed that 2D users skills before starting using building information model programs were excellent. Therefore, a decision whether or not to install expensive BIM softwares did not affect the need to speed up the design process, since employees work optimally.

According to respondents opinion, the ability to automatically perform various analysis (building lighting, positioning and others) interests them averagely- this factor has collected 6.4 points. When providing design services it was noted that demand for these analysis from customers is not high, so factor has no significant influence when choosing to use BIM programs. Ease of use and easy information sharing using central file got 6.4 points.

Factor of group work opportunity with a project at a time was left in 12 place and collected 5.4 points. In today's society, it is noted that professionals often seek to be leaders- show their knowledge, take leadership, make everything perfect to the last detail. Therefore, several professionals are not willing to work together in one project and share their intelligent knowledge, ideas and information. During the survey turns out common opinion of all employees, as companies have implemented BIM technologies for awhile, so owners of the companies had the opportunity to assess the need for BIM technology factors and the most improved employees working areas.

In order to properly assess the importance of BIM technologies and design services need, design company „N" activities were analysed. The company is a private limited company which works more than 2 years. Company „N" is micro enterprise which employs altogether 4 employees (2,5 posts). Since the company is attributed to the group of young companies, it employs few workers not full-time (it is not their main job). By doing this the company has adapted to the changing market and if it is necessary can do larger projects because has available certificates and working professionals. The company carries out different kind of design work. Foreign authors have proven BIM benefits for large companies theoretically and practically. During the research the aim was to find out whether it is beneficial to implement BIM software and spend money for designers training to „micro" enterprise doing business in Lithuania. Fig. 5 shows the staff of „micro" enterprise distribution by profession.

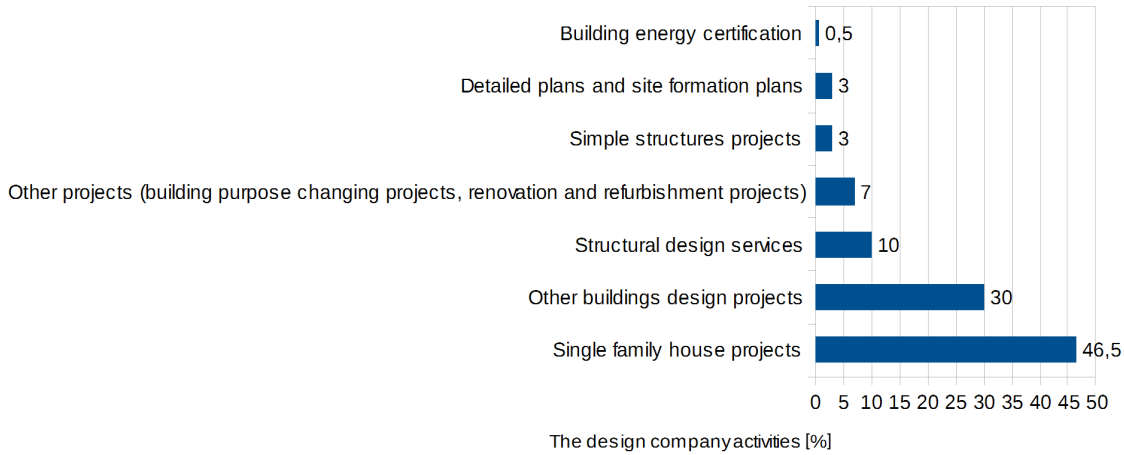

Fig. 6. The design company activities

The company prepares detailed plans and site formation plans, single family houses projects, construction design projects, simple structures and other buildings projects, renovation and refurbishment projects, building energy certification. Company provides a wide range of activities. It was noted that not all activities require complete complex project. It is pointed out that complex project is necessary for the design of single family houses, when architectural and structural parts are required.

Calculations have been carried out according to the company's economic performance and different activities. The cost of the different projects have been evaluated after companies activities were grouped into different areas. Figure 6 shows the price part of different project depending on the total price of all the projects. The biggest part of the company's projects consists of single family house projects – 46.5%. Other buildings design – 30%, 10% – structural design services. Other activities- take only 13%. Despite the fact that single family house design takes the largest part of company's activities (when full complex project is needed with architectural and structural parts), but this activity receives less than half of the company's income.

Not all company's projects are complex. Full complex project is needed with architectural and structural parts only for single family houses. However, company does not offer heating and ventilating, air conditioning, plumbing and other project parts. It is concluded that it is not worth to install BIM programs and train staff for „micro" company, which specializes in many different areas. Payback time is long because the expenses are needed for programs, training. In addition, the company receives less than 50% of income from complex projects. When project ordering demand is moderate, company in not willing to expand and economical situation in the country stays the same, it is not profitable to implement BIM for „micro" company.

Conclusions

Implementation of BIM to design companies is a complex process, changing three areas in the company: technology, processes and people (their skills, qualification). Design process is faster, more efficient, cost estimation accuracy increases, decreases unplanned expenses when using BIM. According to the survey, the greatest impact on BIM technologies implementation to the design company has 3D design calculations. It is convenient to use a single BIM design program for companies, which maintain a full complex project, because constructions are calculated in the same model, where all of the building information model central file is being created.

Building information model technology is more often used by large production companies, design centers. The most common reasons why designers' refuse to work with BIM: the design of small objects, 2D drawings demand (detail drawings, site plans), doubtful return of investment, copyright issues. Designers priorities when they assess BIM technologies need: to design a building fulfilling all essential structural requirements, to provide the basic

material quantities, justify used construction solutions, to provide technical specifications, to provide major non standard detail drawings, shorten design time. When considering the need of BIM implementation, designer does not care, how long construction of a building will take, project delay. Building companies feel the maximum benefit using BIM because the possibility of downtime is reduced as with BIM project is planned precisely, list of materials is more accurate, easier control of work, easier work scheduling, easier to ensure workers' safety and health, better storage places and plot exploitation in urban areas.

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Application of Internet of Things in Logistics – Current Challenges

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ABSTRACT
In this paper, some aspects of modern logistics related to the Internet of Things technology were studied. Internet of Things can overcome shortcomings of some areas of logistics, for example monitoring, production management, efficiency of logistics operations, information, exchange and communication, modeling supply chains, intelligent information collection and security. This paper describes some principles and characteristics of Internet of Things, and briefly discusses the application of it in modern logistics. Logistics has come to a new stage with the development of Internet of Things technology. The current application areas and future prospects of this technology are analyzed in this paper. Difficulties encountered in the implementation show that the IoT technology needed to be further improved. However, despite many difficulties, experts believe that the key are not problems of costs, standards and techniques, but the formation of a profitable business model in the logistics industry.

KEY WORDS
Internet of Things, modern logistics, standardization, architecture, security, privacy, interoperability

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Introduction

Internet of Things (IoT) represents the next step towards the digitization of our society and economy (Rose, 2015), where objects are interconnected through communication networks and exchange information about their status and/or the surrounding environment (Fig. 1). Paradigm „always connected" is one of the feature of IoT. Technology can be very useful in logistics where every object is uniquely identified, and accessible to the network, its position and status known, and where we have special software services.

Modern logistics includes a lot of characteristics, such as systematic industry, combination of logistics and information technology, technology modernization, integration of supply, integration services, a full service and network architecture of logistics system (Chuanyu, 2009; Shaoai, 2009).

The key technology of each path are: sensors, intelligent chips and wireless transmission network. Therefore, the core is identification device, which means using some technique through the internet protocols to achieve automatic recognition and communication. Nowadays the most popular device is RFID (Radio-Frequency Identification). Over the last decade RFID went on to become a useful tool in retail, logistics, healthcare and a handful of other enterprise sectors (Bisk Education, 2012; Harropm, 2006; Das, 2015).

Reports suggest that RFID is fast taking over the world, but the recent Beacon technology may change this situation by giving for businesses new possibilities. However, the market for RFID tags and systems will rise rapidly in the next decade, because RFID devices still have some advantages over Beacons (Girish, 2015).

Internet of Things systems require each device to be embedded with a unique digital tags with its detailed specifications. Using the special system to read or write the information, and then through wireless data communication network send to other

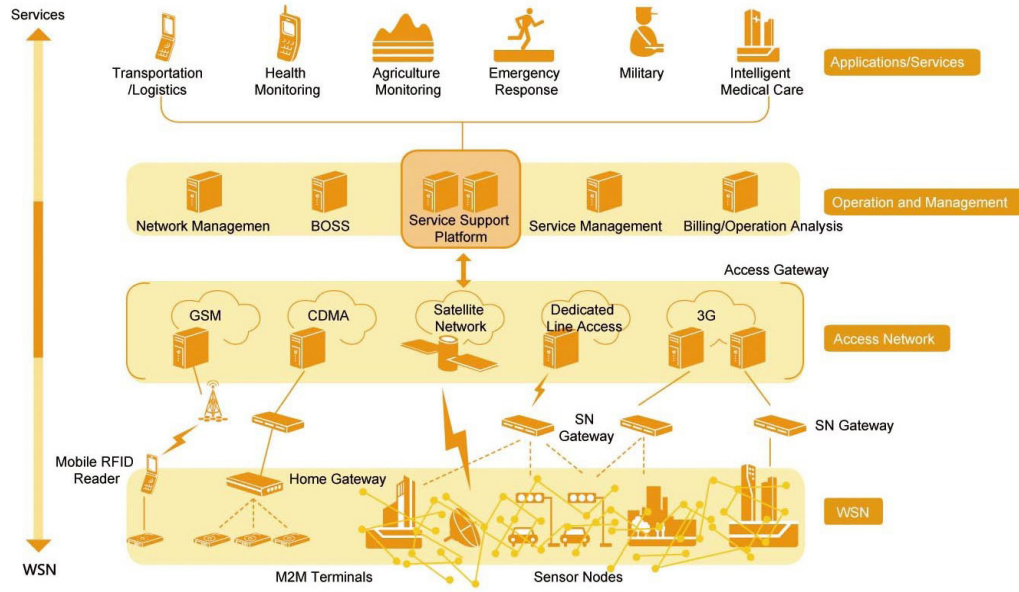

Fig. 1. Framework of the Internet of Things and surrounding environment
Source: (Wanpeng, 2010)

systems. The Internet of Things requires new level of interoperability. This means that IoT requires standards to enable horizontal platforms that consist of special middleware in fields of communication, operation, and programming across devices of different manufacturers, or even industry.

For the past six years, the European Commission has been cooperating actively towards the development and further deployment of the IoT technology. In March 2015 body initiated the creation of the Alliance for Internet of Things Innovation (AIOTI), (AIOTI, 2015). This alliance flags the intention of the European Commission to work closely with all stakeholders and actors of the Internet of Things. Very important role in this scenario plays new idea – the Digital Single Market. DSM (DSM, 2015), adopted in May 2015, leads Europe a step further in accelerating developments on IoT. The DSM consolidates initiatives on security and data protection, which are essential for the adoption of this technology. Most importantly, it announces an initiative on the Data economy (free flow of data, allocation of liability, ownership, interoperability, usability and access) and promises to tackle interoperability and standardisation.

The Internet of Things in the physical world is basically a network of digitally enabled communicating devices, products and services. Domestic appliance, cars, stores, and bus stops, everything will soon have not only connection to the Internet, but also special software with services on board. Research firm Gartner predicts that by 2020 we will have 26 billion smart and connected products in use. This translates to an average of 3.3 devices per person (without smartphones and tablets). What are devices capable of? Nowadays, most systems simply transmit pre-programmed data, but there are devices that transmit data about what they are able to sense and there are „things" that can autonomously respond to changes in their environment. These higher level of interoperability presents a new range of consumer touch points and opportunities for personalization and hybrid shopping in retail. This means that offline retail stores are increasingly moving towards the cloud as well. This calls for designing hybrid customer journeys that work simultaneously offline and online (Bosavage, 2015).

1. Development of the IoT – Application in Logistics

The rapid development of modern logistics used platform based on the RFID technology is the results from few things. RFID technology is a simple, cheap and secure solution. Internet of Things can go beyond it because can provide accurate flow of information of products in market to provide a reliable basis for logistics market analysis, forecasting and decision-making (Ruan, 2012).

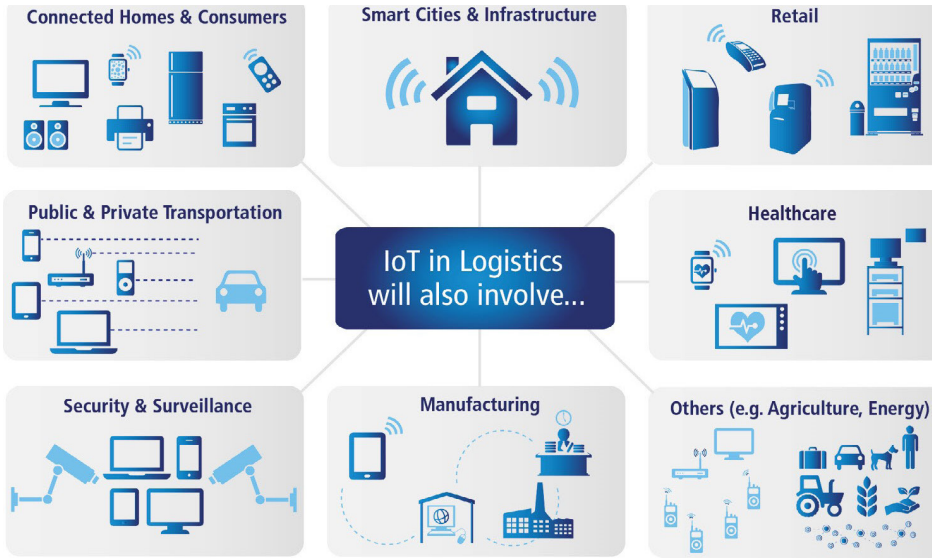

Fig. 2. The Internet of Things Ecosystem
Source: (Improving T&L, 2015).

Internet of Things is a network connecting anything with the Internet to exchange information and communication, to realize intelligent searching source, identification, location, tracking, monitoring and management. IoT and related technologies have strong connection with service-oriented architecture – SOA (Yuqiang, 2010). The facts makes the recommendations for designing a new-type logistics business processes by applying the IoT technology based on the supplying chain perspective. The IoT has many positive impacts on every stage in the global logistics supply chain, starting from the manufacturing stage all the way, to the retail stage (Fig. 2). It makes better visibility of supply chain, tracks deliveries in real time, improve a data accuracy and thus provides the ability of faster exception management.

Standardization of technologies related to IoT is very important, as it will lead to better interoperability, thus lowering the entry barriers. Currently, many manufacturers are creating vertical solutions (a slice in the IoT application space), using their own technologies and inaccessible services. Standards need to be created to change this „Intranet of Things" into the more complete „Internet of Things". As yet, no holistic approach to IoT has been proposed; coherent concepts that unify IoT do not exist, leading to silo solutions that do not support interoperability (Rose, 2015; Bassi, 2013). This approach is an extension of the single device-to-cloud communication model, where „IoT devices upload data only to a single application service provider".

Many industries and business sectors try to use the possibilities of data-driven technology, but companies in transport and logistics are way ahead. By their very nature, the logistics providers that move objects by modes of transport have widely distributed networks and take part in rapid information distribution about states of devices. As a result, they were quick to see the benefits of new kinds of sensors, connection technology and service oriented architecture.

Using mobile technologies and the Internet of Things, enterprises can accelerate productivity, profitability and operations with solutions designed specifically for their processes. Building solution where enterprises can connect all devices across a distributed network, capture and share their mission-critical data, allowing them to show real-time view of all operations (Tab. 1), (Boost to C&L, 2015). By leveraging convergence of the above mentioned trends, transportation and logistics can dramatically improve the following areas:

- End-to-End Visibility – complete visibility facilitates more effective, timely decisions and reduces delays through quicker detection of issues;
- Warehouse and Yard Management – with IoT-enabled mobile devices designed to track inventory data, equipment and vehicles, enterprises can give their physical assets a digital voice;
- Fleet Management – with mobile scanners, computers and RFID systems alone, enterprises can gain visibility into their assets and better streamline operations to keep their fleet moving.

Tab. 1. Transport and Logistics Internet of Things framework

Improvement Area	Improvement Area Description
Sensing and shaping	• Information capture across various nodes of a supply chain • Environmental monitoring aspects
Adaptive supply	• Interpretation of captured information; • Decision aid based on analytics; • Act on changed environment to orchestrate connection across supply chains
New business opportunities	• Continuous improvement based on continuous captured information • New business model generation possibilities based on X-as-a-service • Ecosystem partnership to enable wider market reach with lower levels of investment

Source: author's elaboration on the basis of (Deloitte University Press, 2015).

Companies in this sector made use of data-driven technologies related to the Internet of Things in many ways. Specific applications include the real-time tracking of shipments, warehouse-capacity optimization, predictive asset maintenance, route optimization, improved last-mile delivery, and more. But there are many more capabilities of IoT applications for transport and logistics providers. Through a rapidly increasing number of connected devices, embedded sensors, and analytics technologies, companies in the sector can enjoy unprecedented visibility into almost every aspect of their business, from operations to finance (Koomey, 2012). This real-time visibility will allow transport and logistics providers to explore more effectively and intelligently their rich and complex database, leading to more efficient use of resources, better engagement with customers, and more informed decision making.

Beacon technology consist of a device with special software and can help drive shoppers to those „smart" shelves. One of the most important advantages IoT that shops have is the tremendous amount of customer information they can mine and analyze to provide more tailored and streamlined shopping experiences. Beacons can may offer more targeted (personalized) content onto displays of our mobile devices within the stores whenever they are triggered. Inside a smartphone app, shoppers can define personal shopping preferences – for example, food preferences and allergies. Every time when they enter a store, their phones will connect via Bluetooth to smart displays located underneath products on store shelves. Beacons can be a big part of the near future of retail. Beacons are not the same as RFID, because can interact with environment and can also collect the data.

Machine-to-Machine (M2M) communication has attracted considerable attention in research and from the perspective commercial operators offer services within the domains of fleet management, logistics, home automation and so on. Domain of Internet of Things is starting some kind of revolution of M2M (Alam, 2013). The M2M solutions provided today mostly reside on vertical platforms – silo solutions – servicing only one specific vertical system. IoT is much broader when considering wireless with wired connectivity. Looking at IoT it is lacking behind M2M with only few business cases such as systems of RFID tags in supply chain management and logistics. New IoT platforms on the market today are better addressing the market problems from a M2M silo architecture perspective (Alam, 2013).

2. Main challenging domains of the IoT

For IoT to achieve its vision, a number of challenges need to be overcome (Croll, 2015; Wanpeng, 2010; Bauer, 2015). These challenges range from applications, contextual to technical. A world where all things are connected, communicating information and data about its local environment are send to a distributed cloud computing opens the door for less security and privacy. There are new areas where privacy needs to be protected. Principles of data confidentiality and security must be safeguarded. Governance in the IoT is crucial.

The idea of a globally interconnected continuum of devices based on RFID technology has considerably been extended to the current vision that envisages a plethora of heterogeneous objects interacting with the physical environment. Today, a large number of different means are used to enable communication between heterogeneous devices.

One significant aspect in IoT is the large number of devices being connected to the Internet, each one exchanging data. Finding ways to reliably store and

Tab. 2. Major challenge areas of Internet of Things

Challenge Area	Challenge Area Description
Privacy and Security	IoT presents significant challenges in terms of who can see what with which credentials Millions of devices will create a whole new security landscape as enterprises attempt to protect themselves, it will also create new opportunities for operational technology security providers
Standardization and Interoperability	How do we make sure that the hugely diverse technology platform continues to act in a platform manner? Appropriate standards, reference models, and best practices also will help curb the proliferation of devices that may act in disrupted ways to the Internet
Large data sets – „big data"	There are many of the key challenges similar to large scale data. How do we deal with the data stream of billions of „actors"? How do we ensure the data remains usable? Where is all the data provided by those processors going to be stored and what are the problems around them – processing, analysis, data exploration?

Source: author's elaboration on the basis of (Alistair Croll – O'Reilly Radar, 2015; Wanpeng, 2010; Bauer, 2015).

interpret the masses of data through scalable applications remain a major, not only technological, challenge (Tab. 2).

We can also show fields of challenges from other point of view. The concept of the IoT is the multidisciplinary study that involves the research in the fields of hardware, communication, networking, data flow and software engineering (Tab. 3).

The individual's trust in the IoT should be fundamental and complete, knowing that information will not impact negatively on any individual or society. Factories and industrial facilities will use the IoT in completely different ways. Considering the advantages of IoT, overall architecture of the IoT -enabled manufacturing execution system provides a new paradigm by extending the IoT to manufacturing field. Under this architecture, the manufacturing things, information sharing fleet management and other can be embedded with sensors to interact with wide range of sensors and other IoT systems. The real-time data driven monitoring and optimization for IoT-based sensible systems can be achieved to improve productivity and quality, reduce the wastes of manufacturing resources, cut the costs in logistics, reduce the risk and improve the efficiency in transportation, and improve the responsiveness many tasks (Zhang, 2013).

2.1. Device discovery standards and Protocol translation

The way IoT devices are discovered, managed, data is reported and authentication is done should be interoperable using standard protocols. Ideally, any IoT device should be able to communicate with any application or service. Devices but also applications as well need to talk to each other (Bosavage, 2015). Checking the weather, doing banking operations, looking at my Endomondo runs, getting my medical information. The source of data are not only devices but everything you interact with. They enable devices to be discovered, they broadcast their capabilities and interact with others in standard ways (Schneider, 2013; Bassi, 2013). The IoT needs many protocols. Perhaps it is easiest to categorize them along a few key dimensions: Quality of Service, addressing, and application. We have devices speaking MQTT, some XMPP, some CoAP, some DDS, some proprietary

Tab. 3. Major fields of challenges of Internet of Things

Field od Challenge	Fields of Challenge Description
Technology level (Interface between the real and digital worlds)	Challenges linked to the integration of smart 'network enabled' objects under strong energy and environment constraints, communication technology – wireless technologies
Network level (Data and Transmission)	Challenges linked to the massive secure and dynamic and flexible networking and the ubiquitous service provision
Application level (Intelligence level)	Challenges linked the data flow and service discovery where data collected by individual smart 'network enabled' objects such as wireless sensors are enquired by distributed users

Source: author's elaboration on the basis of (Croll, 2015; Wanpeng, 2010; Bauer, 2015).

protocols. Inside those the data format may even be different. Translating those protocol to something standard either through JSON, XML or RESTFul APIs is going to be key (Schneider, 2013).

2.2. Interoperability – Fragmentation and Silos

Interoperability is a critical source of value in IoT systems. One of the most important things of interoperability in generating maximum value from IoT applications. Much of the data collected by sensors today is used to monitor discrete machines or systems. Individual equipment manufacturers collect performance data from their own machines and the data can be used to schedule maintenance. Interoperability would significantly improve performance, costs, effectiveness by combining sensor data from different machines and systems to provide decision makers with an integrated view of performance across an entire factory or between different systems.

The Internet of Things is becoming the Internet of Everything, connecting people, processes, data, and things at unprecedented scope and scale. Despite the many concerns around privacy and security, a poll by IoT Nexus found that interoperability was seen as the biggest challenge to the IoE by 77% of respondents. Research by McKinsey suggests that 40% of the value of the IoE will need to be unlocked via interoperability (Manyika, 2015). Given the potential benefits, and the previous interoperability challenges faced by IT, it may seem surprising that it continues to be a problem. Main reason for that is a lot of the applications that have been created. Most of them have been created as a stand-alone systems and often it is in their interest not to build open systems. Great examples are Smart Cities and Transport and Logistics solutions. Design IoT solutions should use IoT Architectural Reference Model or something similar concepts (Bassi, 2013). The Lighthouse Project IoT-A proposes the creation of an architectural reference model for the IoT as well as the definition of a set of key building blocks to lay the foundation for a ubiquitous IoT (European Lighthouse Integrated Project, 2013).

2.3. Security

Security and privacy protocols are very important issues when it comes to the Internet of Things space. There are some wide known standard like Online Trust Alliance (OTA) published a draft trust framework specifically for Internet of Things devices that entails specific best practices for data privacy and protection manufacturers should follow. The Framework is a comprehensive global initiative that provides guidance for device manufacturers and developers to enhance the security, privacy and sustainability of connected home devices, wearable fitness and health technologies, and the data they collect (FTC Staff Report, 2015).

According to a press release, this framework could pose as the building blocks of a certification program among manufacturers of IoT devices. To address the problem Online Trust Alliance established the IoT Trustworthy Working Group (Online Trust Alliance, 2015), as a vendor neutral multi-stakeholder initiative. The group recognizes that „security and privacy by design" must be a priority of product development. Sustainability incorporates the life-cycle issues related to transfer and processing of collected data.

2.4. Privacy

Furthermore Internet of Things technology enables a whole new context for smart objects. Even RFID putting an identification label into every object, but Beacon enables a smart system to collect the data interact and exchange information. Information retrieved from such an object, turns it into a potential smart objects. If security problems are suitably treated, they will most probably be able to connect to the global Internet. This way, one can get an ubiquitous framework to access, monitor and control many systems of those smart devices over an Internet (FTC Staff Report, 2015).

There is a special field of IoT – Mobile Health (mHealth) with rapidly growing sector stemming out of the convergence between healthcare and ICT (European Data Protection Supervisor, 2015; Harropm, 2006). It includes mobile applications designed to deliver health-related services through smart devices often processing personal information about health, lifestyle and well-being information. Medical context enables a rapid and precise identification and quick access to Personal Health Records over an IoT. The use of smartphones with Internet access turns this whole context into many mobile healthcare systems. The mHealth market is complicated because many public and private operators are active at the same time, for example app

developers, devices manufacturers and advertisers, and there are many business models with fast changing conditions (Mobile Health – Reconciling, 2015).

2.5. Collecting IoT data – really Big Data

Companies need to collect most of the data because that is relevant to their business and that is a seriously challenging task. Furthermore they need to filter out redundant data and also protect the data from getting attacked. This requires highly efficient mechanism that includes software and protocols (Croll, 2015).

The most common data collection tool is the devices with special sensors. Data collection process in field of IoT also requires particular protocols. Message Queue Telemetry Transport (MQTT) and Data Distribution Service (DDS) are two of the most comprehensive protocols. Both protocols can help devices connect with real-time machine-to-machine (M2) networks. MQTT collects data from multiple devices and puts the data through the IT infrastructure. On the other hand, DDS distributes data across devices.

IoT deployments will generate large quantities of data that need to be processed and analyzed in some cases real time. Processing large amount of data in real time will increase workloads of data centers, leaving providers facing new security, capacity and analytics challenges. This is where knowledge discovery in databases and data mining technologies come into play. These technologies (called sometimes machine learning or deep learning) provide possible solutions to find out the information hidden in the data of IoT. Next knowledge can be used to enhance the performance of the system or to improve the quality of services (Tsai, 2014).

2.6. Legal, Regulatory and Rights

The use of IoT devices raises many needs of regulations and legal questions as well as amplifies existing legal issues around the privacy and personal data processing. The questions are wide in scope, and the rapid rate of change in IoT technology outpaces the ability to adapt. Gartner said cybersecurity and privacy concerns are the main obstacles to IoT adoption. A report by the U.S. Federal Trade Commission enumerated the risks of a standard-less IoT: enabling unauthorized access and use of personal information, facilitating attacks on other systems and endangering personal safety (Cline, 2015).

Companies need to get ahead of the inevitable fearmongering and back a minimum set of privacy standards that addresses the core concerns of IoT users. Other industries have successfully taken a similar self-regulatory approach, such as the mobile-marketing industry's „Mobile Application Privacy Policy Framework", automaker industry's „Consumer Privacy Protection Principles for Vehicle Technologies and Services" and agribusiness sector's „Privacy and Security Principles for Farm Data".

In October 2014, Europe's Article Working Party (WP) published Opinion 8/2014 on the Recent Developments on the IoT. While the Opinion is based on the current Data Protection Directive 95/46/EC, many of the legal solutions and recommendations are taken from concepts proposed in the draft EC data protection regulation (95/46/EC, 1995; 2002/58/EC, 2002). The Opinion establishes that European data protection law applies even if the data controller is outside of the European Union.

The US regulator has adopted similar non-binding guidance. In January 2015, the Federal Trade Commission (FTC) released a report on „The Internet of Things: Privacy and security in a connected world" (FTC Staff Report, 2015), which provides a „series of concrete steps that businesses can take to enhance and protect consumers" privacy and security.

2.7. Issues strictly addressed to Transport and Logistics

Some techniques based on IoT can help manufacturing execution system to solve real-time data driven optimization among each manufacturing system layer. Most key components of T&L systems can be designed to track and trace the real-time information of the manufacturing things such as operators, machines, pallets, materials and so on. The dynamical optimization of the production process could be possible in new way if we can use the real-time manufacturing information coming from IoT sensors. The objective of dynamical optimization is to analyze and quickly adjust the production control parameters based on information from IoT devices. The most important challenge is how to establish an reference architecture for IoT-based manufacturing execution system to apply the conception of IoT to manufacturing field and build up a referenced real-time information capturing and integration framework (Zhang, 2013).

However, although companies are aiming to implement IoT-based manufacturing models, there are still some other risks that prevent companies from widely using amount of collected data. These barriers are basically related to the lack of security services and standard and effective data management with desired level of protection of sensitive information (Ortiz, 2013).

Next issue is connected with traditional IP networking and the QoS level, because guarantees provided with current solution will no longer suffice compared to requirements of IoT nets of sensors. Most M2M systems and IoT solutions are currently should be implemented over transportation layer with special new application protocols connected with the network layer. This becomes a critical use cases when we talks about special uses, such as connected vehicles and telemedicine where latency and the guarantee of delivery are essential. Therefore, this kind of solution should to consider multilayer architecture of whole system as an integral part of the end-to-end solution, not only as network transport medium (Alam, 2013).

Another, one of the scientific and technical challenges in the design of the IoT systems is the dedicated architecture design, which enables the interconnection of trillions of smart devices. Modern wireless technology like WiFi, GSM 3G/LTE nets are only transport medium. Smart devices or RFID sensors will use wireless technology as smart network but we need some standards for „network enabled" objects in IoT architecture for logistics management.

Logistics has always been considered as an most important element in emergency response operations. Technology can help to manage rescue equipment, vehicles and on-site staff as well as food, medicine and general living goods. The emergency response operations require the participation of a wide range of organizations with a lot of equipment. Extensive information and resource sharing help to better cooperation between separated organizations. The results of using smart IoT systems include better resource allocation, cooperation among multiple participants, faster and accurate situation analysis, complete visibility of response forces, and their capability. These benefits looks like as emergency response specific, but there is a room for wide range of logistics management applications based on IoT applications and systems (Xu, 2013).

As we see, in general, scientific and technical challenges in the development of the IoT solution for transport and logistics require different systems and competencies: challenges of interconnecting massive smart 'network-enabled' objects, networking smart objects with external networks, and challenges of data storage, data discovery and data sharing.

Conclusions

IoT is a very complicated matter and we need to make standards in many areas, most importantly in privacy and security. We also need standards for interoperability. The applications and devices will have to be compliant to these standards. Otherwise, there will be a weak link that compromises the whole idea of „connected world". More devices are becoming embedded with sensors and gaining the ability to collect and exchange data. The resulting information networks promise to create new business models. But the predictable pathways of information are changing.

The physical world itself is becoming a type of information system where sensors embedded in physical objects are linked, often using the same Internet Protocol (IP) that connects the Internet. These networks generate large volumes of data. Often in the single device-to-cloud model, the data each IoT system produces is processing in a private stand-alone data silos. Every major IT company wants to build their own IoT platform, meaning that each one is developing its own set of standards. Is it too late to save the IoT from becoming broken into useless pieces or can the industry work together to build a true Internet of Everything?

We need an effective back-end data sharing architecture that would allow the companies to easily access, exchange and analyze the data in the cloud. Solutions designed with the IoT Architectural Reference Model (ARM) allow users to move their data when they switch between IoT services, breaking down traditional data silo barriers. The ARM provided aims to connect vertically closed systems for creating open systems and integrated environments or platforms. Industry can capitalise on the benefits of developing this kind of „Internet of Consumer-oriented Things" platforms that closely involve the telecom, hardware, software and service industries.

IoT-A, the European Lighthouse Integrated Project has created the proposed architectural reference model for IoT solutions. Using an experimental paradigm with the definition

of an initial set of key building blocks, IoT-A combined top-down reasoning about architectural principles and design guidelines with simulation and prototyping in exploring the technical consequences of architectural design choices.

However, we must face the biggest problem of IoT. Security as an important requirement for growth in IoT systems. One called it the „critical enabler", claiming that many developers and companies initially underestimate its importance when creating IoT devices. He noted, „Security is not a key issue while your application or product has not reached scale, but once you are at scale and maybe have a first incident, it becomes the most important problem" (Bauer, 2015). Recent hacks on online car systems also highlight the importance of addressing security challenges for connected devices, vehicles, and buildings.

Ensuring security will not be easy, given the numerous stand-alone applications, each with its own special features. For instance, fitness wearables might only require relatively basic security measures that ensure consumer privacy, such as software-based solutions. But IoT applications that control more critical functions, including vehicles, medical electronics and industrial automation, need much higher security level, including sometimes hardware-based solutions.

Privacy and protection of personal data are fundamental rights under Articles 7 and 8 of the EU Charter of Fundamental Rights. In addition there are specific rules currently applicable to mHealth laid down in the Data Protection Directive (95/46/EC, 1995) and the ePrivacy Directive (2002/58/EC, 2002). Completing the Digital Single Market is one of the top priorities of the European Commission. The digital technologies are transforming our world. But existing barriers online mean citizens, businesses and governments cannot fully benefit from digital tools. If citizens do not trust online services, they will not benefit from all the opportunities.

The European Commission's proposals for a comprehensive reform of the EU's 1995 Data Protection Directive aim to strengthen privacy rights and boost Europe's digital economy. The Commission's proposals update and modernize the principles enshrined in the 1995 Directive, bringing them into the digital age and building on the high level of data protection which has been in place in Europe since 1995. A clear definition of personal data will be established in the regulation to ensure harmonized implementation of the rules across the EU. The legislation is technologically neutral: this means that it will not go out of date, enabling innovation to continue to thrive under the new rules.

The current stage, known as the „trilogue", involves negotiations between the three European institutions to reach an agreement on the final text. There are many specific disagreements, but overall the Parliament's approach has been focused more on the rights of data subjects, whereas the Council wants to take approach which leaves many of the details up to national law. This may reflect the preference of some member countries, but it does risk the GDPR failing in its stated goal of harmonizing data protection rules across the EU.

While the EU had presented a strategy on cloud computing, data and the DSM, there had been little focus on IoT since the 2009 action plan. Opening the discussion on IoT policy during a debate in Brussels (Moss, 2015), Thibaut Kleiner said the EU was at a „key moment in policy in relation to IoT". Kleiner questioned if a „horizontal data approach" was needed, asking, „Do we need essential elements in terms of privacy in general or something specific for IoT?" Some important privacy questions may be covered in general, but „others deserve attention in terms of policymaking and possible legislation", he told the event. Kleiner noted that the IoT had been mentioned in the EU's recently unveiled digital single market (DSM) strategy, with its potential in helping build a telecoms single market among the aspects highlighted. In addition, some of Europe's largest tech and digital companies, launches the Alliance for Internet of Things Innovation (AIOTI) to strengthen links and build new relationships between the different IoT players (industries, SMEs, startups) and sectors.

The widespread adoption of the Internet of Things will take time, but the time line is advancing thanks to improvements in underlying technologies. Advances in technology and the greater standardization of communications protocols make it possible to collect data from sensors almost anywhere at any time. While consumers stand to reap the greatest benefits from the Internet of Things, they will have to balance potential benefits with privacy concerns. Business users of IoT technology will need to change their systems and organizations in order to make the most of the Internet of Things. They will need to invest in capabilities, culture, and processes as well as in technology. Policy makers also have an important

role in enabling the Internet of Things by leading and encouraging standards that will make interoperability and widespread adoption possible. Industry players know that a successful adoption of industrial IoT requires a rich network of partners to help companies put together all the pieces of the puzzle. From device makers to developers who can write software applications and to service providers who connect things to mobile devices and the cloud. In order to meet the needs all of the players in industrial IoT, interoperability needs to be top priority.

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Creativity in management – correlates symptoms as determinants of success

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ABSTRACT
The aim of this publication is to determine the correlates of creative and transgressive behavior in the context of the model of the determinants of creative management. The aim of this study was to verify empirically the relationship between the symptoms of creative features (cognitively and characterlogically) and indicators of transgressive behavior. The determinants of subjective qualities of creative and transgressive behavior are analyzed in this article. The author has adopted the assumption about a role of transgressive behaviors in dynamics of creative behaviors (creative resources). The following set of methods has been applied in the research: 1) Questionnaire of Creative Behavior KANH (Popek, 2001; Popek, 2010); 2) Scale to Measure Transgression (STr), (Studenski, 2006). Activity, predominance, courage and high self-esteem – main indicators of functioning a man with a high level of subject creative features – have proved to be significantly correlated with transgressive indicators of behavior. Subject of creative features expressed in a creative attitude coexists with transgressive behaviors: pro-creative motivation in searching for changes, non-conformism, focus on activity and overcoming problems, openness and courage to take up new tasks, innovation and acceptance of novelty. The resulting configurations of features in a range of variables (characteristics of creative and transgressive behavior) correspond to factors conditioning the success in business and management. To a little extent the previous studies took into account the subjective features recognized as creative (in the cognitive and characterological sphere) and their relationship with predisposition for transgressive behavior. The obtained results of research could contribute to the existing scientific achievements in the field of management of important determinants and correlates with subjective features ensuring success. It is defined by a transgressive action – as a kind of activity type to be changed. Subjective characteristics of the creative (creative assets) increases the efficiency of the action.

KEY WORDS
creative management, human capital, success, managing creativity, creative competencies, transgressive behaviors, risk, procreative motivation, non-conformism

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Introduction

Human capital is a specific resource and the benefits of investing in it are indisputable. In a global economy, the human factor is increasingly linked to the progress of management (Rożnowski et al., Biela, Bańka, 2006; Juchnowicz, 2010; Bohdziewicz, 2011). Components of human capital (Steward, 1997; Cole, 1995) – knowledge and skills, experience, creativity and innovation, motivation, agility, creating visions exploring the future – constitute the intellectual capital and social capital – interpersonal relationships between team members (Miller et al., Omens, Delvadia, 1991) and emotional capital – consistency in achieving, courage in action, empathy, assertiveness, social openness, the logic in action, observing standards and values (Mayer et al., Salovey, Caruso, 2000; Mayer et al., Roberts, Barsade, 2008). Managing creativity is one of the new challenges of organization and management (Proctor, 2001; Bransford, Stein, 1993; Mroziewski, 2005; Witkowski, Listwan, 2008; Tyszka, 2004). A creative person is

functioning in a connection with a specific mechanism which essence is the interaction operating in accordance with the principle of feedback of the following elements: 1) potential cognitive creative talents or gifts; 2) personality activation – halting or stimulating activity of emotional and motivational sphere upon creativity development in the cognitive sphere and its manifestation in one's behavior; 3) the evaluation of the effects of one's own activity – creative or adaptive (Popek, 2001; Popek, 2010). The aim of publication is to determine the connections of creative and transgressive behavior in the context of the model of the creative management determinants. Creative resources symptoms were included in the terms of determinants of a success. This article analyzes the determinants of subjective qualities of creative and transgressive behavior. The following set of methods has been applied in the research: 1) Questionnaire of Creative Behavior KANH (Popek, 2001; Popek, 2010); 2) Scale to Measure Transgression (STr), (Studenski, 2006).

Governance is a set of activities including planning, decision making, organizing, leadership and controlling resources of human organization, (Clarke, 1997; Gryffin, 2000; Cole, 1995). Creativity in business requires creative thinking skills, expertise and motivation (Amabile, 1998; Crant, 2000; Kharkhurin, 2014; Cropley, Cropley, 2012). Tendency to take economic and enterprising behavior is a complex syndrome of personality traits (Peltier, 2005; Strzałecki, 2006; Strzałecki, Lizurej, 2011; Witkowski, 2003; Caroff, Lubart, 2012; Rakowska, 2001; Rożnowski et al., Biela, Bańka, 2006). It determines the high motivation to achieve a success, readiness to take risks and high level of innovation (Studenski, 2006). Persons characterized by symptoms such as an arrangement exhibit characteristics enterprising behavior in situation tasks (Goszczyńska, 2006; Studenski, 2004). According to the theory on investment of Sternberg and Lubart (1991, 1999) creation requires cooperation (a confluence) of six interrelated factors: intellectual abilities, knowledge, style of thinking (especially legislative), personality traits, motivation of an internal nature and the environment (supportive social environment), (Sternberg, 1996, 2003).

Innovative solutions for the technological, organizational and social problems are not possible to be used without a creative approach. The creative process used to generate innovation can be recognized in terms of a creative problem-solving system (creative problem solving – CPS), (Proctor, 2003). Intuition and intuitive thinking plays a special role in the process of a creative problem solving for innovation. They facilitate the search for new solutions and applications. Features of intuitive thinking (intuitive intelligence) are unconscious, non-verbal, emotional and heuristic (Runco, 2004, 2012; Dobrołowicz, 2001). Distinctive competences (differentiating competences) – employee's competencies effectively distinguish it from other such as leadership, empathy, future orientation, readiness to learn, focus on creativity, tolerance and ambiguity, awareness of the value (Pocztowski, 2008). The effective management played an important role in the works of the personality associated with the concept of creativity. Persons succeeding in creative entrepreneurship show a characteristic configuration of management features for creative people (Strzałecki, 2001; Stasiakiewicz, 1999; Nosal, 1993; Dąbek et al., Jarmuż, Witkowski, 1994). The results of empirical research on the sources of success in business and management, show that the main determinants of this success – the ability to take risk, optimism, hope, sense of coherence, are derived from the ability of transgression. Previous studies on the effectiveness of the functioning of entrepreneurs and managers indicate a high level of creative behavior expressed in an creative base of openness to innovation (Goszczyńska, 2006). Creative management is defined as willingness and ability to make and implement new, courageous changes (Tyszka, 2004). It can also be a creative management of people and resources, including informational (Strzałecki, 2001) and creative management (Strzałecki, 2003). Disposition of taking economic and entrepreneurial behavior is a complex syndrome of personality traits that sets high achievement motivation, readiness to take risks, as well as a high level of innovation. People with such system characterized by symptoms often manifest characteristics of entrepreneurial behavior in situation tasks (Glăveanu, 2014). Important proactivity variables are: style creative behavior, entrepreneurship, belief in self-efficacy (Crant, 1995, 1996; Bateman, Crant, 1993; Silvia et al., Beaty, Nusbaum, Eddington, Kwapil, 2014). Proactivity is a purposeful activity, aimed at making and implementing changes, initiating and using the occasion (Bańka, 2005, 2007; Bańka, Hauziński, 2015). Proactivity is a form of building forms of capital career (Lamb, Sutherland, 2010).

An example of this study demonstrates the growing importance of creative resources of individuals and their implementation in the field of management, entrepreneurship and innovation. The previous studies, to the small extent, took into account the subjective features of the creativity (cognitive and characterological sphere) and their relationship with predisposition for transgressive behavior. Question of the relationship between these variables requires further in-depth empirical studies.

1. Research hypothesis

The aim of the study is to demonstrate that effective management mechanisms play an important personality, tied the theory and practice of the concept of creativity and transgression. The effective and creative management mechanisms are an important personality bonding to the transgression. Persons receiving success in creative entrepreneurship and management exhibit a characteristic configuration of the characteristics of creative people.

The obtained results of the research provided new data on the inter-relationships between symptoms of creative features and indicators of transgressive behavior. The main issue was presented in the form of a question about the relation between the occurrence of subject creative features and subject-causative activities and transgressive behaviors. It was assumed that in the pursuit of creative competencies[1], subject creative features and subject-causative activities (Non-Conformism-Conformism) are positively connected with transgressive behaviors and activities directed at changes (hypothesis 1). The author adopted the assumption about a role of transgressive behaviors in dynamics of creative behaviors (creative resources), (hypothesis 2). Transgressions are innovative and creative activities. A transgressive concept of a man, focused on change and development, assumes that human behavior is an intentional and autonomic activity which is purpose-oriented and aimed at surpassing possibilities (Kozielecki, 1987/1999, 2001/2007). Non-conformism as a personality trait is an indispensable characteristics of creative people. Positive personality activation is defined as an active set of non-conformism traits stimulating the individual's potential for creativity in terms of cognition and realisation. A person's positive personality activation improves the likelihood of efficient and constructive utilisation of one's cognitive potential, the ability to defend one's own creations and convince others to acknowledge their value. This active attitude is based upon such traits as: high self-esteem, spontaneity, activeness, resilience and perseverance, as well as independence (Popek, 2001; Popek, 2010).

1 The concept of a theoretical structure of the model of creative competencies (which was proved before) assumed the following: 1. Creative competencies are a descriptive dynamic category of a processual nature; 2. Creative competencies are a complex phenomenon both at inter-personal (subject differences) and intra-personal (individual) level. They constitute inter-individual and intra-individual subject resources; 3. Creative competencies' character is revealed as a potential: developing-adaptive, subject-causative, changes-oriented – transgressive and individualized (Wróblewska, 2015).

2. Research methods

The following set of methods was applied in the research: 1) Questionnaire of Creative Behavior KANH (Popek, 2001; Popek, 2010); 2) Scale to Measure Transgression (STr), (Studenski, 2006). The KANH Questionnaire of Creative Behavior is probably one of the most esteemed and most often used questionnaires in Poland when it comes to diagnosing the general creative and imitative abilities of people. The Questionnaire comprises 60 statements, all in the form of declarative sentences. The KANH includes four subscales: (K) Conformism and (N) Nonconformism, belonging to the emotional-motivational sphere, as well as (A) Algorithmic Behavior and (H) Heuristic Behavior, belonging to the cognitive sphere. The subscale of Conformism and Algorithmic Behavior account imitative attitudes, while the subscales of Non-conformism and Heuristic Behavior measure creative attitudes. Each of the subscales controls 15 traits distributed dichotomously, as continuous traits (continuum). In the revised version KANH III the number of questions was reduced from 60 to 26, diagnosing 13 traits on the conformism – non-conformism scale and 13 on the scale of heuristic behaviour – algorithmic behaviour (Bernacka, 2008).

In this study placing a bed of a total of 12 variables: six dimensions of the model of creative attitude and six behavior transgressive factors to test hypotheses statistical model of factor and correlation analysis was used.

Women and men in the first decade of early adulthood within the age range (20-23 years old), a middle phase (24-29 years old), and people over 29 years old (30-35 years old) were invited to take part in the research. 350 individuals altogether between 20 and 35 years of age took part in the research (including 290 women and 60 men). The participants were students of the University of Bialystok. The sample selection was purposeful. The survey was anonymous.

Research was carried out in the annual period of time.

3. Research results

We reported a higher percentage of very creative individuals within the group of respondents over 29 (due to a significantly higher level of a subject-causative activity). The results show increased predisposition to transgressive behavior among men in gender-distinct groups (men and women). Higher indicators of transgressive behavior among men were observed within the scope of the attitude to dominate others, extending one's rights and influence and courage to undertake new tasks that are difficult and risky. As expected, the level of willingness to undertake transgressive behaviors varied with age in the examined group. The obtained results indicate that people above 30 are more often characterized by a high level of transgressive behaviors.

The analysis helped to develop the characteristics of a factor activity aimed to change (Tab. 1).

Five features, that is high self-esteem, openness, activity, courage and adaptive flexibility, decided about the essence of Non-Conformism's subject activation factor. The features obtained in the factor structure of Non-Conformism, correspond to the characteristics of a creative and innovative style of functioning.

The values of Pearson's correlation of Nonconformism, Conformism, Heuristic Behavior, Algorithmic Behavior (Questionnaire of Creative Behavior KANH) and scale factors measured Transgression (transgressive behavior), (Scale Factors measured Transgression STr) are presented in Tab. 2.

The higher the level of a creative attitude (N+H) and its elements in the cognitive (H), (heuristic behaviors) and characterological (N), (non-conformist orientation) sphere, the stronger the relations with different manifestations of transgression: disposition to dominate others, motivation to enrich competencies, innovation in designing new solutions, and courage to take up new tasks. Subject of non-conformist (N) features which were connected with transgressive behaviors included the strongest: predominance, activity, courage, spontaneity, consistency, originality, and high self-

Tab. 1. The structure of the scale factor Nonconformity - varimax rotation

Ma*				
Dimensions Nonconformity	Factor analysis			
	1	2	3	4
N15 High self-esteem	0, 675			
N10_Openness	0, 669			
N2_Activeness	0, 632			
N6_Courage	0, 623			
N3 Resilience	0, 398			
N8_Self-organization		0, 654		
N7_Dominativeness		0, 591		
N9_ Adaptive flexibility		0, 547		
N4_Originality		0, 473		
N12 Independence			0, 743	
N13_Self-criticism			0, 696	
N14_Tolerance			0, 577	
N1_Indepedence				0, 727
N5_ Consistency				0, 665
N11_Perseverance				0, 652

* – The method of extracting factors – the main components
Rotation method - varimax with Kaiser normalization.

Tab. 2. The values of Pearson's r correlation of Nonconformism, Conformism, Heuristic Behavior, Algorithmic Behavior (KANH) and Scale Factors measured Transgression (STr)

FACTORS MEASURED TRANSGRESSION SCALE							
KANH		**T1**	**T2**	**T3**	**T4**	**T5**	**T6**
K	Pearson's correlation	-, 326**	-, 196**	-, 137**	-, 380**	-, 021	-, 225**
	(one-sided)	, 000	, 000	, 009	, 000	, 358	, 000
A	Pearson's correlation	-, 105*	-, 190**	-, 115*	-, 288**	, 021	-, 094
	(one-sided)	, 035	, 000	, 024	, 000	, 362	, 053
N	Pearson's correlation	, 353**	, 347**	, 272**	, 306**	, 282**	, 355**
	(one-sided)	, 000	, 000	, 000	, 000	, 000	, 000
H	Pearson's correlation	, 355**	, 129*	, 288**	, 219**	, 256**	, 328**
	(one-sided)	, 000	, 013	, 000	, 000	, 000	, 000
K+A	Pearson's correlation	-, 254**	-, 218**	-, 143**	-, 382**	-, 002	-, 186**
	(one-sided)	, 000	, 000	, 007	, 000	, 484	, 001
N+H	Pearson's correaltion	, 396**	, 273**	, 313**	, 296**	, 302**	, 383**
	(one-sided)	, 000	, 000	, 000	, 000	, 000	, 000

** – Correlation significant at the level at the 0.01 level (one-sided); * - Correlation significant at 0.05 level (one-sided)

esteem. Activity, predominance, courage and high self-esteem – main indicators of functioning a man with a high level of subject creative features – have proved to be significantly correlated with transgressive behaviors' indicators.

Subject creative features combine positively with transgressive behaviors being taken up. Subject-causative activity (Non-Conformism) is positively connected with taking up and realizing transgressive behaviors and changes-oriented activities. Subject creative features expressed in a creative attitude coexist with transgressive behaviors: pro-creative motivation in searching for changes (T1), non-conformism (T2), focus on activity and overcoming problems (T3), openness and courage to take up new tasks (T4), innovation (T5) and acceptance of novelty (T6)[2].

2 The achieved research results allow to assume three basic strategies of the implementation of creative competencies (creative subject and transgressive resources) in adult life. The first one is the strategy (a concept of functioning) of adaptive (conservative, adaptable) realization of creative competencies (potential, subject resources). The second one is a creative (innovative) strategy, whereas the third one – balanced (harmonious), (adaptive-innovative). All three strategies derive from the need to create, which is developmental power and dynamism of any activity where human potential is realized (Wróblewska, 2013, 2015).

4. Discussion of the results

The obtained results of the research provided new data on the inter-relationships between symptoms of creative features and indicators of transgressive behavior. It is difficult to determine the direction of the relationship between the studied variables. Do subjective characteristics cause creative transgressive behavior? Does making transgressive behavior affect the growth level of creative attitude and its components? In Popek`s opinion the dichotomy of adaptation and creation is a trait characteristics of human existence and the two types of functions are inseparable (Popek, 2010).

The resulting configurations of features in a range of variables (characteristics of creative and transgressive behavior) corresponded to factors conditioning the success in business and management (Stasiakiewicz, 1999; Strzałecki, 2001; Bańka, 2005; Bańka, Hauziński, 2015). Creative competencies and transgressive behaviors are a specific resource. Creativity in the management (including personal resources and capabilities) requires activity, independence, action orientation and overcoming difficulties, the courage to take on new tasks, openness and acceptance of something new. Willingness to take creative and transgressive behavior is a complex syndrome of personality traits. It determines the willingness to take risks. People with such system characterized by symptoms often exhibit characteristics of innovative approaches, creative and entrepreneurial in task situations (differentiating competences of management wizard). In the pursuit of fulfillment and inner potential development, motivation derives from two basic needs: competence – impact on the events and effects of activities, and autonomy – acting with a sense of choice freedom. Subject creative features combine positively with transgressive behaviors being taken up. The obtained results indicate that people above 30 are more often characterized by a high level of transgressive behaviors. Within the group of respondents over 29, we reported a higher percentage of highly creative individuals (due to a significantly higher level of subject-causative activity). Considering creative competencies from the transgressive perspective, it is worth pointing out that similar to the creative approach, they present a man as an active person creatively transforming his/her environment and himself/herself. A creative person is functioning in connection with a specific mechanism which essence is the interaction operating in accordance with the principle of feedback of the following elements: 1) potential cognitive creative talents or gifts; 2) personality activation – halting or stimulating activity of emotional and motivational sphere upon creativity development in the cognitive sphere and its manifestation in one's behavior; 3) the evaluation of the effects on one's own activity – creative or adaptive (Popek, 2001; Popek, 2010).

The obtained results of research could enrich the existing scientific achievements in the field of management of important determinants and correlates subjective features ensuring success. It is defined by a transgressive action – as a kind of activity type to be changed. Subjective characteristics of the creativity (creative assets) increase the efficiency of action.

Conclusions

This article analyzes the determinants of subjective qualities of creative and transgressive behavior in the context of the model of the creative management determinants. Creative resources symptoms were included in the term of success determinants. What is the novelty of this scientific work?

First: research project was based on the concept of man's transgressive feature Kozielecki (1987/1999, 2001/2007). A transgressive concept of a man, focused on change and development, assumes that human behavior is an intentional and autonomic activity which is purpose-oriented and aimed at surpassing possibilities. Transgressions are innovative and creative activities. They let man go beyond the limits of his/her previous functioning, thus allowing acquisition of new areas of activity, or the formation of new values. Secondly: The authoress has adopted the assumption about a role of transgressive behaviors in dynamics of creative behaviors (creative resources). Thirdly: Considering creative competencies from the transgressive perspective, it is worth pointing out that similar to the creative approach they present a man as an active person creatively transforming his/her environment and himself/herself. He/she is an active creator, capable of transgressive thinking and behavior concentrated on change and development.

Fourthly: These human resources are potential correlates of a success in creative managing. Creativity in management – is a creative management one of the

symptoms of human resources? Activity, predominance, courage and high self-esteem – main indicators of functioning of a man with a high level of subject creative features – proved to be significantly correlated with transgressive behaviors' indicators. It may mean that subject creative features supported by predisposition to transgressive behaviors (and the opposite) are important personal resources – components of human capital.

Subject creative features expressed in a creative attitude coexist with transgressive behaviors: pro-creative motivation in searching for changes, non-conformism, focus on activity and overcoming problems, openness and courage to take up new tasks, innovation and acceptance of novelty. Subject non-conformism features which were connected with transgressive behaviors included the strongest: predominance, activity, courage, spontaneity, consistency, originality, and high self-esteem.

At the same time, it serves personal potential enhancement and is connected with the achievement of well-being. What is more, it increases an ability to perceive the environment in accordance with one's needs and values. It influences development of a sense of self-authorship and competence. It allows to take up a challenge. It stimulates development of positive interpersonal relations and social contacts and has impact on personal development. It is not only success that makes man happy, being happy brings success too.

Success-orientation – is a belief that fate favors individuals in realizing their goals, positive thinking – is positive expectations, positive thinking, acceptance of oneself and the environment, openness – is readiness for new and not typical experiences, risk acceptance.

Referring to the model of well-being proposed by Ryff (1989, 1996) we may suppose and assume with a high degree of likelihood that in the case of people with a high level of creative attitude and subject-causative activity (Non-Conformism), the following dimensions of well-being refer to them: autonomy, control of the environment, self-acceptance, personal development, a sense of having a goal in life, and positive relations with other people. These aspects create favorable conditions and a kind of readiness for development understood as the process of actions' pursuit initiated actively and purposefully by an individual.

The limitation of the study is a sampling of research. It was not recruited from specialty area of management. It would therefore make replicas studies involving a group of people associated with the field of management, entrepreneurship and economics. As noted in the introduction question of the relationship of measured variables requires further in-depth empirical studies. The proposals for future research and exploration in this area may include the following questions: what kind of subjective creative qualities and transgressions take part in the implementation of the objectives and tasks in specific areas and fields of management? Is there a relationship between creative management and creative management results? What specific creative results in the management can raise the creative potential of a human and his ability to constantly push the boundaries?

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Towards performance culture via learning culture: lessons from Poland

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ABSTRACT

To enable the public administration the effective realisation of public tasks in dynamically changing, contemporary reality it was necessary to replace the traditional methods of administrating by the New Public Management and New Governance instruments. At the beginning of this century the Polish Ministry of Finance (MF) has begun to implement these tools, including performance budgeting (PB) aiming at increasing of the efficiency and effectiveness of public spending. MF improves their methods and strategies, thus it is a learning organization as evidenced by the numerous documents prepared by MF. To identify the learning disabilities in PB implementation process in Poland, we use the non-reactive research method based on the analyses of the content and the evolution of documents issued by Ministry of Finances covering the period 2005-2014 and we analyse the publications evaluating PB implementation in Poland, including the reports of the Polish Court of Auditors, as well. The research problem is the answer to the question: in which way learning disabilities in the performance budget implementation process make the effective implementation of the performance budgeting in the Polish government sector more difficult from the perspective of the Senge's theory of learning organization. The aim of the paper is to indicate the way to improve the performance budgeting implementation process. We conclude that even if the new concepts require the transformation of the public administration unit into more adaptive learning organizations, the appropriate learning methods and strategies were not sufficiently implemented in MF. Therefore, it was possible to achieved the main objective of PB only to a limited extent.

KEY WORDS

performance budgeting, learning disabilities, Ministry of Finances, Poland, Court of Auditors

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Introduction

For several decades the old, traditional methods of bureaucratic administrating in the public sector are being replaced by the New Public Management that has initiated the „performance culture" or „performance orientedness" of public administration (van Dooren et al., 2010). These changes aim to fulfil public tasks more effectively and efficiently in the contemporary, dynamically changing reality. At the beginning of this century Polish authorities have initiated the implementation of these tools, including a performance budget (PB). However, all over the world this process faces difficulties having the practical, political, managerial and psychological explanations (Behn, 2002). Also in Poland this process is subjected to the criticism of academics and the Polish Court of Auditors. Thus, the research problem is the answer to the question: in which way learning disabilities in performance budget implementation process make the effective implementation of the performance budgeting in the Polish government sector more difficult from the perspective of the Senge's theory of learning organization. The aim of the paper is to indicate ways to improve the performance budgeting implementation process.

1. Literature review

Performance budgeting is an instrument of New Public Management aiming at reinforcing effectiveness, efficiency and transparency of public spending. This institution, originating from private sector, gradually replaces the traditional public spending budgetary classification and enables to obtain information not only about the amounts destined from public budget for specific organs or public policies but also about the results of public spending. According to the definition of OECD (2005), performance budgeting is defined as the management cycle under which programme performance objectives and targets are determined, managers have flexibility to achieve them, actual performance is measured and reported, and this information feeds into decisions about programme funding, design, operations and rewards or penalties. According to the wider definition proposed by Robinson and Last (2009) performance budgeting should be understood as all mechanisms and processes used in the public finance sector that aim at improving the efficiency and effectiveness of public expenditures by linking the funding of public sector organizations to the results they deliver, making systematic use of performance information. Often, the implementation process encounters the difficulties. For instance, instead of using performance management to make evidence-based policy some public managers use it as policy-based evidence to justify a predetermined policy (Taylor, 2014). In other cases the performance information is ignored by decision-makers (Pollitt, 2006; Taylor, 2009).

One of the reasons is that the PB implementation process constitutes the element of learning process in public sector units. A learning organization is characterized by such features as: providing learning opportunities and using a learning process to reach goals, making it safe for people to share openly with each other and taking risks, linking individuals with the organizational performance, embracing creative tension as the source of energy and renewal (Argyris, Schön, 1978). A learning organization can also be understood as the one that facilitates the learning of all its members and transforms itself continually (Pedler et al., 1989). N. Dixon indicates that the essence of the learning organization is its ability to use mental capacity of all its members to create processes that will improve its own capabilities (Dixon, 1994). Modern reality requires managing new challenges in public activity because of fast changing situations and relations which can be very difficult to predict. That is why the representatives of public administration must withdraw from a traditional approach to managing, searching thereby for new solutions to help them to adapt to contemporary realities. It is important to understand at the beginning of this paper that though the concept of Learning Organization may seem to be a new one, it was created by Senge in his book „The fifth discipline. The Art & Practice of The Learning Organization" in 1990. The author (Senge, 1990) defines a learning organization as one that has the capacity to continually enhance its capabilities to shape its future and indicate disciplines which an organization should be enhanced, that is: shared vision, mental models, personal mastery, team learning, systems thinking.

2. Research methods

To identify the learning disabilities in the PB implementation process in Poland, we use the unobtrusive research methods of studying social behaviour without affecting it (Babbie, 2007). We use two types of unobtrusive research, that is content analysis and comparative and historical research, both having the qualitative character.

Firstly, the content analysis meaning „the study of recorded human communication" (Babbie, 2007) encompassed the content of legal acts voted by the Polish Parliament and other documents issued by MF, including the legal provisions determining the legal frameworks of PB (for example the Public Finances Act and the further amendments thereof), the Multi-Year State Financial Plans, the regulations issued annually by MF determining the framework of methodology of Polish PB and containing instructions to subordinate units and the structure of PB, finally the state performance budgets for particular years. We have chosen the documents issued by the Ministry of Finances because it is a unit mainly responsible for PB implementation and because it has still been improving its method thus it is a learning organization. In addition, the conclusions from the comprehensive control of PB implementation process carried out by the Polish Court of Auditors (Najwyższa Iza Kontroli, 2012), as well as the literature discussing the process of learning by organizations and PB issues were important sources of information.

Secondly, we have carried out the comparative and historical research. This method enabled the evaluation of historically consecutive instruments aiming at the implementation of PB in Poland and was used to analyse the learning process of MF for the purpose of learning disabilities identification. The study covered the comparative analysis of legal acts and documents prepared over the period 2005-2014.

3. Learning disabilities in performance budget implementation process in Poland

As we can see from the abovementioned features, a learning organization is one that sees learning process as a factor that leads to achieving expected changes in fundamental organizational assumptions and values. This kind of organization notices how important it is to learn, especially using the adaptive or corrective learning which is complemented by the process called learning to learn (this process is also called the generative learning). There are several studies relating to the learning process and learning disabilities (Levinthal, March, 1993; Hodgkinson, 1998; Lähteenmäki et al., 2001; Smith, Elliott, 2007). Nevertheless, as research of Senge's (1990) indicates, most of organizations learn poorly. The author points out that the reasons for this situation are for example the way organizations are designed and managed, the way people's jobs are defined, and most importantly the way we have all been taught to think and interact (not only in organizations but more broadly). These reason create seven fundamental learning disabilities, that is: „I am my position", Wydawnictwo Naukowe PWN „the enemy is out there" syndrome, the illusion of taking charge, the fixation on events, the parable of the boiled frog, the delusion of learning from experience, the myth of the management team. To achieve our scientific aim we concentrate on the first three of them by illustrating their existence with some examples summarized in Tab. 1.

Tab. 1. Learning disabilities in PB implementation process in Poland

Name of learning disabilities	Manifestations of existence of the learning disabilities in the PB implementation process in Poland
I am my position	• lack of common guidelines concerning methods determining: indicators values, collection and processing of data needed to calculate the indicators values, criteria for measuring and evaluating the activity, and finally internal control of the reliability of presented results that would be applicable for all public administration units • two separate budgets, deadlines motivating for preparation traditional budget first, PB next • two separate IT tools • trainings addressed to public administration only: PB implementation is an internal matter of public administration
The enemy is out there	In 2012 Court of Auditors has negatively assessed the PB implementation process in Poland. MF: • explained that it acts according to its schedule for 2008-2015 • explained that after the Court of Auditors' control, MF issued two regulations concerning the performance reporting and accounting (however lack of substantial discussion about their content) • tried to justify the state of the works on PB by the international experiences and the complexity of the implementation process • drew attention to the minor linguistic inaccuracies in the report
The illusion of taking charge	• insertion of PB in the justification to the Budget Bill • withdrawal from the plans of replacement the traditional budgeting by the PB • withdrawal from obligatory implementation of the PB at the local level • lack of information about the costs of public services • lack of substantive evaluation of the training

The first of the learning disabilities in the one called by Senge I am my position. The learning process can by impeded by the identification of individual employees with their positions. Senge emphasizes that people are trained to express loyalty to their jobs in the way that they can confuse them with their own identities (Senge, 1990). More precisely – when employees concentrate only on their workplace and own positions, it is very difficult to carry out the learning process which also refers to the responsibility for the overall results of the work. People tend to focus all of their involvement on their own position thus they feel minor responsibility in relation to the performance of the whole organization. This can lead to a situation when we cannot see how our actions affect the rest of the organizational system.

Let us give some examples of this learning disability on the basis of Polish administration entities implementing the PB concept. Firstly, to evaluate the activity of the public administration units, PB concept assumes usage of objectives and indicators. However, as the control of the Court of Auditors has shown (Najwyższa Izba Kontroli, 2012) in Poland there are no common guidelines concerning methods determining: indicators values, collection and processing of data needed to calculate the indicators values, criteria for measuring and evaluating the activity, and finally internal control of the reliability of presented results that would be applicable for all public administration units obliged to prepare their financial plans in the traditional and performance form. In consequence, typically the situation presents as follows: an administrator of budgetary funds proposes a set of indicators that should be used to their units evaluation, then they plan the indicators values based on their own experience and without any obligation to justify the proposed values, and finally they calculate (determine) the accomplished indicator value to place them in the report on the state of performance budget execution (Misiąg, 2013).

Secondly, in Poland the traditional budget still constitutes the basis of expenditure allocation decisions. Thus, to make sense of the PB that it would not only be a pointless, additional administrative staff obligation, but have an impact on decisions about the allocation of public funds, in the first place the tasks expenditure should be planned, and only on this basis the expenditures of traditional classification should be decided. In practice, however, the order of obligations fulfilment depends on the deadlines for submission of the two kinds of plans. Therefore, there was a legal obligation in 2008 and 2009 to depose the traditional plans for the following year earlier than the performance ones. Since 2010 these deadlines have been the same, however it is not a fully satisfactory solution yet. To motivate the employees to start the planning with PB tasks, the deadlines for preparation of the traditional plans should be extended because usually busy employees plan to fulfil the realisation of their obligations on time, even if the legal provisions have the inverse effect on the PB idea.

The second learning disability is the syndrome called the enemy is out there. It is a human tendency to find fault in everything and everyone around us instead of admitting our own fault. This disability is seen as a byproduct of I am my position, because of the non-systemic models of looking at the situation, but Senge (1990) indicates that it is not limited to assigning blame within the organization. When we blame enemies out there it is almost impossible to effectively implement the learning process, because appearing problems are not solved globally. We fail to take responsibility for our actions – instead we prefer to see the blame in the unknown „them". One should notice that mentioned out there and in here usually are a part of a general system. That is why Senge (1990) explains that this learning disability makes the detection of the leverage, which we can use „in here" on problems that straddle the boundary between us and „out there", almost impossible.

The opportunity to observe the existence of the analysed learning disability arises from the results of the control carried out by the Court of Auditors at the turn of 2011/2012 in MF and nearly 50 other units of the public finance sector. As a result, the Court of Auditors highlighted a number of weaknesses of the PB implementation and negatively assessed the actions, methods and rules of this process (Najwyższa Izba Kontroli, 2012).

Our analysis of the MF official answer on the Court of Auditors control conclusions shows that according to the controlled unit, the Ministry should not be regarded guilty for the state of the implementation works. MF explains that it acts according to its schedule for the PB implementation which provides gradual preparation and introduction of particular elements of PB. Additionally, all the conclusions of the Court of Auditors were related to the state before 30th September 2011, whereas after this date, MF undertook a number of activities resulting from the schedule, primarily it issued two

regulations concerning the performance reporting and accounting. MF suggests that if the control had taken place later, the conclusions would not have been so severe. Interestingly, MF does not refer to the content of these regulations only indicating the formal aspect of issuing them. Moreover, MF does not take into consideration that perhaps the adopted schedule is too spread over time and some important decisions should be taken earlier. MF tries to justify the state of the works on PB in Poland by the international experiences and the complexity of the implementation process. Interestingly, it also drew attention to the minor linguistic inaccuracies contained in the report.

The third learning disability called the illusion of taking charge usually is understood as facing up difficult issues without waiting for others to react and solve the problems before they will evolve into a bigger crisis. Senge (1990) explains that being proactive is frequently seen as an antidote to being reactive – waiting until a situation gets out of hand before taking a step. Often not real pro-activeness but a well disguised re-activeness is observed. The genuine pro-activeness should come from understanding how actions contribute to problems. Individuals raise their capability to handle certain problems – usually in a single situation – while they should focus on trying to reduce or eliminate the cause of the problems.

The inclusion of PB (in the economic and not legal terms) in the justification to the Budget Bill, as it has been taking place since 2008 till now, may only enable obtaining the information about the effectiveness and the efficiency of public spending (providing that it contains relevant indicators) without the enhancement possibilities. To make from the PB a tool enabling the public managers to improve the efficiency and effectiveness of public spending it is required to replace the traditional budget by the performance one. Only in such a situation is it possible to confer a sufficient space of action flexibility on them and to account them for the results of public policies. The Polish government in Convergence Programme – 2005 Update announced, without specifying the date, the replacement of the traditional budget by the performance one. The plans of total resignation from a budget in its traditional form and transition just to the performance one after the 2011 was confirmed in the next year. However, till now these plans were not realised.

Let us now concentrate on the lack of information about the costs of public services. On the one hand, in 2005 the government has announced the introduction of the Low Cost Country programme that would be realised, inter alia, thanks to the introduction of PB and radical changes through cutting unnecessary posts, reduction in the number and use of work cars etc. On the other hand, as Płoskonka explained in 2013, there are still no analysis concerning for example the costs of using work cars by senior officials. As he explained, when the controllers of the Court of Auditors calculated that the cost of 1 km is about 12 PLN whereas a taxi driver takes about 2 PLN, the public administration officers say that it must be a mistake in the calculation (Nędzyński, 2013). Let us give just one another example of the excessive expenditure for the consultations of speeches of Sikorski, Minister of Foreign Affairs, even though the Ministry employs an expert in English translation it spent about 250,000 PLN for the consultations of 14 speeches by the former ambassador of Great Britain in Poland and privately an acquaintance of Sikorski (TVN24, 2015). To compare, the cost of correction of one page of a text by a certified translator in Poland is about 20 PLN. Let us give another example. Till the end of 2014, seven training editions co-financed from EU funds were realised. For instance, in the last 2014 edition, 2159 employees of public administration took part in such trainings. On the website of the Ministry of Finance the following information (even illustrated by graphs) is presented: training participants number, their age, working place, the results of surveys presenting opinions of participant about: the content of the training, the coach, the results of preliminary and final tests as well as the organisation (including catering, participants accommodation, lighting of training rooms). However, the most essential information, that is the content of these trainings, is not public. We only know from the notice about public procurement that the training materials (accepted by MF) must be prepared and distributed to the training participants. Publishing these materials would enable obtaining the knowledge by a wider group of people, including deputies and citizens. Without knowing these materials it is not possible to make the most important task, that is substantive evaluation of the training. What is more, the consecutive training editions are realised by different companies selected in the procurement procedure, employing their own coaches. In consequence, they may present their own vision of PB more or less agreed with the Ministry of Finance. Moreover, the fact of spending important funds on such trainings

does not guarantee at all that PB implemented by trained public administration employees will enable to improve the effectiveness and efficiency of public spending.

4. Discussion of the results

The above analyses proved the existence of the first three learning disabilities defined by the Senge. The first of them, I am my position caused that PB implementation is considered as the internal matter of MF which has no relation with the traditional, even still exclusively binding, budgeting method. Even if the public administration employees fulfil the obligations resulting from the PB implementation process, the MF concentration on the realisation of the consecutive steps of PB implementation schedule and the lack of the factual collaboration between the legislative, executive and control bodies make impossible the successful implementation of this public management reform. The existence of the second learning disability, the enemy is out there caused that after negative appreciation of PB implementation by the Court of Auditors, the MF management felt no guilt for these results trying to explain it with the time of the control, difficulty of process and even the international experiences. Particularly severe consequences for the future of PB has the third learning disability, that is the illusion of taking charge. In consequence, there is still no PB in legal sense in Poland, instead we have the empty PB notion (Lipszyc, 2011) that does not allow to obtain the crucial information about the public task effects and the public expenditures.

We conclude that even if the PB concept requires transformation of public administration units into more adaptive learning organizations, appropriate learning methods and strategies were not sufficiently implemented in the MF. Therefore, it was possible to achieve the main objective of PB only to a limited extent. The existing barriers should be eliminated to move via learning culture to performance culture.

Conclusions

Marquardt and Reynolds (1994) provided thirteen connected steps for building organization's learning capacity. We consider that all of them could play an important role on the way towards performance culture in Poland, however four of them seem to be particularly valuable in this context.

Firstly, team learning activities should be developed and expanded. Currently, the main way of the Polish public administration employees upskilling in the field of PB is participation in trainings, whereas less than 10 percent of the learning that occurs in the classroom is ever transferred to the job (Marquardt, Reynolds, 1994). Even if a coaches, chosen via the public procurement, are experts in PB, they are also from outside of the organisation, so they cannot fulfil the function of a leader who is capable of pushing the introduction of changes in PB, developed jointly during the training, into practice. We recognise the need for the team learning activities, involving (apart from the public administration employees of different levels) also: the employees of Prime Minister Offices and MF who are decision-makers in the PB, parliament representatives involved in this way in the government activity control and finally private sector entities, so as to enable public entities to perceive the public spending process through the lens of entrepreneurs, who are permanently looking for efficiency and effectiveness of their business activities. Such team learning activities would have positive implications especially for indicators quality (since the idea of indicators database have not worked) as well as for all PB methodology.

What is more, the role of a public manager should be changed. The PB concept assumes using the indicators to improve effectiveness and efficiency of public administration. Currently, in Poland the indicators system enables at most the measurement of effectiveness and efficiency, however it does not allow to enhance them. The statement that PB enables the transition from the passive administration to the active management in the Polish context has only theoretical value. If we want the public managers to have active influence on the quality of public policies, their action flexibility should not be limited by the traditional expenditure classification. Public agents who concentrate mainly on the respect of detailed expenditure limits and on making legally allowed changes in the budgetary lines cannot focus on finding the way to increase public performance. The change of the managers' role would have crucial influence on the learning processes. Managers having action flexibility would have more chances to introduce innovative ideas and test their efficacy in practice. The role of public managers, accountable for achieved results and properly motivated by financial

and promotion means, should consists of searching solutions of public sector efficacy and effectiveness improvement.

In consequence, the bureaucracy, if not rooted out because it fulfils the ordering role, should be restricted. The PB assumptions and methods strongly vary from traditional budgeting and require more flexibility. To move from the funds culture to performance culture, not only formal changes but mainly mental ones should be taken.

Finally, creating a culture of continuous improvement is needed to gather and use the information about tasks costs. A key role in this regard could play the Department of Expenditure Policy, recently created in frame of the Ministry of Finances. However, this organizational change of ministry structure will not be sufficient without the actual change of the expenditure planning philosophy indispensable for the PB implementation[1].

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